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 information on private equity (PE) investors, we argue that PEs took a positive role in stabilizing the financial system in the crisis through their resolution of failed banks. We show PE acquisitions were economically important, accounting for a quarter of all failed bank assets acquired in the resolution process; PEs acquired underperforming and riskier failed banks, focuing on and providing complementary capital in areas where the local potential bank acquirers were themselves distressed. Using a quasi-random empirical design, we investigate subsequent performance and effect on the local economy. We find PE-acquired banks performed better, and that this, in turn, benefited local economic recovery. Our results support a positive role of PEs in the crisis in failed bank resolution.

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1. Introduction

Private equity (PE) has become an important component in the financial system. The PE asset class reached $1.6 trillion in global transaction value before the financial crisis, between the years 2005 to 2007 (Kaplan and Stromberg 2009). An extensive literature explores the effects of private equity on firm-level outcomes, such as employment, productivity, product quality, innovation, and others, with some papers arguing that private equity firms positively affect the operations of target companies.[1] At the same time, the private equity industry generates much controversy. Critics of the private equity 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. 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 bad times. In this paper, we shed light on the role of PEs in the financial system by directly investigating their interconnections with the banking sector during the crisis. Specifically, 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).

While there are concerns, as described above, that PEs could exert negative forces on financial stability, they 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. If this were true, PEs would complement the bank acquirers through the "selection" of the banks. Second, during those financial downturns, PE may have the expertise to turn-around adverse economic situations (Jiang, Li, Wang, 2012; Hotchkiss and Stromberg, 2014) and have relatively more stable funding (Bernstein, Lerner, and Mezzanotti, 2019). As a result, they may do well in bringing in a positive "treatment" effect on the recovery of the failed banks.

[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).

In this paper we take a first stab at the following questions. How economically important are PEs in failed bank acquisitions and why? Were PE acquisitions of certain kinds of banks? What, if any, is the interactive effect with the natural failed bank acquirors – local banks - were PEs complements or substitutes to failed banks? How did PE acquired failed banks perform? What was the real effect on the local economy?

We are able to address these questions by accessing 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 bidder of the failed bank's assets in failed bank auctions, as well as acquirer 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. PEs bid for, and eventually acquire, failed banks that are of poorer quality and higher risk compared to those bank-acquired. 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.[2] We show that PE-acquired banks on average hold 27 percent more C&D loans.

We further find that PEs 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

[2] As the FDIC describes in its history of the crisis, "Most banks that failed or became problem banks did so because of large concentrations of poorly underwritten and administered commercial real estate loans and (especially) ADC [acquisition, development & construction] loans." These loans are risky for a number of reasons – for example, projects may experience a lack 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.

informational benefits and economies of scale. Hence the natural acquirors are healthy local banks. We show that failed banks whose neighboring banks are in worse health are more likely to be acquired by PEs. PE acquisitions happen more often in regions that have a more distressed banking sector—when neighboring banks have lower tier 1 capital, higher C&D loans and higher other real estate owned (OREO), which are often distressed real estate properties held by the bank due to foreclosure.

The evidence thus far 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 addition, PEs provide complementary 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 the crisis would have been liquidated. In total, we estimate that PE acquisitions allowed the FDIC to reduce the resolution costs by $3.63 billion.

The next question that naturally arises: 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 the performance of banks is, unfortunately, 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 the 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. 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 in this specific set of banks. Indeed, in this quasi-random sample, PE-acquired banks and bank-acquired banks look statistically identical along dozens of characteristics.

Armed with this empirical strategy, we explore several different performance metrics. First, we track branch closures of acquired failed banks. We find 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 marginally 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 find the higher rate of branch closure in bank-acquired banks is also associated with a higher probability of exiting a county altogether.

Among branches that remain open, we investigate the deposit increase over a three-year window after the acquisition. As above, our specifications allow us to control time trends in each geographical region. 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 branch closing and deposit evidence combined suggests that even though PE-acquired banks underperform prior to the acquisition, these banks provide stable and growing operations that show stronger performance.

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 analytical framework to a county-level analysis, in which we compare two counties, both with a failed bank branch, but one (marginally) acquired by a PE investor and one (marginally) 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 of 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 indicators reflect and may be partially attributable to the expertise management team that PEs bring into the 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.

Overall, our results suggest that during the selection stage, PEs provide complementary capital that can fill the gap of the weak banking sector and the huge needs for new capital in failed bank resolutions. During the treatment stage, the PE presence allows more failed banks to recover more smoothly and the local financial system to be preserved.

The final conceptual question is—why are PEs helpful in stabilizing the financial system when directly interacting with the banking sector during the financial crisis? The prior literature points to three key advantages of PEs. First, the higher-powered incentives of the PE compensation structure make them more risk-tolerant (Jensen, 1989; Kaplan and Stromberg, 2009), which is particularly necessary during the crisis, for acquiring the less healthy banks. Second, the long-term nature of contracting between limited partners (LPs, the fund provider) and PEs allows them draw down funds over multiple years even when the external environment changes (Bernstein, Lerner, and Mezzanotti, 2019). Indeed, in our sample, most of the PE funds participating in failed bank resolutions are of the vintage of 2007 or later thus were at the early stage of their fund life. The available funds for them to deploy allows flexibility in investment. Third, PEs can recruit and redeploy their human capital from undertaking new traditional transactions to assisting bank operations.

