Private Equity Investment in U.S. Banks

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Abstract: We document and analyze the performance of 79 private equity investments in publicly traded U.S. commercial banking companies between 2004 and 2016. Abnormal announcement returns were strong and positive; standard industry metrics indicate that PE firms earned positive return premiums on these deals; but both market-based and accounting-based measures indicate increased risk profiles at PE-targeted banks. We conclude that (a) PE firms were able to earn acceptable returns on these deals, despite having to operate under regulatory constraints, and (b) consistent with the historical concerns of bank regulators, private equity investment makes commercial banking companies riskier.

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1. Introduction

Banks have long been a supplier of equity and debt finance to private equity (PE) firms. Fang, Ivashina and Lerner (2013) report that 30% of all PE deals in the U.S. between 1983 and 2009 included equity and/or debt investments from the private equity arm of a large commercial or investment banking company. But the reverse pattern of investment—that is, private equity investment in U.S. banking companies—has been rare. There are at least three potential explanations for this historical asymmetry. First, the heavily regulated environment in which banks operate may interfere with the ability of PE investors to make sharp and swift operational and financial changes. Second, the relatively short-run time investment horizons of PE investors may be antithetical to the preferences of commercial bank regulators for stable, long-term equity investors. And third, bank regulators' institutional antipathy to downside risk takes some tactics for increasing shareholder value off the table at PE-managed banks, such as boosting financial leverage or accelerating earnings growth.

This asymmetry began to break down during the global financial crisis. On-the-one-hand, banks found themselves under intense regulatory scrutiny to strengthen their balance sheets, and they responded by reduced their risky investments across the board. This included, though was not limited to, banks paring back their equity and debt positions in private equity firms.[1] This resulted in a disintermediation of sorts in the private equity space, with increased funding by non-bank institutional investors offsetting much of the reduction in PE funding from banks (Fang, Ivashina and Lerner 2015). On-the-other-hand, the federal government initiated new policies to increase the flow of investment capital into the troubled commercial banking system. While the largest of these policy responses by far was injecting taxpayer-backed equity capital into commercial banks through the TARP program, federal regulators also took more subtle actions to encourage private capital investment in commercial banks. In September 2008, the Federal Reserve

[1] The so-called Volcker Rule (part of the Dodd-Frank Act of 2010) also played a role by restricting banks' exposures to private equity and hedge funds. Although this rule was not finalized until 2014 and full compliance was delayed until 2015, it was highly anticipated and likely influenced bank investment behavior earlier in the process.

relaxed its rules governing private equity investments in bank holding companies.[2] Private equity firms, flush with un-deployed capital raised during the pre-crisis years (Piper Jaffray 2008), took advantage of this new opportunity. In 2008, PE investment in U.S. banking companies totaled only about $400 million; by 2012, PE investment in U.S. banking companies had increased to more than $7 billion.

In this study we document, describe, and assess the performance of 79 private equity investments in U.S. commercial banking companies between 2004 and 2016. To the best of knowledge, these deals comprise the population of all PE investments in publicly traded commercial banks during this time period. We focus on two interrelated questions. First, were private equity investors able to earn acceptable returns on these investments, despite the operating and financial constraints placed upon them by bank regulations? Second, did private equity investors generate returns by making changes that increased the risk profiles of these banks, consistent with the historical concerns of bank regulators?

We address the first question by measuring the stock market reactions to the deal announcements, the returns to market investors over the life of these deals, and the investment multiples and internal rates of return earned by the PE investors themselves. Abnormal announcement returns averaged between +2% and +8% across a variety of market models and announcement windows; clearly, the market believed that PE firms could make value-enhancing interventions at regulated commercial banking firms. Over the longer run, these beliefs were borne for both passive shareholders and for PE investors. Buy-and-hold returns measured over four years (the average duration of the deals in our data) imply average annual shareholder returns of 9% to 17%, while the internal rate of return earned by private equity investors over the life of their deals averaged 12.7%. These rates of return exceeded the returns from simultaneous investments in broad market indices, and are similar to private equity investor returns found in previous studies of non-bank PE deals. So in general, the answer to our first question is yes: Private equity investors

[2] The new Federal Reserve guidelines (2008) were generally interpreted as expanding the ability of private equity funds to invest in banks while avoiding being subject themselves to banking regulations. A year later, the Federal Deposit Insurance Corporation (FDIC, 2009) made clear that it would not relax its rules for private equity investors in failed banks. We provide additional detail about these two policy announcements in the next section of the paper.

were able to earn acceptable returns on their investments in U.S. commercial banking companies, even while operating under the strict operational constraints imposed by U.S. bank regulations.

We address the second question using panel regressions to gauge the impact of private equity investment on standard measures of bank risk and return, as well as on various bank balance sheet and income statement ratios, over the life of the PE investments in these banks. We estimate these models for a matched sample of commercial banking companies with and without private equity investments during our 2004-2016 sample period. On average, PE investments are associated with increased earnings, which start at the top of the income statement with stronger net interest income, which carry through to the bottom of the income statement as improved net income and ROA. But both accounting-based (Z-score, earnings volatility) and market-based (return volatility, idiosyncratic risk, implied volatility) measures of bank risk also increase. On net, we find evidence of an improved return-risk tradeoff: Announcement returns, buy-and-hold returns, and Tobin's Q all increase with PE investment. This offers little comfort for bank regulators who are disproportionately concerned about downside risk. So in general, the answer to our second question is also yes: Consistent with the historical reservations held by U.S. bank regulators, private equity investments in commercial banking companies do appear to increase the risk profiles of these firms.

Our findings have implications for both research and policy. We expand the academic literature on private equity investment by analyzing the performance of PE investments in commercial banking companies, a heavily regulated industry that is typically excluded from empirical finance studies. By and large, our results indicate that the institutional regularities of the PE sector trump the unique institutional differences of the banking industry: The commercial bank PE investments in our data were completed in similar time frames, and upon completion earned similar return multiples, as PE investments in non-bank companies. We also provide a first analysis of the impact of changes in Federal Reserve policies that lightened the regulatory burden for private equity investment in this heavily regulated and fundamentally important industry. Both the number of PE deals and the ownership shares purchased in these deals increased following the change in Fed policy. PE investors were more attracted to financially sound banks rather than financially troubled banks; on average, PE investment added value to these firms, by altering

the composition of their investments, reducing interest expenses, and increasing risk exposures. These findings are consistent with capital market discipline in an industry where takeover bids are infrequent and during a time when public capital markets were relatively wary of bank equity investments.

The remainder of the paper is organized as follows: In Section 2 we provide an overview of how private equity investment in commercial banks historically has been regulated, and how the Fed loosened these rules in 2008. In Section 3 we describe our data on private equity investments in U.S. commercial banking companies. In Section 4 we perform univariate analysis on these data, including above announcement returns, buy-and-hold returns, and the return on investment gauges most often employed by private equity firms. In Section 5 we perform multivariate panel estimations to analyze the impact of PE investments on bank performance. Section 6 concludes.

2. Regulation of private equity investments in U.S. commercial banks

Equity investments in commercial banks are regulated under the Bank Holding Company Act (BHCA, 1982), which is interpreted and enforced by the Federal Reserve (the Fed). A three-pronged test determines whether or not the BHCA regulations apply for a given private equity investment. If the investor owns a relatively small share of total bank equity, appoints a relatively small portion of the bank's board of directors, and refrains from discussing policy decisions with bank management, then she qualifies as a 'minority investor' and is unimpeded by the BHCA. However, if the investor violates any one of these three conditions, then she is no longer a minority investor; she must form a bank holding company (BHC) and make her investment through that BHC, which exposes her to costly and potentially intrusive Federal Reserve regulation.

Prior to 2008, the Federal Reserve parameterized the three-pronged test as follows: Minority investments could not exceed 25% of total bank equity; minority investors with between 10% and 25% could not have any seats on the board of directors; and must act as passive investors and not attempt to influence management decisions. In September 2008, the Fed issued an updated policy statement that weakened these restrictions: Minority investors can hold as much as 33.3% of total bank equity, so long as

no more than 15% is comprised of voting shares and the non-voting shares are not convertible to voting shares while in the hands of these investors; minority investors may appoint one director, and may appoint two directors so long as these directorships comprise less than 25% of the board, this directorship share is proportionate to the private equity ownership share, and some other investor has larger ownership and directorship shares; and minority investors are not prohibited from conversing with bank management regarding policy issues, similar to non-minority investors.[3]

By increasing the permissible size and influence of private equity investors in commercial banks, these changes increased the incentives for private equity funds to invest in commercial banks. It is interesting that the Fed justified these changes without any reference to the need for new equity investment in the U.S. banking industry.[4] For at the time, many commercial banks were taking large asset write-downs on real estate loans and real estate-backed securities, and the losses associated with these write-downs were depleting book equity capital and causing substantial declines in share prices. It is unlikely that the timing of these changes was coincidental.