This paper connects to several areas in the literature. The paper 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. 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 the banks that are failing that could incur 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) 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 bank buyers incurs costs to FDIC's resolution efforts in failed banks. Our paper contributes to this new area of research by introducing 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 a complementary source of funding in the resolution of bank failures. 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. A substantial number of banks failed during the financial crisis, putting a large strain on the financial system. 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.

To address bank failures, 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 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 identifies and notifies a pool of potential bidders that have expressed interest in bidding for failed institutions and that satisfy a list of requirements. 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, 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.

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 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. Of these, thirteen were shelf charters and seven were inflatable charters.

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

[Insert Figure 2 Here.]

In the approval process, authorities consider among other things the proposed 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 charter itself is preliminary and remains inactive until the PE entity is awarded the winning bid on a failed institution. It remains "on the shelf" for 18 months if no acquisitions are made, allowing the PE investors to bid on numerous failed institutions throughout that period. 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. 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. These included: (1) maintaining a tier 1 common equity to total assets ratio of at least 10 percent for at least 3 years after the time of acquisition; (2) pledges of cross-support if investors own 80 percent or more of two or more banks; (3) no credit transactions with affiliates; (4) no ownership by entities in bank secrecy jurisdictions; (5) continuity of ownership for at least 3 years after the time of acquisition, absent FDIC approval; (6) no opaque ownership structures; (7) no investors having 10 percent or more equity in the same bank before failure; and (8) required disclosure about investors and ownership to the FDIC.[4]

[Insert Figure 3 and 4 Here.]

As shown in Figure 3,[5] 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. PEs remained active in acquiring failed banks through 2014, and through all those years, they acquired 13 percent of all failed banks acquired, or 24 percent in terms of assets acquired in resolution. Bank failures were spread across the nation, and so were PE acquisitions, as shown in Figure 4. 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.

3. Data and Sample Overview

3.1 Banking Data

3.1.1 Failed Bank Data

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, existing banks purchased 393 failed banks,[6] and 27 failed banks had no acquirer.[7] The 27 banks with no acquirer are excluded from our analysis. Details on bank failures and their resolution come from the FDIC. These include the timing of failure and acquisition, the location and size of the institution at failure, the amount of assets passed

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

[5] 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).

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

[7] The 27 banks with no acquirer include two failed banks that were operated as temporary bridge banks by the FDIC.

to the acquirer, the terms of the failed bank transaction (transaction type, loss share coverage, and so on), the identity of the acquirer, and the type of charter.

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 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. Therefore, while most of the funds raised are from PE firms, they are not necessarily exclusive to PE sources. Additional non-PE sources sometimes include asset management companies, institutional investors, and family offices. 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.[8] In the Appendix, we show alternative definitions of PE-acquired banks based on the ownership of PE (e.g., PE shares being larger or equal to 75%), 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)

[8] 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 a hedge fund). We group them with ones acquired by PEs rather than those acquired by banks. All analysis results remain similar if we do not include those cases.

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 having five percent or more shares. They on average bid on 5.2 failed banks[9], 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 have actively participated in the distressed investment space as identified in Jiang, Li, Wang (2012) and Hotchkiss and Stromberg (2014) 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. Importantly, most of those PE funds are of recent vintages—and 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.

[9] 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.

Most of these funds are not first-time funds, so they have accumulated networks and human capital from the PE markets before.

[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, 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 consumer loans to total loans 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 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

To understand the role of private equity in failed bank resolutions, our first step is to investigate which segment of the failed bank market was targeted by PEs, and which was targeted by banks—the result of which 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:

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

The analysis is performed on the cross-sectional sample of all failed banks that were eventually acquired by a bank or a private equity investor. The dependent variable is a dummy that takes value 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 measured using the logarithm of the total assets of the bank. 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, and marginal effects calculated at the sample mean are reported. 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 change 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 they may have had an advantage over existing banks in raising larger amount of capital for these purchases.

In column (2) we switch to another measure of the stability of banks' sources of funding—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 change 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) studies the profitability of a bank and shows that low-profitability 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 and focus on the riskier C&D loans and OREO assets. These C&D loans are risky for a number of 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, "Most banks that failed or became problem banks did so because of large concentrations of poorly underwritten and administered commercial real estate loans and (especially) ADC [acquisition, development & construction] loans." We show that banks with riskier asset portfolios are more likely to be acquired by a PE firm. In addition, as described earlier, a higher proportion of OREO assets is often a sign of a loan portfolio in distress. Banks with a higher proportion of OREO assets to total assets were more likely to be acquired by PE as well.

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

In this section, we further strengthen the argument that PEs acquire a segment of banks that are unlikely to be taken over and well operated by other banks. In recent work studying failed bank resolution in the crisis, Granja, Matvos, and Seru (2017) show that in crisis, healthier banks are more willing to bid for 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 Granja, Matvos, and Seru (2017) and the broad discussion above is that banks without a set of healthier banks in nearby geographic regions face great 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's participation particularly important for those banks without a potential bank acquirer?

We explore this question formally in a similar setting as in Eq. (1), except that the key explanatory variables are the conditions of 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 of worse financial health conditions, 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 as 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 bank remains healthy, it may be unlikely for them to obtain enough capital to purchase anything that is at their size or bigger than their size. As a result, banks that are considerably larger than the failed bank may be more likely 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. 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.

Overall, this evidence seems to suggest that PEs are largely 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 Complementarities Based on Sorting

The results we have shown so far are based on the final bidding outcomes. Our results suggest that PEs were able to stabilize part of the system in which other banks are less likely to be able to participate. 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?

[Insert Table 4 Here.]

Table 4 presents evidence that is consistent with the PEs actively pursuing such a strategy. The way to do so 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 that failed to achieve the winning bid. 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.

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.

[Insert Figure 5 Here.]

In Figure 5, we push the argument further by presenting 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—acquired by PEs, bid by PEs, and those that are only bid by and eventually acquired by other incumbent banks. For each of such characteristics, we separately show the mean across the three groups. There is a clear pattern of sorting presented in the graph. PEs successfully acquire the weakest banks with the most limited outside incumbent acquirer sets. They also target some slightly stronger failed banks in which they compete with other banks, and they may win or lose in such cases. Banks, on the other hand, focus quite exclusively on the healthier banks in the failed bank set. 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 (Granja, Matvos, Seru, 2017), PEs may have an edge in cases when the failed bank is particularly risky or in deeper distress.

4.4 The Value of PE "Selection": A World Without PE Bidding?

It is now a good time to highlight that in our setting, the value of PEs in the financial crisis first comes from their unique and complementary selection of failed banks. The traditional concern that maybe the positive changes in PE-acquired banks may be due to the positive selection skills of PEs is totally possible but is nested in our framework. If PEs are willing to bid higher for potentially well-performing assets while other bank buyers are unwilling, it is along our interpretation that PE plays an important role in stabilizing the economy during the crisis.

One way to further investigate the economic significance of PE bidding in failed bank resolution is through some simple back-of-the-envelope calculations. We ask—what if there were no PE bidding? To answer this question, we collect non-public, internal 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 acquisitions 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 the bank failure cost during the crisis is about $73 billion in total.[10] This means that the PE participation helped the FDIC reduce the cost of failed bank resolution in the crisis by nearly 5 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 have at most 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 tackle this problem by tracking the post-acquisition performance of failed banks that are acquired by PE and by other banks. We also study the real effects by examining economic recovery of regions in which the failed banks are acquired by PEs.

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

5.1 Empirical Strategy

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 already been documented in the previous section, and ii) the treatment effect of PEs on the acquired banks. That is, PEs may improve the operational efficiency of failed bank using their management expertise, or—alternatively—PEs may destroy value for the acquired banks due to their lack of experience in the banking sector.

In this section we make an effort to further isolate this treatment part. An ideal experiment to isolate the effect of PEs would focus on a set of banks that are of interest to both PEs and banks, and the allocation of which 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 a bank was the cover bidder (submitted the second highest bid), and those won by a bank and a PE was the cover bidder. We further require that in the auction the margin of victory of the winning bidder over the cover bid is small, within five percent to be precise.[11]

Intuitively, our empirical strategy will compare failed banks that were just won by the PEs and those that were just won by the banks. 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 often captured at the state-failed year level. Finer regionally geographic delineation, say county-year, renders 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 can also be adapted to other

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

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 below.

[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. We provide a simple balance test and show the results in Table 5. We first examine whether bank-level characteristics differ between the bank-acquired and the PE-acquired samples. Among those characteristics shown to matter in 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.

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.[12]

5.2 Banks: Branch Closure and Deposit

We first study bank performance. 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 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.

We perform an analysis at the bank branch level by focusing on all bank branches owned by a failed bank at the time of failure. For the key outcome variable, we code whether the bank branch

[12]. 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 unobserved.

is closed within three years post-acquisition using the FDIC Reports of Structure Changes.[13] 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 of bank operations.

[Insert Table 6 Here.]

Table 6 reports the results. Columns (1) and (2) are our preferred specifications where we focus our sample to the tighter sample of bank branches that were bid by both banks and PEs. In column (1), we consider a thought experiment in which two bank branches located in the same geographic region (at the level of state) 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 are more likely to close. Both banks were bid on by PEs and banks, but one was won by the bank and one was won by a PE, both with a narrow margin. 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 the 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

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

to close to retain limited branches in a region. In other words, bank acquirers may shut down an acquired branch because they already own one in the local area. 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-adding of PEs.

Next, we examine bank performance using the growth of deposits. Deposits are an important measure of bank performance, as it is related to banks' local market power, 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 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 county-bank 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.[14]

[Insert Table 7 Here.]

[14] 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.

Table 7 presents the results. In column (1), using the full non-quasi-random sample, we show that within one year, there was little change—this makes sense given that changing failed bank operations takes time. This also provides additional assurance that 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 14 percentage points.