A year later in August 2009, the Federal Deposit Insurance Corporation (FDIC) released a policy statement to meant to clarify its position on private investors that purchase and recapitalize insolvent (failed) commercial banks that have been seized by the FDIC.[5] In the wake of the Fed's policy statement that eased restrictions on private equity investment in solvent banks, the FDIC's statement reaffirmed its own policies that private equity investment should have a stabilizing long-run effect on failed banks. In addition to complying with the Fed's rules under the BHCA, the FDIC required the following of these private equity investors: They must maintain their equity positions in these previously insolvent banks for at least 3 years;

[3] See http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20080922b1.pdf for the full policy statement, or 12 C.F.R. § 225.144 of the United States Code.

[4] In its policy statement, the Board states that it "has reviewed the consistency of a number of features of these investments with the [Bank Holding Company] Act. In particular, the Board has reviewed its experience with director interlocks, limits on the amount of nonvoting shares that can be held in combination with voting shares, and the scope of discussions that minority investors may have with management of the banking organization." See page 6 of the statement.

[5] See https://www.fdic.gov/news/board/aug26no2.pdf, Final Statement of Policy on Qualifications for Failed Bank Acquisitions [6714-01-P], August 26, 2009. The policy statement included some exemptions for

the acquired bank must maintain a Tier 1 common equity-to-assets ratio (CET1) of at least 10% for those 3 years; prompt corrective action penalties and restrictions will kick-in if the CET1 ratio falls below 10% before the end of the third year; and in some cases PEs that invest in multiple failed banks must provide cross-guarantees that make the resources of one bank available to provide capital support for the other banks. These conditions imposed on PE investors are more strict than those applied to commercial banking companies that acquire either failed or solvent banks.[6]

As can be seen in Figure 1, private equity investments in U.S. commercial banks increased in 2010, following (though not necessarily caused by) the Fed and FDIC policy statements. Between 2009:Q4 and 2011:Q4, the number of PE investments in commercial banks more than doubled from 22 to 51, and the total value of these investments increased seven-fold from $569 million to $4.1 billion. As we discover later in our analysis, this these new investments tended to be in financially healthy banks, not in failed banks in the process of being resolved and refloated by the FDIC. However, this surge in investments was a temporary phenomenon rather than a permanent regime shift. As shown in Figure 2, new PE investments in commercial banks reached a high plateau between 2009 and 2013, averaging more than 13 new deals per year, before declining to historically normal levels in 2014. Accordingly, an echoing surge in PE exits is clearly visible in 2013 through 2016.

The reduction in private equity bank deals during the mid-2010s may indicate that commercial banks were no longer in need of private equity assistance once the financial crisis abated and banking industry and capital market conditions improved; a casual glance at banking, macroeconomic, and financial market time series' provides plentiful evidence consistent with this explanation. Alternatively, it may be that the returns required by PE investors in bank deals were no longer available after bank equity prices recovered; again, this explanation is consistent with the broad facts. Finally, but more difficult to observe, it may be that bank regulators, after observing the outcomes of the 2009-2013 surge in PE bank deals,

[6] The FDIC policy statement included some exemptions for passive private equity investors that purchase less than 5% of total voting shares in the failed bank as well as for private equity investors that invest together with an established and successful bank holding company that purchases a controlling ownership stake in the failed bank.

switched from encouraging to discouraging private equity investment in banking companies; our analysis below, which documents increased risk-taking at PE targeted commercial banks, is consistent with this explanation, albeit without a smoking gun.

3. Data

We perform our analysis on private equity investments in U.S. commercial banking companies made between 2004:Q1 and 2016:Q1. We hand-collected the data on private equity investments from the SNL, S&P Capital IQ, and Bloomberg databases, and complemented these data with additional information from targeted banks' press releases, transaction documents and SEC filings. We then merged these data with quarterly financial statement information from the Federal Reserve Y-9C commercial bank holding company database. Throughout the rest of the paper, we use the terms *banks*, *banking companies*, and *bank holding companies* interchangeably.

We identified private equity capital injections in 97 unique banking companies. For a given targeted banking company, we define the beginning of the PE investment (PE Entry) as the quarter in which the first investment was made in the target bank, and the end of the PE investment (PE Exit) as the quarter in which the total accumulated investment in the target bank was liquidated. Among 97 these deals, 79 targeted publicly traded banks while 18 targeted privately held banks. Because the PE investors exited via M&As in 9 of 18 the privately held bank deals, we able to identify entry dates, exit dates, and deal size (the PE ownership share and total dollar amount of PE investment) for 88 (79 + 9) of the 97 total deals.

Table 1 displays the distributions of the deal characteristics—the dollar amount of the PE investment, the share of total bank equity represented by this investment, and the number of directors controlled by the PE fund—across the 88 deals. When more than one PE firm held an equity stake in a given deal, PE equity share and PE investment value reflect the combination of these investments. Because not all private equity investments were made on the PE Entry date, we calculate PE equity share and PE investment value as within-deal averages across all of the quarters during which at least one private equity fund held an equity investment in the bank. PE ownership share averaged about 24%, ranging from as little

as 2% to as much as 100%; in the large majority of deals, the PE fund owned a block-holding equity stake of at least 5%. Similarly, PE investments averaged about $74 million but ranged widely from as little as $20,000 to as much as $2 billion.

In about one-half of the deals, PE investors controlled at least one bank directorship. Of these 88 deals, 50 (about 57%) had successfully exited before the end of our sample period. The average duration (entry date to exit date) of these 50 completed deals was 3.82 years, which is similar to the figures found in previous studies of non-financial PE deals. Guo, Hotchkiss and Song (2011) report an average 3.86 year duration for buyout deals between 1990 and 2006, while Fang, Ivashina and Lerner (2013) report an average 3.92 years for private equity deals between 1993 and 2008. At first glance, these duration data suggest that pressure from bank regulators on PE investors to provide stable, long-run ownership did not result in meaningfully delays in the investor exit.

Table 2 displays data for each of the private equity firms that made investments in more than one of the 88 commercial bank deals. The bank investments made by these firms may have been held in a single fund, or these firms may have been operating multiple investment funds that held bank equity investments. There are clear differences in investment approaches. Some firms (e.g., Banc Funds Company, FSI Group) tend to take small, non-block-holding positions in a large number of deals. This reflects the prevalence of so-called "club deals" in our data, in which multiple PE funds make investments in the same firm (Officer, Ozbas and Sensoy 2010). Other firms (e.g., Warburg Pincus, Corsair Capital, Thomas H. Lee Partners) take large dollar positions with non-trivial ownership shares in a small number of banks. The remainder of the firms tend to fall in-between these two extreme approaches.

4. Univariate Analysis

For the remainder of the paper, we focus exclusively on the 79 private equity deal in which the targeted bank was publicly traded. We begin with a series of univariate analyses. First, we measure the abnormal announcement returns associated with PE entry, as well as the buy-and-hold returns up to five years after PE entry, for these 79 deals. Second, we calculate the returns earned by the private equity

investors for the 45 publicly traded bank deals that exited successfully before the end of our sample period. Third, we calculate the M&A sales premiums for the 33 PE exits that were facilitated by selling the targeted bank to another bank. Fourth, we perform difference in means tests that compare the financial and operational characteristics of the targeted banks before and after they receive PE investments. Fifth, we perform difference in means tests to compare of the pre-PE investment characteristics of the targeted banks to the characteristics of non-targeted banks.

4.1. Market returns to passive equity investors

Table 3 presents event study results for the 79 publicly traded commercial bank holding companies in our sample. The event at day 0 is the announcement of the initial investment in each bank by a private equity firm. In columns 1 and 2, standard CAPM and Fama-French models indicate substantially positive and statistically significant abnormal post-announcement returns, ranging from 4.71% to 7.50%. There is no evidence of pre-event information leakage. The results clearly indicate that market investors expected private equity firms would make value-enhancing operational and/or strategic changes at the targeted banks.

In column 3 we re-estimate the CAPM model after replacing the market equity index (CRSP) with a banking industry equity index (the Keefe Bruyette Woods, or KBW, index for regional banks).[7] While this approach is somewhat unorthodox, it sheds light on a related important valuation question: Did banks receiving private equity investment experience a positive valuation increment relative to the rest of the *banking* industry, which did not receive private equity investment? The data indicate an affirmative answer to this question, with banks receiving PE investment enjoying economically and statistically positive within-industry abnormal returns.

The market's short-run expectation that banks receiving private equity investment would experience increased future earnings is largely borne out in the long-run pricing data. Table 4 presents the buy-and-hold abnormal returns for the same 79 commercial banks, for holding periods of up to four years.

[7] We use the KBW index for regional banks because it comports well with the 79 target banks in our sample, which averaged about $4 billion in assets. All of the results in Table 3 are based on models using equally-weighted market return indices; the results are virtually identical when we use value-weighted market return indices.

Cumulative abnormal returns over four years—which is the average duration of the completed deals in our data—range between 44% and 90%. These compounded abnormal four-year returns imply average annual abnormal rates of return of between 9.6% and 17.4%, respectively.[8]

4.2. Returns to private equity investors

In a survey of 79 different private equity groups conducted in 2012, Gompers, Kaplan, and Mukharlyamov (2015) found that PE firms rely predominantly on two measurement tools to evaluate their own financial performance: The multiple on invested capital (MOIC) and the gross internal rate of return (IRR). On average, these 79 firms used MOIC to evaluate 94.8% of their investments, and used IRR to evaluate 92.7% of their investments. Based on this evidence, we measure the performance of the PE bank deals in our data using both of these gauges.

MOIC captures the accumulated percent return to invested capital over the life of the investment. We use the following formula to calculate MOIC:

$$MOIC = \frac{\sum_{t=0}^{T2} payments\ to\ capital_t + \sum_{T1}^{T2} p_t \cdot shares\ sold_t}{\sum_{t=0}^{T1} p_t \cdot shares\ purchased_t} \quad (1)$$

The summation terms allow for stock share purchases (PE entry) and stock share sales (PE exit) to occur on multiple trading days. The subscript t denotes time and p_t is the share price at time t. We denote 0 through *T1* as the time span over which the PE investor purchases equity shares, we denote *T1* through *T2* as the time span over which the PE investor sells off the equity shares ($0<T1<T2$), and *payments to capital* consist of any dividend payments received by PE investor during the lifetime of the deal.

Gross IRR is the annualized percentage return before netting out management fees, carried interest, and other transactions costs. Gross IRR is calculated by solving the following formula for R:

[8] The calculations are $0.096 = (1.4417^{0.25}) - 1$ and $0.174 = (1.9009^{0.25}) - 1$.

$$0 = \sum_{t=0}^{T2} \frac{p_t \cdot shares\ sold_t + payments\ to\ capital - p_t \cdot shares\ purchased_t}{(1+R)^t} \quad (2)$$

Table 4 displays the distributions of MOIC and IRR for the 45 bank deals in which private equity investors successfully exited before the end of our sample period. When multiple PE firms held an equity stake in a given bank deal, we combine these stakes into a single investment for the purposes of these return calculations. To provide a real-time benchmark, we show the distributions of MOIC and IRR calculated for investments in the S&P 500 over the entry-to-exit dates of each of the 45 completed deals. Because the values of MOIC and IRR for our bank PE deals exhibit substantial variation, we will focus mainly on the median averages.

The median average MOIC for the bank PE deals is 1.4006, an approximate 40% total return on invested capital over the life of the investment. This exceeds the median 1.2630 multiple (a 26% total return) median for simultaneous investments in the S&P 500. Compared to the literature, the 40% total return for PE bank investments is larger than the 30% average figure for PE nonfinancial firm investments reported by 79 firms surveyed Gompers, Kaplan, and Mukharlyamov (2015). But the 40% total return is substantially smaller than the investment multiples found in pre-crisis studies of PE investments. For example, Guo, Hotchkiss and Song (2011) found a median investment multiple of 64.5% for 70 leveraged buyouts completed between 1990 and 2006, while Harris, Jenkinson and Kaplan (2014) found the median fund-level multiples of 81% and 73%, respectively, for leveraged buyout firms and venture capital firms between 1984 and 2008. Nevertheless, we note that the Harris, Jenkinson and Kaplan (2014) study also found that the average returns earned by venture capital firms in the U.S. declined substantially after 2000, and that the PE bank deals in our data were all initiated after 2000.

The median IRR for the bank PE deals is 13.83%.[9] This is comparable to the median fund-level IRRs of 13.0% for leveraged buyout firms, and 11.1% for venture capital firms, found by Harris, Jenkinson

[9] When compounded over the five year average duration of the deals in our sample, an annual return of 13.83% would result in a $(1.1383)^5 - 1 = 91\%$ accumulated return. This figure is inconsistent on its face with the total accumulated

and Kaplan (2014) between 1984 and 2008. The 18.83% figure represents a 4.20% premium over the median 9.63% return on simultaneous investments in the S&P 500, a result that is similar to the IRR premiums found in non-bank PE studies. Harris, Jenkinson and Kaplan (2014) report a 3.7% annual return premium for PE investments over returns to investing in the S&P 500, while Gompers, Kaplan, and Mukharlyamov (2015) report a 2.7% annual return premium for PE firms over an industry benchmark provided by Preqin, a private provider of data on alternative asset investments.

4.3. PE exits via M&A

Of the 79 bank PE investments in the data, 45 exited prior to the end of the 2004-2016 sample period. Among these, 33 of the exits occurred when the targeted bank was sold to another bank in an M&A transaction. Table 6 displays information on the offer prices, the percent acquisition premiums, and completion times for these M&A exits. All but 3 of the 79 targeted bank acquisitions sold at positive premiums, with an average acquisition premium of about 23%.[10] These M&A exits took 197 days on average from announcement to completion, longer than typical for M&Ss of publicly traded firms. For example, Bhagwat, Dam and Harford (2016) report a 126 day mean (106 day median) time to completion for M&As of publicly traded firms in the U.S. between 1990 and 2013. The most likely cause of these delays is the need to receive the additional regulatory clearances associated with the acquisition of a commercial banking company in the U.S.

4.4. Financial and operating performance of target banks

We perform approximately three dozen difference-in-means tests to determine whether and how the financial performance and internal structure of the 79 targeted banks changed during the duration of the PE investment. Table 7 displays the names and definitions of each of the variables included in these tests.

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return of 40% suggested by our 1.4006 median MOIC. This seeming inconsistency occurs because our calculations of IRR discount future cash flows, while our calculations of MOIC sum-up cash flows regardless of when they occur.

[10] The National City Corp deal (backed by Corsair Capital LLC) exited via M&A with a -2.8% merger premium. The Capital Bank Financial deal (backed by Crestview Partners) exited via M&A with a -5.58% merger premium. The Talmer Bancorp deal (backed by WL Ross Co LLC) exited via M&A with a -1.31% merger premium.

Table 8 shows the results of the tests, in which compare the average pre-PE investment and post-PE investment values of these variables.

For each targeted bank in the data, the pre-PE investment sub-period begins in 2004:Q1 and ends in the quarter just prior to the initial PE investment. The post-PE investment sub-period begins with the quarter in which the initial PE investment was made and ends in either the quarter in which the PE investor exited (for completed deals) or in 2016:Q1 (for uncompleted deals). Thus, the pre- and post-PE investment sub-periods are different for each of the 79 targeted banks. Within each of these sub-periods, we calculate bank-level quarterly mean averages for every variable; the related cross sectional means are reported in Table 8 for both sub-periods. Because these cross sectional means combine data from different years and quarters, the raw differences in means reported in the third column are biased. To mitigate this bias, we normalize all of the bank-quarter values by their same-quarter banking industry means, and then re-calculate each of the sub-period means (not shown) based on these adjusted values. The industry-adjusted differences in means are reported in the fourth column.

These univariate tests suggest a positive association between bank riskiness and PE investor presence. *Z-score* measures the decline in equity capital that is necessary for a bank to become insolvent, using standard deviations of ROA as the unit of measurement. The -4.5413 industry-adjusted decline reduces the quarterly *Z-score* from about 33.8 standard deviations of ROA to about 29.3 standard deviations of ROA. By itself, this result indicates an economically meaningless increase in the quarterly probability of insolvency; but if this result is being driven by a permanent increase in the standard deviation of ROA, the cumulative equity-reducing effects of consecutive quarters of negative ROA can become material. The reduction in *Z-score* is driven by an increase in income volatility rather than an increase in financial leverage: Private equity investment is associated with an economically large increase in industry-adjusted *Std(ROA)*, the effect of which is partially offset by an economically meaningful increase in quarterly *ROA* and a less substantial increase in *Equity*. While our measure of *Implied Volatility* increased while PE investment was present, the other market-based indicators of shareholder risk (*Stock Return Volatility, Systematic Risk, Idiosyncratic Risk*) were statistically unchanged.

The relationship between PE investor presence and overall bank value in mixed in these tests. As measured by *Tobin's Q*, the value of bank assets increased on average by an industry-adjusted 154 basis points. Moreover, as mentioned above, bank *ROA* increased by 25 quarterly basis points with PE investor presence. The Sharpe ratio declined substantially, however, an indication that accounting earnings, though on the increase, might not be staying abreast of earnings risk at these banks.