In columns (3) and (4) we examine the same issue using the quasi-random sample. We find a very similar pattern, with minimal changes at the one-year horizon and a big positive impact at the three-year horizon. 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 average of the deposit growth variables are negative as a national trend or only mildly positive.

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 outperform.

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 branches 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 results, we 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 Panel A presents the results. 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 that 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 6.5 percent as reported in Table 5. In column (4) we show that the average deal size increase only mildly, suggesting that the extending of credit to small businesses allows more companies to benefit rather than a small set of small businesses benefiting from a larger loan size.

In Panel B of Table 8 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 Panel A. In columns (1) and (2) the outcome variables are job creation rates. We find that both the total number of jobs created and the 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 Claims from 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 typically grant the failed bank acquirers a period to claim losses from loan portfolios of the failed banks. Commercial loan portfolios have five years of loss coverage, with an additional three years of reporting to share any recoveries. Single family loan portfolios have 10 years of loss 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 from 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 9 Here.]

Table 9 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 net of loss sharing payments made to the acquirer by the FDIC.

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 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 lumped into one bank after being acquired by the same consortium under the same charter.

[Insert Table 10 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.[15] We also report the bank-

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

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, out of all 15 acquisitions, 60 percent were acquired by a local banks—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 for incumbent banks who themselves are in deep distress. They 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.

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

5.6 Management of PE-Acquired Failed Banks

Evidence thus far paints a positive role of PEs in stabilizing the financial system through participating in the process of failed bank resolution. A question naturally arises: PEs are not bankers, 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 11 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

Private equity has become an important participant in the financial system. An extensive literature explores the effects of private equity on firm-level outcomes, such as employment, productivity, product quality, innovation, and others. Some papers argue that private equity firms positively affect the operations of target companies. At the same time, the private equity industry generates much controversy. Critics of the private equity industry often argue that PE transactions involve heavy financial engineering schemes, which introduce heavy debt burdens to the target companies and default risks to the financial system. As a result, 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.

This paper studies the role of private equity in stabilizing the financial system in the crisis. Using detailed and proprietary failed bank data from the FDIC combined with information on private equity investors, we provide the first evidence on PE participation in failed banks. PEs purchased nearly a quarter of all failed bank assets acquired in the resolution process in 2009-2014. We find that PE investors acquired banks that were generally underperforming and riskier than bank-acquired banks. PEs acquired banks whose neighboring banks were also in distress and therefore had a lower ability to make failed bank acquisitions. Thus, our findings suggest that PEs provide complementary capital 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.
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 financial 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.

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

Bank resolution activities are often 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. 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, and we discuss the process of getting a charter and qualification in the section below. Moreover, the bidding financial institution must be well capitalized and possess a CAMELS[16] 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

[16] 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),[17] 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.[18] 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.[19] 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.[20]

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

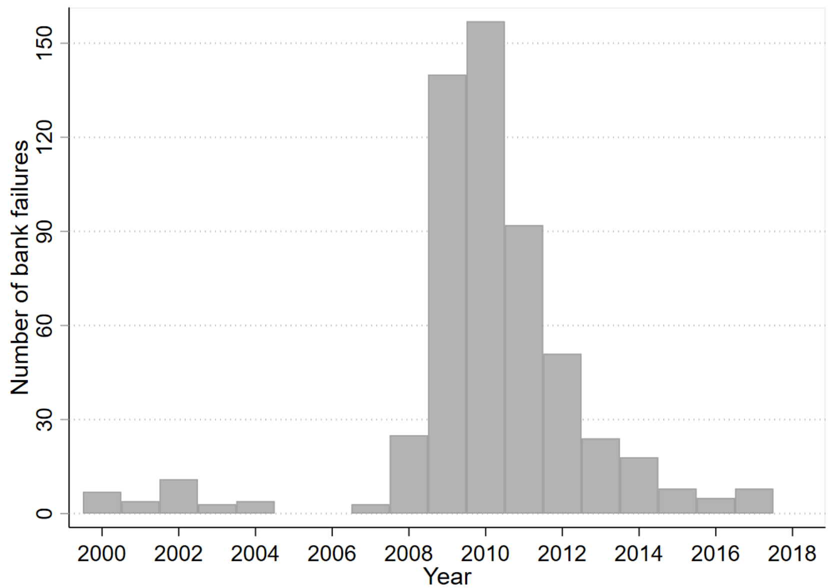
[18] Federal Deposit Insurance Corporation (FDIC). 2017. *Crisis and Response: An FDIC History, 2008-2013*. Washington, DC: FDIC. p.xiii.