The voluminous and publicly available financial statement data for commercial banks allow us to take an especially detailed look into the underlying drivers of the changes in the earnings, value, and riskiness at the targeted banks. The increase in targeted bank *ROA* can be explained largely by the 31 quarterly basis point increase in *Net Interest Income*, driven by large increases in *Interest Income* and smaller reductions in *Interest Expense*. The most likely explanation for the reduction in *Interest Expense* is the increase in relatively inexpensive *Core Deposits* financing. Explaining the increase in *Interest Income* is less straightforward. The 215 basis point increase in asset-based securities and mortgage-backed securities investments (*ABS&MBS*) is one possibility; total *Securities* investments were unchanged, so the increase in *ABS&MBS* could indicate a reallocation of PE-targeted banks' investment portfolios away from lower yielding securities. Another possibility is the reallocation of PE-targeted banks' loan portfolios—a 259 basis point reduction in *Real Estate Loans*, roughly balanced by increases in *Business Loans* and *Consumer Loans*—that substituted higher yielding for lower yielding credits. Finally, there is evidence that PE-targeted banks used the increase in *Deposits* to grow their balance sheets (*Asset Growth*) with higher yielding assets.

In contrast, we find little evidence in the financial statement data to explain the heightened risk levels at the targeted banks. There is some evidence of increased credit risk in targeted bank loan portfolios—both *NPL Business Loans* and *NPL Consumer Loans* are higher, although overall *NPL* is unchanged—and the increased investment in *ABS&MBS* likely generate more volatile income streams than the securities that these investments replaced.[11]

[11] For example, income from mortgage-backed securities is exposed to both credit risk and prepayment risk.

4.5. Ex ante characteristics of PE targeted banks

Thus far, all of the univariate tests have focused on the data that follows private equity investments in commercial banks: ex post market returns, ex post investor returns, and ex post bank performance. It is also informative to focus on the condition and performance of the 79 targeted banks before they received. By understanding the reasons that PE funds made investments in these banks (as opposed to investing in other banks), we might better understand the ex post changes in these banks under PE-influenced bank management.

In Table 9 we compare the 79 targeted banks in the quarter just prior to PE investment to non-targeted commercial banks during those same quarters. We make these comparisons across the same measures of return, risk, and financial performance that we used in Table 8. The very large number of observations used in these tests almost guarantees statistically significant differences, so we focus on the direction of the results. There is a clear pattern in the bottom-line variables. The banks targeted by private equity investors tended to be poor performers: They generated low earnings relative to other banks (*Net Interest Income, Operating Income, ROA*), low accounting earnings relative to risk (*Sharpe*), and low market-to-book assets valuations (*Tobin's Q*). Moreover, the PE targeted banks were riskier than other banks (*Z-score, Std(ROA), Stock Return Volatility, Idiosyncratic Risk, Systematic Risk, NPL, Provisions, Net Charge-offs*). This combination of subpar returns and above-average risk creates opportunities for investors, but only if these problems are fixable—that is, only if (a) the poor performance is due to management failure, and (b) there are underlying strengths at the targeted bank upon which to build a recovery. The data indicate several latent strengths at the targeted banks, such as above average growth rates (*Asset Growth, FTE Growth*), strong demand for loans (*Loans*), and a strong deposit franchise (*Core Deposits*). For future reference, we note here that PE-targeted banks had below-industry allocations in each of the following asset categories: *Consumer Loans, Securities, Trading Exposures,* and *ABS&MBS*.

4.6. Summary of univariate findings

The univariate tests provide some initial answers to our two main research questions. The first question is whether private equity investors are able to earn acceptable returns on their investments in U.S.

commercial banking companies, despite the operating and financial constraints placed upon them by bank regulations? We find clear affirmative evidence in the univariate tests. The average duration of PE investments in our sample is four years, and the buy-and-hold calculations (Table 4) indicate that large accumulations of abnormal shareholder wealth accumulated during these years. On average, the 45 completed PE bank deals in our sample generated investment multiples and internal rates of return comparable to those reported in studies of recent non-bank PE investments.

The second question is whether private equity investments result in greater amounts of operational or financial risk at commercial banks, as historically feared by U.S. bank regulators? The results of the univariate analysis are somewhat mixed on this question. On-the-one-hand, the presence of PE investment is associated with more volatile earnings streams, an increased risk of bank insolvency as measured by the accounting *Z-score*, and a worsening risk-return tradeoff as measured by the accounting *Sharpe* ratio. On-the-other-hand, PE investment is associated with an increase in bank earnings and an increase in bank asset value as measured by *Tobin's Q*.

5. Multivariate tests

Thus far, all of our evidence comes from univariate measures and comparisons, rather than from multivariate models that impose ceteris paribus conditions on the data. For the remainder of the paper, we investigate our two questions using a higher level of statistical rigor. First, we use propensity score techniques to match the 79 PE target banks in our sample to otherwise similar commercial banking companies that did not receive PE investment during our sample period. Second, we use fixed effects panel regression techniques to compare the relative financial performances of the two matched sets of banks.

5.1. Propensity matched data sample

We estimate a pooled probit model (time fixed effects only) of the latent propensity for banks to be targeted by PE investors. The dependent variable is a dummy equal to one for banks that had non-zero private equity investment during any quarter during the sample period. We estimate the model for all quarterly observations of publicly traded commercial banks that were not PE targets during the 2004:Q1

and 2016:Q1 sample period, plus all quarterly observations of the 79 targeted commercial banks prior to their PE investments. These data contain 16,354 bank-quarter observations from 735 different banks. The estimated parameters of this model, expressed in terms of odds ratios, are displayed in Table 9.

To the best of our knowledge, the prior literature does not contain any theoretical or empirical studies on the determinants of private equity investment. (The authors will be pleased to discover that they are incorrect on this notion.) So the right-hand side specification of our model is ad hoc. Because making changes to a bank's asset mix and/or its funding mix is a natural way for PE investors to add value by, we include a number of balance sheet variables: *Loans*, *Loan HHI* (a crude portfolio diversification measure), *Nonperforming Loans*, *Securities*, *Deposits* and *Equity*. Because profitability is a central concern of PE investors, we include *ROE* and also *Interest Expense*, which is by far the largest single expense item at any commercial bank. Because risk-taking is a fundamental driver of bank earnings and bank funding rates, we include *Z-score* to measure insolvency risk and *Nonperforming Loans* to measure (ex post) credit risk. Because PE investors are constrained by the size of their funds, we include the natural log of bank *Assets*. Finally, we include the *Age* of the bank because it seemed like a good idea at the time.

Following Rosenbaum and Rubin (1983), we use the estimated model parameters to generate a fitted-value propensity score for every bank-quarter observation in the data. For each bank-quarter observation of a PE-targeted bank, we construct a control group by selecting the five non-targeted banks from that quarter with propensity scores absolutely closest to the PE-targeted bank's propensity score. We select each quarter with replacement; hence, a bank in our control group can be matched more than one bank in our treatment group.[12] This procedure yields a matched data sample of 8,718 bank-quarter observations from 79 PE-targeted banks and 167 non-targeted banks. Summary statistics for the variables in the matched data sample are displayed in Table 10.

In the first-stage probit model in column 1, predictive power is more important than statistical inference. The pseudo-R-squared of 0.10 is a moderately strong fit for what is essentially a cross-sectional

[12] As a robustness check, we constructed a second matched data sample using a one-to-one matching procedure without replacement. Our results and ultimate findings were qualitatively unchanged.

model. Still, it is interesting to consider which right-hand side determinant variables had statistically significant coefficients, and hence were most important for delivering this strong statistical fit. We find three statistically significant explanatory variables in column 1, and each of these results is economically sensible. Private equity investment was statistically more likely at smaller banks (consistent with PE fund budget constraints), at well-capitalized banks (an important result, as it indicates that PE funds played little role in providing new equity for failed or failing banks), and at banks with low interest expenses (suggesting that PE investors were interested in banks with low-cost core deposits franchises, such as transactions accounts).

In the second-stage probit model in column 2, we re-estimate the model using only the 8,718 bank-quarter observations from the matched data sample. In a well matched sample, we would not expect any of the explanatory variables to have statistically significant coefficients. We come very close to meeting that criterion, with only *Loan HHI* showing a (weak) statistical relationship with PE target bank selection.

5.2. Panel regressions

Tables 12 through 15 display the results of fixed effects panel regressions using the matched sample data set. Each regression takes the following form:

$$Y_{it} = a + b \cdot PE_{it} + c \cdot lnAssets_{it} + B_i + T_t + \varepsilon_{it} \quad (3)$$

where i indexes banks, t indexes time in quarters, B represents fixed bank effects, T represents fixed time effects, and ε is a symmetric error term. We specify the dependent variable Y using 30 different risk, return, and financial ratio variables. We specify the treatment variable PE two different ways: *PE Share* is the percentage of outstanding bank i shares owned by private equity investors in quarter t, while *PE Block-holder* is a dummy equal to one if *PE Share* is 5% or greater. Our set of controls is quite sparse, including just the natural log of bank assets (a standard control variable in nearly all empirical banking models), fixed bank effects, and fixed time effects. We estimate (3) using ordinary least squares, and standard errors are clustered at the bank level.

Bank Risk, Return and Value. In the Table 12 regressions, the dependent variables are accounting-based measures of bank risk and return. *Z-Score* is an inverse measure of insolvency risk (Boyd and Graham 1988). *ROA*, *Std(ROA)*, and *Equity/Assets* are the three component parts of *Z-Score*. *Sharpe* is accounting ROE, net of the risk-free interest rate, divided by the standard deviation of ROE. The regression results confirm the results from the univariate analysis in in Table 8: On average, the variability of targeted bank profits (*Std(ROA)*) increases more than proportionally than the increased in targeted bank profits (*ROA*). As a result, insolvency risk as measured by *Z-score* increases, while risk-adjusted earnings as measured by the *Sharpe* ratio decline, following private equity investments.

On average, a block-holding PE investment is associated with a decline in targeted bank *Z-Scores* of 10.99 standard deviations of ROA; this represents a large decline for the average targeted bank in our data, from 32.77 to 21.78 standard deviations of ROA. While 21.78 still indicates an extremely low annual probability of insolvency, we note that about one-in-ten of the targeted bank-year observations in our matched sample have *Z-Score*s less than 10.99 and hence a downward shock of this magnitude would result in insolvency, all else equal. On the plus side, we note that a block-holding PE investment is associated with a 48 basis point improvement in targeted bank *ROA*, which approximately closes the 0.0015 versus 0.0065 average earnings gap between the targeted and non-targeted banks in our matched sample (see Table 11).

The coefficients on *PE Block-holder* and *PE Share* have the same signs and statistical significance in all of the Table 12 regressions. This indicates that, on average, both the *presence* of a private equity investment (*PE Block-holder*) and the *relative size* of that investment (*PE Share*) matter. As an example of the relative size effect, a ten percentage point increase in *PE Share* (say, from a 10% to a 20% ownership share) is associated with an economically substantial 22.6 basis point increase in targeted bank *ROA*.

In the Table 13 regressions, the dependent variables are market-based measures of bank risk and bank value. *Return Volatility*, *Systematic Risk*, and *Idiosyncratic Risk* are the risk decompositions of daily stock returns from a one-factor market model estimated quarterly for each bank. *Implied Volatility* is derived from a Black-Scholes-Merton option pricing model calculated quarterly for each bank. *Tobin's Q*

is the market value of bank assets divided by the book value of bank assets. In these regressions, the size of the private equity investment often contains more information than just the presence of a private equity investment. For example, while the coefficient on *PE Block-holder* is not statistically different from zero, a ten percentage point increase in *PE Share* is associated with a 4.3% increase in *Return Volatility* and a 4.7% increase in *Idiosyncratic Risk*.[13] Risk as measured by *Implied Volatility* is positively associated with both the presence and size of a PE investment. Importantly, we also find evidence of increased bank value: On average, *Tobin's Q* is 1.7% percent higher (0.0168/1.0042) in the presence of private equity investment.

The regression results in Table 12 and 13 are broadly consistent with the univariate valuation results from Tables 3, 4 and 5, and tell a more consistent story about bank risk than the difference in means tests in Table 8. These regressions indicate that banks became more risky after private equity investments, and although accounting returns may not have increased commensurately with these risks, market investors tended to believe that taking these risks was value-additive. In our next set of regression tests, we seek to identify the internal operational changes that drove banks' post-PE risk and return profiles.

Bank Financial Ratios. In the Table 14 regressions, the dependent variables are derived from items on bank balance sheets. *Asset Growth*, *FTE Growth*, and *Branch Growth* are, respectively, the quarterly growth rates of bank assets, bank full-time employment, and the stock of physical bank branches. *Loans*, *Deposits*, *Securities*, *ABS & MBS*, *Trading Exposures*, *Nonperforming Loans (NPL)*, and various other asset and liability accounts are expressed as a percentage of total assets.[14] Although there is no evidence that private equity investment influences the size of targeted banks' balance sheets (the test coefficients on *Asset Growth*, *FTE Growth*, and *Branch Growth* are statistically zero),[15] we do find that the composition of the balance sheet changes. Block-holding PE investments are associated with a substitution from loans to investment securities: *Loans* decrease by 1.98 percentage points of assets while *Securities*

[13] The calculations are 0.1*0.0159/0.0363 = 0.0430 and 0.1*0.0159/0.0338 = 0.0470, respectively, using data from Tables 10 and 12.
[14] *Trading Exposures* is the sum of trading assets plus trading liabilities, which has appeared as a memorandum item in the Y-9C reports since 1998.
[15] Removing the control variable *lnAssets* from the right-hand sides of these regressions does not affect this finding.

increase by 2.39 percentage points of assets. The reduction in loans is facilitated by a 2.93 percentage point reduction in Real Estate Loans coupled with a 0.63 percentage point increase in *Consumer Loans*. While the reduction in *Real Estate Loans* at first might indicate that PE investors took action to undo the over-investment in mortgage loans that plagued so many commercial banks during our sample period, the 267 basis point increase in asset-backed and mortgage-backed securities (*ABS&MBS*, a subcategory of total *Securities*) likely maintains these banks' exposure to mortgages. Thus, any risk mitigation effects would be limited to replacing exposure to local mortgage loans with exposure to mortgage loans in other geographic areas. We also find weak evidence that *Trading Exposures* increased with private equity investment.

In our analysis of the difference in means tests in Table 9, we pointed out that the PE-targeted banks had below-industry levels of *Consumer Loans, Securities, Trading Exposures,* and *ABS&MBS* prior to receiving private equity investments. The regressions in Table 15 indicate non-trivial increases in each of these four items at banks that received block-holding PE investments. This raises the possibility that PE investors followed a simple value-additive strategy: Locate poorly performing banks, and the simply re-allocate their loans and securities investments toward the industry averages.

In the Table 15 regressions, the dependent variables are the major items from bank income statements—interest income, interest expense, net interest income, loan loss provisions, noninterest income, operating income, noninterest expense, and net income—divided by bank assets. The increase in *ROA* reported above in both the univariate tests and the regression tests appears to be driven by two phenomena: Higher *Net Interest Income* and lower *Provisions* for loan losses. Block-holding investments are associated with a 50 basis point increase in *Net Interest Income*. While the 7 basis point decline in *Interest Expense* is consistent with this result (and is itself consistent with the increase in low-cost *Core Deposits* found in Table 8), it is too small to be its main driver. Block-holding investments are associated with a 28 basis point reduction in *Provisions* expenses. This is a sensible result, as a bank that reduced its investment in *Loans* (see Table 14) would expect fewer loan losses in the future, all else equal.

5.3. Robustness tests

The data displayed in Figures 1 and 2 show a clear increase in private equity investments in U.S. commercial banks following the Federal Reserve's 2008 policy announcement loosening the requirements for private investments in commercial banks. While the intertemporal ordering of these two phenomena may simply be coincidental (the post-2008 surges in PE investment might reflect regulatory changes, macroeconomic conditions associated with the financial crisis, or some unidentified exogenous shock—it seems natural to test whether the results of our regression analysis are robust before and after 2008. To do so, we re-estimated all of the regressions displayed in Tables 12 through 15 using the following regression specification:

$$Y_{it} = a + b1 \cdot PE_{it} + b2 \cdot PE_{it} \cdot Pre2008_t + c \cdot lnAssets_{it} + B_i + T_t + \varepsilon_{it} \quad (4)$$

where *Pre2008* is a dummy equal to one for all quarterly observations prior to 2008. The coefficient *b2* is our test of whether the impact of private equity investment on commercial bank performance was different during the pre-2008 regime when (a) the Fed had strict guidelines on PE investment and (b) PE investment activity was low. Finding $b2 \neq 0$ would be consistent with a change at the intensive margin, i.e., a change in environment that impacted the ability of PE investment to alter individual bank performance at the margin. Finding $b2 = 0$ would be consistent with a change at the extensive margin, i.e., we observe an increase in the volume of PE investments in commercial banks in the data, but we find no difference in the ability of PE investment to alter individual bank performance at the margin. Our results (not shown here, available upon request) are strongly consistent with the former: In these 66 regressions, the interaction term was statistically significant at the 5% level only twice. These results suggest that the post-2008 patterns in Figure 1 and 2 mainly reflect a reduction in entry barriers to private equity investment in commercial banks.