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

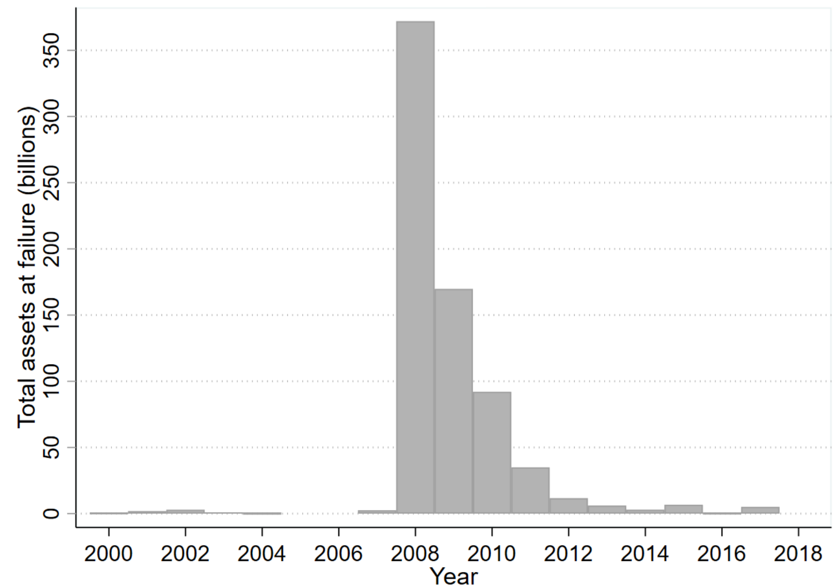
[20] Federal Deposit Insurance Corporation (FDIC). 2017. *Crisis and Response: An FDIC History, 2008-2013*. Washington, DC: FDIC. Chapter 5.

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

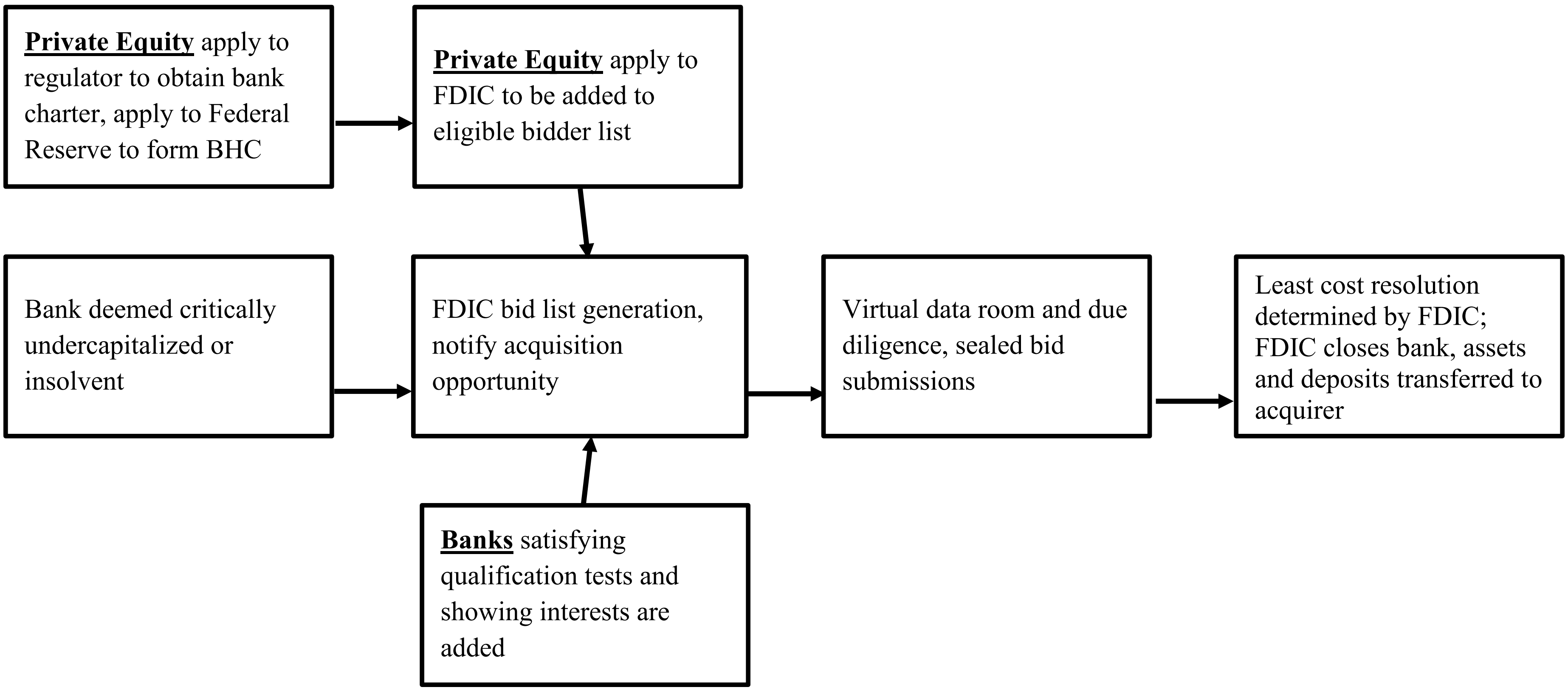
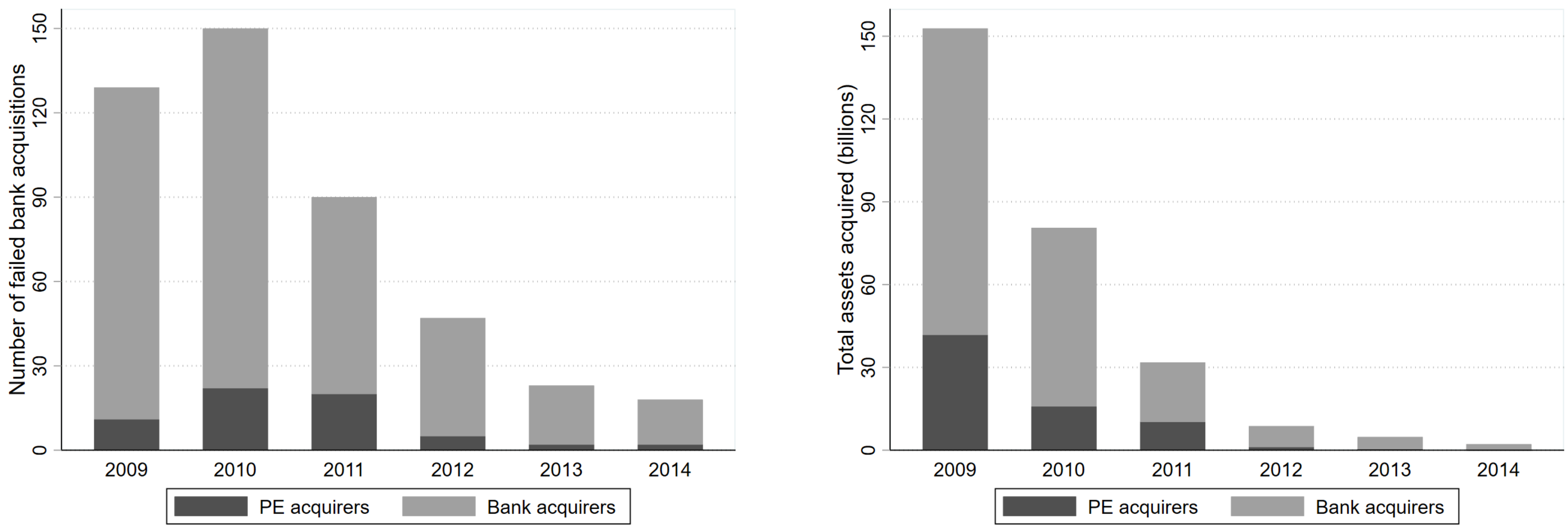


Figure 3. PE Participation in Failed Bank Acquisitions

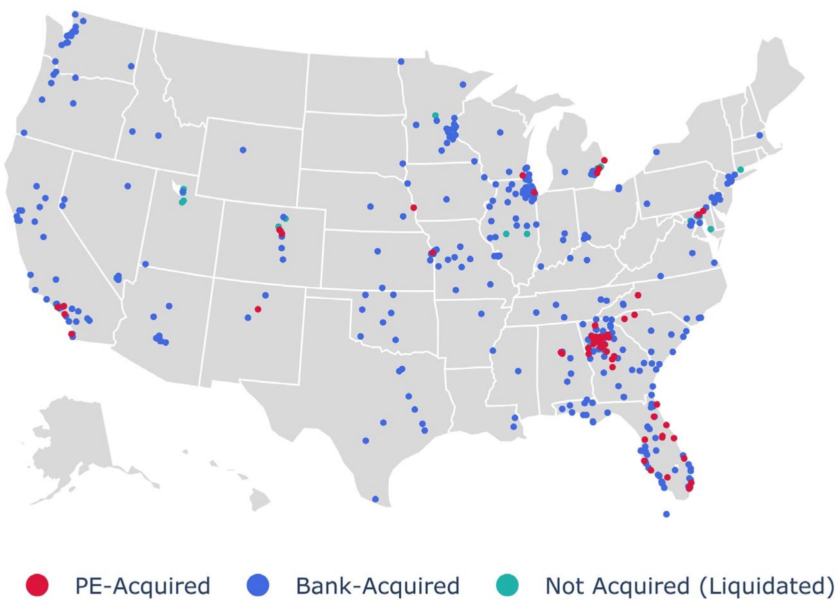
This figure shows the number of failed banks acquired by other banks and by PE during 2009-2014. The figure excludes 25 banks that were liquidated by the FDIC due to lack of buyer; it also excludes one bank that failed in 2009 but was run by the FDIC as a temporary bridge bank before being liquidated. One bank failed in 2008 but was temporarily run by the FDIC as a conservatorship and subsequently acquired in 2009 – this is counted as a 2009 acquisition in the figure below. Another bank failed in 2009 but was temporarily run by the FDIC as a bridge bank before being acquired in 2010 – this is counted as a 2010 acquisition below. 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.