A change in ownership without a change in control is unlikely to influence firm performance. Our data include the number of directorships controlled by private equity investors, and we utilize these data to

test whether the presence of PE investment is more or less important than the ability of PE investors to influence and/or closely monitor management strategy and decision-making. We employ the following regression specification:

$$Y_{it} = a + b1 \cdot PE_{it} + b2 \cdot PE_{it} \cdot Directors_{it} + c \cdot lnAssets_{it} + B_i + T_t + \varepsilon_{it} \quad (5)$$

where *Directors* is the number of directorships controlled by private equity investors. The coefficient *b2* provides our test. We expect to find $b2 > 0$, which would be consistent with priors that seats at the table allow PE investors to better assert control and make changes in bank investment, financing, risk-taking and performance. Because *Directors* is highly collinear with *PE share*, we are only have confidence in the 33 versions of equation (5) in which *PE Block-holder* is the test variable.[16] In these 33 regressions, the interaction term was statistically significant at the 5% level only once (results not shown here, available upon request). This somewhat puzzling result may reflect the highly skewed and nearly dichotomous distribution of the *Director* variable (see Table 1), which makes it difficult to capture the impact of marginal changes in the number of board seats. Other explanations are also possible: First, in an industry in which federal supervisors essentially serve as monitors themselves—and especially at banks with below-average financial performance during turbulent times—bank directors may have less influence than directors of firms in unregulated sectors. Second, directors who are temporary by definition—they are unlikely to stand for re-election, because the investors that control their seats have at most a moderate-run horizon—may have relatively little influence. Third, because hostile takeovers are extremely rare in the banking industry, directors appointed by private equity investors lack the ultimate leverage for influencing bank management.

[16] In the 33 regressions using *PE share* as the test variable, the standard errors on *PE share* were double to triple the magnitudes observed in Tables 12-15, classic evidence of the presence of collinearity in the data. (Results not shown here, available upon request.)

5. Conclusions

As financial losses mounted at U.S. commercial banking companies during the global financial crisis, the Federal Reserve relaxed its stance concerning private equity investment in U.S. banking companies. Private equity firms took advantage of this change, and approximately $7 billion in new private equity capital flowed into the commercial banking system. We analyze 79 private equity investments in publicly traded commercial banks between 2004 and 2016, with a focus on two interrelated questions. First, were these private equity investors able to earn acceptable returns on their investments in commercial banking companies, despite the operating and financial constraints placed upon them by bank regulations? Second, did these private equity investments result in greater amounts of business and/or financial risk at commercial banks, as historically feared by U.S. bank regulators? Our analysis provides affirmative answers to both of these questions.

We find positive and nontrivial abnormal stock returns at PE-targeted banks upon the announcement of these deals, a clear signal that the market expected intervention by PE firms to be value-enhancing. These expectations were largely confirmed in the longer run, with both passive investors and the PE firms themselves earning above-market return premiums. Clearly, private equity investors were able to earn acceptable returns on these investments, despite having to operate under regulatory constraints. We also find plentiful evidence of heightened risk at PE-targeted banks, including increases in earnings volatility, stock return volatility, and indicators of bank insolvency. So consistent with the historically held concerns of bank regulators, private equity investment increased the risk profiles of commercial banking companies. Perhaps surprising, we find little evidence that this increased riskiness is the result higher financial leverage, faster rates of growth, or increased credit risk. Rather, we find that PE investment was associated on average with a reallocation of assets from loans to securities investments, and increased reliance earning gains from trading assets and trading liabilities.

For private investors in bank shares, an increase in bank-specific riskiness matters only to the extent that this additional risk either is, or is not, offset by a higher expected returns and/or portfolio diversification effects. As such, our results indicate that bank shareholders on average were made better off from the

private equity investments. But bank regulators do not benefit appreciably from the upside risk in bank earnings variability or stock return volatility—in this way, bank regulators they resemble bondholders. Nor do bank regulators benefit from portfolio diversification effects; indeed, bank failures tend to occur in waves, and increased bank-level diversification will tend to increase the performance correlation across banks and thus increase the magnitudes of those waves. For a bank regulator, the main benefits from private equity investments in banks would appear to occur in the short run, when PE firms could provide temporary but timely capital injections that dampen bank failure waves—however, in a 2009 clarification of its policies concerning private equity investment, the FDIC signaled that it is not open to expanded PE investment in failed or failing banks. In the longer run, the demonstrated increase in bank riskiness associated with the private equity investments in our data may cause bank regulators to revert to their historical, less welcoming policies regarding PE investments in commercial banks, regardless of the private market value created by those investments.

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Table 1: Characteristics of PE target banks

This table shows some characteristics for 88 of the 97 private equity investments in U.S. commercial banking companies between 2004:Q1 and 2016:Q1, for which we have data on entry dates, exit dates, and deal size. The data for PE equity share, PE investment value and Number of directors are within-deal averages across the quarters during which at least one private equity fund held an equity investment in the bank.

	number of deals	mean	standard deviation	min	25th	50th	75th	max
Deals with full information on entry date, exit date, and deal size:								
PE equity share	88	23.98	23.23	2.39	7.68	13.61	32.08	100
PE investment value ($ millions)	88	74.21	159.12	0.02	8.13	22.77	75.00	2,025
Number of directors controlled by PEs	82	0.89	1.11	0	0	1	1	5
Deals completed prior to end of sample:								
Duration of the deal (years)	50	3.82	2.20	0.25	1.98	3.97	5.04	9.06

Table 2: Characteristics of PE funds

This table shows the characteristics of the private equity firms that made investments in more than one of the 88 commercial bank deals described in Table 1. Firms are ranked by the number of deals in our sample. The data for Investment value and Equity share are within-deal averages across the quarters during which there was a private equity investment at that bank. PE firm asset sizes are averages over our sample period.

PE Fund Name	number of bank PE deals	mean PE investment value ($ millions)	mean PE equity share (percent)
Banc Funds Company LLC	51	5.76	3.64
Patriot Financial Partners	16	17.92	11.68
Castle Creek Capital LLC	15	26.82	25.70
FSI Group LLC	11	5.50	2.73
CapGen Capital Advisors	5	66.62	26.53
Carlyle	5	80.92	16.58
Carpenter Company	4	45.71	35.66
Warburg Pincus LLC	4	233.59	15.77
WL Ross Co LLC	4	118.79	19.62
Acmo-CPF LLC (Anchorage Capital)	4	85.94	14.95
Corsair Capital LLC	3	206.41	22.91
GF Financial (Diaco Investments)	2	19.73	8.26
JAM Equity Partners LLC	2	23.69	6.95
Lightyear Capital LLC	2	62.4	17.88
Siguler Guff Company LP	2	38.81	9.28
Thomas H. Lee Partners LP	2	271.74	18.83

Table 3: Announcement Returns

This table shows the stock market reaction to 79 public announcements of regulatory approval of private equity investments in U.S. bank holding companies between 2004:Q1 and 2016:Q1. The market model is either the CAPM with equally-weighted CRSP market index (column 1), the CAPM with equally weighted KBW regional bank index (column 3), or the Fama-French 3 Factor plus Momentum (column 2). Because the KBW regional banking index is available only after July 2005, the sample size declines from 78 to 65 in column 3. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Event Window (Days)	CAPM (CRSP index)		Fama-French 3 Factor + Momentum		CAPM (KBW index)	
	CAR	t-value	CAR	t-value	CAR	t-value
(-1,0)	0.009	1.03	0.0092	1.08	-0.0129	-0.06
(0,0)	-0.0061	-0.98	-0.0050	-0.84	-0.0137	-0.69
(0,+1)	0.0417	4.77***	0.0401	4.71***	0.0339	2.42***
(-1,+1)	0.0478	7.07***	0.0452	7.50***	0.0606	4.65***
(-1,+2)	0.0568	5.30***	0.0544	5.21***	0.0337	2.30**
(-2,+2)	0.0763	5.51***	0.0694	5.16***	0.0488	2.85***

Table 4: Buy-and-Hold Returns

This table shows the long-run buy-and-hold abnormal returns on 79 private equity investments in U.S. bank holding companies between 2004:Q1 and 2016:Q1. The market model is either the CAPM with equally-weighted CRSP market index (column 1), the CAPM with equally weighted KBW regional bank index (column 3), or the Fama-French 3 Factor plus Momentum (column 2). Because the KBW regional banking index is available only after July 2005, the sample size declines from 78 to 65 in column 3. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	CAPM (CRSP index)		Fama-French 3 Factor + Momentum		CAPM (KBW index)	
Holding Period	BHAR	t-value	BHAR	t-value	BHAR	t-value
(0,+1 year)	0.1302	2.35***	0.1312	2.76***	0.1011	1.38
(0,+2 year)	0.3542	2.86***	0.3157	3.27***	0.2378	1.92*
(0,+3 year)	0.6090	3.12***	0.5627	3.01***	0.325	2.01**
(0,+4 year)	0.9009	3.38***	0.8130	3.01***	0.4417	2.48***

Table 5: Private Equity Performance Metrics

This table uses two performance metrics to evaluate the returns to private equity firms on 47 investments in U.S. bank holding companies between 2004:Q1 and 2016:Q1 for which PE investors had completed their exit. *MOIC* is the multiple on invested capital and *IRR* is the gross annualized internal rate of return. The *MOIC(S&P)* and *IRR(S&P)* columns display the distribution of MOIC and IRR for the S&P 500 index over the entry-to-exit dates of each of the 47 completed deals.