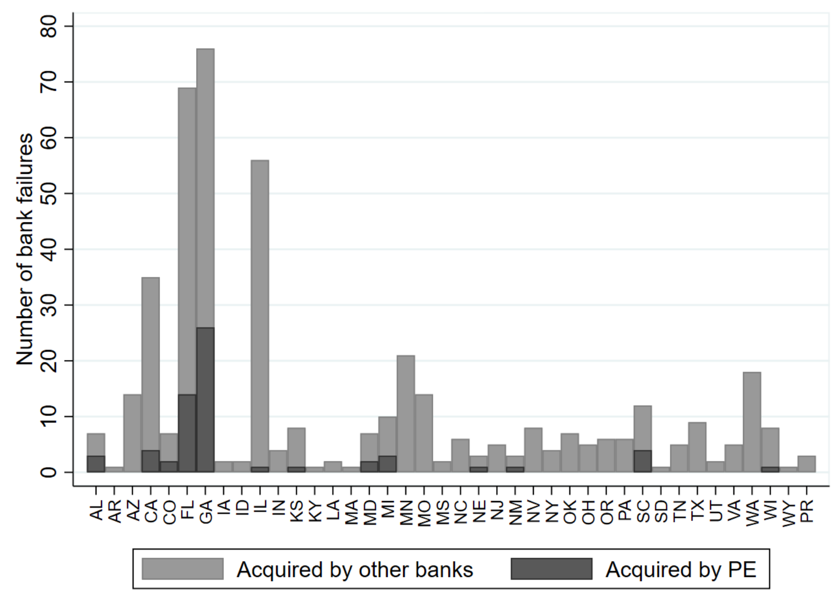
Panel (A) Panel (B)

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 liquated). 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 about their neighboring banks) targeted by different pools of acquirers: those that were eventually acquired by PEs, those that were bid on by PEs, and those that were bid only by and eventually acquired by an incumbent bank. For each characteristic, we present the sample mean across the three groups.

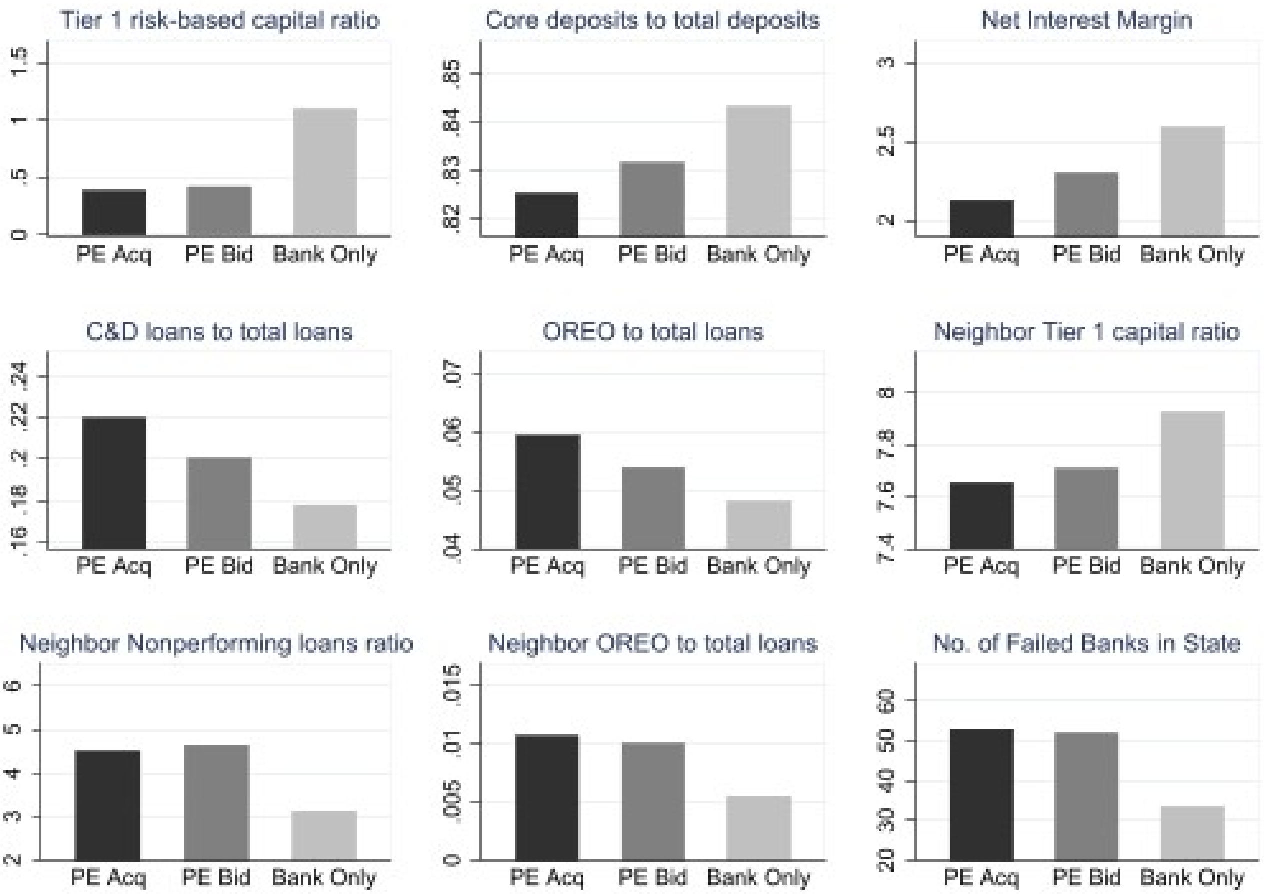


Table 1. Summary Statistics for the Private Equity Buyers

This table presents summary statistics of the PE buyers in failed bank acquisitions. We report the summary statistics at the consortia-level and PE 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. This 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, 25th, 50th, and 75th percentiles.