	MOIC	*MOIC(S&P)*	*IRR*	*IRR(S&P)*
Mean	1.4764	1.3119	0.1266	0.0842
Standard Deviation	0.7001	0.2875	0.1921	0.0612
Maximum	3.7826	2.4568	0.5789	0.2086
75^{th} percentile	1.8011	1.5157	0.2447	0.1195
50^{th} percentile	1.4006	1.2630	0.1383	0.0963
25^{th} percentile	1.1221	1.1083	0.0559	0.0606
Minimum	0.2136	0.7723	-0.4212	-0.0867

Table 6: Exits via M&A

This table shows the characteristics of 33 private equity investments in commercial banking companies between 2004:Q1 and 2016:Q that exited via mergers or acquisitions.

	number of exits	mean	min	25th	50th	75th	max
M&A premium	33	22.9%	-5.6%	7.2%	15.7%	31.2%	97.2%
M&A offer value ($ millions)	33	$572.6	$26.9	$122.7	$350.0	$653.2	$5,311.9
M&A completion time (days)	33	197	70	142	195	224	400

Table 7: Variable Names and Definitions

Accounting Risk and Return	
Z-Score	= [equity/assets + μ(ROA)] / σ(ROA), where μ(ROA) and σ(ROA) are the mean and standard deviation of ROA over the previous eight quarters.
ROA	= return on assets.
Std(ROA)	= standard deviation of ROA.
Equity	= book equity divided by book assets.
Sharpe	= (μ(ROE)-risk free rate)/σ(ROE), where μ(ROE) and σ(ROE) are the mean and standard deviation of ROE over the previous eight quarters.
Market Risk and Value	
Return Volatility	= total stock price variation. Standard deviation of daily stock returns.
Idiosyncratic Risk	= idiosyncratic risk. Square root of idiosyncratic variance decomposed from total stock price variation using the single factor market model, $\sigma_i^2 = \beta_i^2\sigma_m^2 + \sigma^2(e_i)$, where $\sigma^2(e_i)$ is the idiosyncratic variance.
Systematic Risk	= systematic risk. Square root of systematic variance decomposed from total stock price variation using the single factor market model, $\sigma_i^2 = \beta_i^2\sigma_m^2 + \sigma^2(e_i)$, where $\beta_i^2\sigma_m^2$ is the systematic variance.
Implied Volatility	= implied volatility derived from Black-Scholes-Merton option pricing theory.
Tobin's Q	= market value of bank's assets divided by book value of bank's assets.
Balance Sheet	
Asset Growth	= quarterly growth in total assets.
FTE Growth	= quarterly growth in full-time employees.
Branch Growth	= quarterly growth in number of bank branches.
Trading Exposures	= quarterly average of trading portfolio, divided by assets.
Loans	= total loans divided by assets.
Business Loans	= commercial loans plus agricultural production loans, divided by assets.
Real Estate Loans	= all loans backed by real estates, divided by assets.
Consumer Loans	= consumer loans not backed by real estate, divided by assets.
Loan HHI	= Herfindahl index based on *Business, Real Estate,* and *Consumer Loans* loan shares.
Securities	= held-to-maturity and available-for-sale securities, divided by assets.
ABS&MBS	= all asset-backed and mortgage-backed securities, divided by assets.
Deposits	= deposits divided by assets.
Core Deposits	= transactions deposits plus small time deposits, divided by assets.
Nonperforming Loans	= loans 90 days delinquent plus non-accruing loans, divided by assets.
Income Statement	
Interest Income	= interest income divided by assets.
Interest Expense	= interest expense divided by assets.
Net Interest Income	= net interest income minus provisions, divided by assets.
Provisions	= loan loss provisions divided by assets.
Net Charge-offs	= loan charge-offs minus loan recoveries, divided by assets.
Noninterest Income	= noninterest income divided by assets.
Operating Income	= net interest income plus noninterest income minus provisions, divided by assets
Noninterest Expense	= noninterest expense divided by assets.
Net Income	= net income divided by assets.
Other variables	
PE Share	= percent of equity shares owned by private equity investors.
PE Block-holder	= 1 if *PE Share* > 5%.
Assets	= total book value of assets in millions of dollars.
Age	= age of bank in years.

Table 8: Pre-entry and Post-entry Performance of Targeted Banks

This table displays annualized average values of performance indicators for 79 private equity target banks that are publicly traded. The pre-PE investment subsample includes all quarters in our sample prior to the quarter in which the PE investment was made (N=1,287 bank-quarters). The post-PE investment subsample begins with the first block-holding PE investment, excluding all quarters after which the private equity position was sold (N=1,479 bank-quarters). ***, ** and * indicate a difference in means at the 1%, 5% and 10% levels of statistical significance.

	Means for post-PE investment	Means for pre-PE investment	Difference in means	Difference in industry-adjusted means	
Accounting Risk and Return					
Z-Score	33.8379	31.9550	1.8829	-4.5413	***
ROA	0.0030	0.0005	0.0025	0.0022	**
Std(ROA)	0.0295	0.0196	0.0098	0.0094	***
Equity	0.1051	0.0947	0.0104	0.0022	*
Sharpe	0.7133	0.6270	0.0863	-0.2770	***
Market Risk and Value					
Stock Return Volatility	0.0338	0.0383	-0.0045	-0.0038	
Idiosyncratic Risk	0.0316	0.0356	-0.0040	-0.0032	
Systematic Risk	0.0088	0.0103	-0.0014	-0.0013	
Implied Volatility	0.0028	0.0027	0.0002	0.0006	***
Tobin's Q	1.0046	1.0033	0.0014	0.0154	***
Balance Sheet					
Asset Growth	0.1166	0.1146	0.0021	0.0267	*
FTE Growth	0.0826	0.0742	0.0084	0.0144	
Branch Growth	0.0741	0.0790	-0.0049	-0.0042	
Trading Exposures	0.0006	0.0003	0.0003	-0.0002	*
Loans	0.6843	0.7155	-0.0312	-0.0032	
Business Loans	0.1193	0.1099	0.0094	0.0150	***
Real Estate Loans	0.5238	0.5685	-0.0447	-0.0259	***
Consumer Loans	0.0269	0.0242	0.0027	0.0083	***
Loan HHI	0.6973	0.7048	-0.0075	-0.0267	
Securities	0.2459	0.2102	0.0357	0.0054	
ABS&MBS	0.1310	0.0922	0.0388	0.0215	***
Deposits	0.8211	0.8049	0.0162	0.0120	***
Core Deposits	0.6677	0.6281	0.0396	0.0103	***
Nonperforming Loans	0.0179	0.0141	0.0038	0.0003	
NPL Business Loans	0.0020	0.0016	0.0004	0.0003	***
NPL Real Estate Loans	0.0156	0.0124	0.0033	-0.0002	
NPL Consumer Loans	0.0003	0.0001	0.0002	0.0001	*
Income Statement					
Interest Income	0.0340	0.0345	-0.0005	0.0011	***
Interest Expense	0.0056	0.0118	-0.0061	-0.0002	**
Net Interest Income	0.0195	0.0065	0.0130	0.0031	***
Provisions/Assets	0.0057	0.0084	-0.0026	-0.0015	*
Net Charge-offs	0.0015	0.0017	-0.0002	-0.0002	
Noninterest Income /Assets	0.0087	0.0090	-0.0003	-0.0010	***
Operating Income/Assets	0.0224	0.0072	0.0152	0.0035	***
Noninterest Expense/Assets	0.0338	0.0322	0.0016	0.0001	
Net Income (ROA)	0.0030	0.0005	0.0025	0.0022	**