	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Consortia-Level (N=19)					
Number of PEs per consortium	3.37	2.29	2	4	4.5
Share of PE ownership in consortium[1]	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

[1] 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. *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 bank variables are constructed as the mean of banks that share at least one branch zip code with the focal 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
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

Table 3. Characteristics of PE-Acquired Failed Banks

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

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

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: Characteristic 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:

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

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 the appendix of variable definition. 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

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

	(1)	(2)	(3) *I(PE Bidding)*	(4)	(5)
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 loans			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)	12.922	1.156	12.352	1.129	-1.656
Tier 1 risk-based capital ratio	0.218	1.836	0.375	2.578	0.246
Core deposits to total deposits	0.868	0.131	0.878	0.145	0.236
Net Interest Margin	2.236	1.100	2.559	0.936	1.027
CRE loans to total loans	0.202	0.111	0.146	0.110	-1.701
C&D loans to total loans	0.072	0.061	0.068	0.075	-0.227
OREO to total assets	12.922	1.156	12.352	1.129	-1.656
Neighboring bank conditions					
Neighbor Tier 1 risk-based capital ratio	7.464	2.051	6.917	3.387	-0.705
Neighbor Nonperforming loans to total loans	5.109	4.801	3.154	3.499	-1.480
Neighbor OREO to total loans	-0.018	0.180	-0.110	0.335	-1.255
Branch-level Conditions					
Branch closure rate (2005-2007)	4.082%	1.267%	6.667%	2.644%	0.982
Branch Deposit ($000 USD)	51,777.11	91,362.15	57,660.35	100,444.4	0.513
County-level Condition					
Log(SBA loan number)	15.463	1.881	15.900	2.075	1.304
Log(SBA loan amount)	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
Log(total personal income)	0.023	0.127	0.047	0.122	0.977
Log(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	586	586	4,242	4,242
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.

	Full Sample		**Quasi-Random 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)	-0.008	0.140**	-0.018	0.356***	-0.014	0.351**
	(0.079)	(0.062)	(0.141)	(0.111)	(0.135)	(0.115)
Observations	1,492	1,492	388	388	355	355
R-squared	0.459	0.505	0.594	0.611	0.162	0.248
State x Fail Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var	-0.0605	-0.173	0.0627	-0.0288	0.0408	-0.0401

Table 8. Real Economic Outcomes: Small Business Lending and Regional Recovery

This table studies the regional economic activities after their own failed banks were acquired by a PE and 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. Panel A 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 B studies regional economic indicators, and the dependent variables are three-year growth in startup employment, total employment, total personal income, and per capita income. 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

	(1) ΔSBA Number	(2) ΔSBA Amount	(3) ΔSBA Interest Rate	(4) ΔSBA Average Loan Size
I(PE Acquired)	0.320**	0.154**	-0.323*	0.165
	(0.112)	(0.049)	(0.147)	(0.107)
Observations	206	206	206	206
R-squared	0.797	0.901	0.777	0.479
State x Fail Year FE	Yes	Yes	Yes	Yes

Panel B: Regional economic recovery

	(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	206	206	206	206
R-squared	0.957	0.949	0.600	0.412
State x Fail Year FE	Yes	Yes	Yes	Yes

Table 9. Loss Share Claims for Failed Banks

This table studies loss share claims submitted by failed bank acquirers and examines the difference of 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 loss comparable across different banks. More specifically, the dependent variable in Panel A shows the total loss rate, which reflects the total losses on the acquired portfolio. The dependent variable in Panel B shows the incurred loss rate, which reflects 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 loans. 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)
	Total Loss Rate			
	Total Loss Rate		Incurred Loss Rate	
I(PE Acquired)	-0.015	-0.013	0.007	0.003
	(-0.544)	(-0.406)	(0.648)	(0.207)
Tier 1 risk-based capital ratio	-0.005**	-0.007**	0.000	0.001
	(-2.578)	(-2.368)	(0.268)	(0.510)
Core deposits to total deposits	-0.028	0.042	0.015	0.023
	(-0.486)	(0.736)	(0.801)	(0.930)
C&D loans to total loans	0.307***	0.334***	0.055**	0.063*
	(5.688)	(3.933)	(2.340)	(1.921)
OREO to total loans	0.339*	0.560***	0.054	0.106
	(1.694)	(3.206)	(0.851)	(1.320)
Observations	304	304	304	304
R-squared	0.836	0.939	0.650	0.815
State FE	Yes	No	Yes	No
Failed Year FE	Yes	No	Yes	No
State x Failed Year FE	No	Yes	No	Yes

Table 10. 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 (other items not relevant for this table). 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 PE ownership	1	1	174	307
Acquired or Merged	15	52	44	78
Local bank buyer	9	30	9	21
Non-local bank buyer	6	22	34	56
IPO	2	4	5	7
Closed and liquidated	1	5	2	3

Table 11. 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