Table 9: Ex ante Characteristics of PE Targets

Mean values for PE targets in the quarter prior to PE investment (79 banks) and for all listed non-targeted commercial banks during those same quarters (661 banks, 15,760 bank-quarter observations). The difference in industry-adjusted means test controls for changes in industry average values during the years in question. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Means for PE target banks	Means for other public banks	Difference in means	Difference in industry-adjusted means
Accounting Risk and Return				
Z-Score	31.9550	37.3313	-5.3763	-2.3999***
ROA	0.0005	0.0060	-0.0055	-0.0046***
Std(ROA)	0.0196	0.0168	0.0028	0.0025***
Equity	0.0947	0.1005	-0.0058	-0.0016
Sharpe	0.6270	1.1260	-0.4990	-0.2966***
Market Risk and Value				
Stock Return Volatility	0.0383	0.0250	0.0133	0.0109***
Idiosyncratic Risk	0.0356	0.0222	0.0134	0.0112***
Systematic Risk	0.0103	0.0088	0.0014	0.0007***
Implied Volatility	0.0027	0.0027	0.0000	-0.0003
Tobin's Q	1.0033	1.0263	-0.0230	-0.0238***
Balance Sheet				
Asset Growth	0.1146	0.0810	0.0336	0.0280***
FTE Growth	0.0742	0.0445	0.0297	0.0292***
Branch Growth	0.0790	0.0315	0.0475	0.0113*
Trading Exposures	0.0003	0.0081	-0.0078	-0.0077***
Loans	0.7155	0.6621	0.0534	0.0405***
Business Loans	0.1099	0.0977	0.0122	0.0102***
Real Estate Loans	0.5685	0.4973	0.0712	0.0599***
Consumer Loans	0.0242	0.0384	-0.0142	-0.0158***
Loan HHI	0.7048	0.6792	0.0255	0.0312***
Securities	0.2102	0.2497	-0.0394	-0.0249***
ABS&MBS	0.0922	0.1099	-0.0177	-0.0105***
Deposits	0.8211	0.7816	0.0395	0.0250***
Core Deposits	0.6281	0.6174	0.0107	0.0263***
Nonperforming Loans	0.0141	0.0129	0.0012	0.0014***
NPL Business Loans	0.0016	0.0014	0.0002	0.0002***
NPL Real Estate Loans	0.0124	0.0112	0.0012	0.0014***
NPL Consumer Loans	0.0001	0.0003	-0.0002	0.0001***
Income Statement				
Interest Income	0.0345	0.0326	0.0019	0.0013***
Interest Expense	0.0118	0.0091	0.0027	0.0002**
Net Interest Income	0.0065	0.0128	-0.0063	-0.0007*
Provisions	0.0084	0.0051	0.0033	0.0021***
Net Charge-offs	0.0017	0.0011	0.0006	0.0005***
Noninterest Income	0.0090	0.0127	-0.0036	-0.0033***
Operating Income	0.0072	0.0207	-0.0135	-0.0065***
Noninterest Expense	0.0322	0.0337	-0.0015	-0.0010
Net Income (ROA)	0.0005	0.0060	-0.0055	-0.0046***
Other variables				
Assets ($billions)	$4.0682	$37.5276	-$33.4595	-$31.5000***
Age	20.0913	28.8837	-8.7924	-3.1808**

Table 10: Propensity Score Model

Probit estimation. The dependent variable is a dummy equal to one for banks that had a non-zero private equity investment at any time during the 2004:Q1 and 2016:Q1 sample period. The model in column 1 is estimated using all quarterly observations of non-targeted publicly traded commercial banks plus all pre-PE investment quarterly observations of targeted commercial banks. A matched sample of targeted and non-targeted banks is constructed based on the fitted values of the specification in column 1. The model in column 2 is estimated using the matched sample. The coefficients are the odds ratios of a one-standard deviation change in the variable of interest. Both models include time fixed effects. Standard errors are clustered at the bank level. t-statistics are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

	All banks	Matched sample
	(1)	(2)
lnAssets	**0.5844****	0.7901
	(2.5380)	(0.8734)
Age	1.0118	0.8171
	(0.1840)	(0.3256)
Loans	1.4469	0.8076
	(1.3652)	(0.5366)
Loan HHI	1.0758	**1.3339***
	(0.5194)	(1.6499)
NPL	0.9692	1.0678
	(0.3144)	(0.5729)
Securities	1.0048	0.6089
	(0.0181)	(1.1957)
Equity	**1.2919****	1.1198
	(2.1424)	(0.8861)
ROE	0.9592	0.955
	(1.1106)	(0.5469)
Z-score	0.8996	0.9631
	(1.1230)	(0.3193)
Interest Expense	**0.6809***	1.1414
	(1.7730)	(0.4393)
Deposits	1.3932	0.9572
	(1.2109)	(0.2250)
Pseudo-R squared	0.10	0.08
Chi-square	178.41	205.93
Observations	16,354	7,091
Number of Banks	735	246

Table 11: Descriptive Statistics and Definitions for Variables in the Matched Data Sample
Data for 8,718 bank-quarter observations on 246 different banks (79 unique PE target banks and 167 different matched banks). All quarterly flow variables are reported as annualized numbers. Post-exit bank-quarter observations are excluded. All of the variables listed here are used in the regression tests.

	PE Targets		**Non-PE Targets**	
	Mean	Std. Dev.	Mean	Std. Dev.
PE Share	0.0946	0.1598	0	0
PE Block-holder	0.4504	0.4976	0	0
Assets ($ billions)	3.5962	12.0259	8.3827	21.6944
Age	20.4757	22.8025	26.1900	10.3561
Accounting Risk and Return				
Z-Score	32.7728	24.6496	33.8095	18.5085
ROA	0.0015	0.0280	0.0065	0.0178
Std(ROA)	0.0246	0.0317	0.0167	0.0158
Equity	0.0997	0.0357	0.0959	0.0244
Sharpe	0.6469	1.0577	1.2589	0.8801
Market Risk and Value				
Return Volatility	0.0363	0.0679	0.0248	0.0177
Idiosyncratic Risk	0.0338	0.0664	0.0217	0.0169
Systematic Risk	0.0097	0.0172	0.0095	0.0090
Implied Volatility	0.0028	0.0017	0.0027	0.0014
Tobin's Q	1.0042	0.0775	1.0287	0.0611
Balance Sheet				
Asset Growth	0.1125	0.4158	0.0748	0.2552
FTE Growth	0.0770	0.4771	0.0331	0.2943
Branch Growth	0.0790	0.4562	0.0715	0.4645
Trading Exposures	0.0005	0.0023	0.0015	0.0076
Loans	0.7005	0.1105	0.6697	0.1103
Business Loans	0.1146	0.0806	0.1031	0.0613
Real Estate Loans	0.5465	0.1208	0.4998	0.1356
Consumer Loans	0.0298	0.0551	0.0408	0.0436
Loan HHI	0.7005	0.1213	0.6599	0.1367
Securities	0.2277	0.1124	0.2575	0.1113
ABS&MBS	0.1111	0.0862	0.1128	0.0905
Deposits	0.8128	0.0580	0.8092	0.0686
Core Deposits	0.6472	0.1063	0.6554	0.0970
Nonperforming Loans	0.0160	0.0192	0.0123	0.0168
Income Statement				
Interest Income	0.0342	0.0079	0.0339	0.0067
Interest Expense	0.0090	0.0077	0.0088	0.0074
Net Interest Income	0.0124	0.0209	0.0145	0.0174
Provisions	0.0072	0.0155	0.0050	0.0110
Net Charge-offs	0.0016	0.0035	0.011	0.0023
Noninterest Income	0.0085	0.0083	0.0120	0.0097
Operating Income	0.0137	0.0361	0.0216	0.0293
Noninterest Expense	0.0327	0.0197	0.0311	0.0131
Net Income	0.0015	0.0280	0.0065	0.0178

Table 12: Accounting Risk and Return

OLS estimations of equation (3). Data is a propensity matched sample of U.S. banks targeted (and not targeted) by private equity investors between 2004:Q1 and 2016:Q1. Post-exit bank-quarter observations are excluded. The dependent variables are accounting-based measures of bank performance. *PE Share* is the percent shareholdings of private equity investors in each quarter. *PE Block-holder* is a dummy equal to one if *PE Share* equals at least 5%. All variables are defined at Table 7. All regressions include bank fixed effects and time fixed effects. Standard errors are clustered by bank. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Dependent variable:	*Z-Score*	*Z-Score*	*ROA*	*ROA*	*Std(ROA)*	*Std(ROA)*	*Equity/Assets*	*Equity/Assets*	*Sharpe*	*Sharpe*
PE Share	**-44.9888*** **		**0.0226** **		**0.0149*** **		0.0155		**-1.7594*** **	
	(7.8450)		(0.0089)		(0.0024)		(0.0138)		(0.3150)	
PE Block-holder		**-10.9971*** **		**0.0048** **		**0.0037*** **		0.0051		**-0.3562*** **
		(2.7452)		(0.0020)		(0.0008)		(0.0037)		(0.1213)
lnAssets	7.1110**	7.6415***	-0.0031	-0.0033*	-0.0015**	-0.0016***	0.0085	0.0083	0.3891***	0.4073***
	(2.7474)	(2.8606)	(0.0019)	(0.0019)	(0.0006)	(0.0006)	(0.0060)	(0.0059)	(0.1234)	(0.1240)
Constant	-71.3880*	-79.0111*	0.0544**	0.0579**	0.0244***	0.0269***	-0.0280	-0.0248	-4.1336**	-4.3968**
	(38.6906)	(40.2928)	(0.0276)	(0.0269)	(0.0082)	(0.0087)	(0.0847)	(0.0837)	(1.7408)	(1.7483)
Observations	8,718	8,718	8,718	8,718	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246	246	246	246	246
Number of Targets	79	79	79	79	79	79	79	79	79	79
R-squared (within)	0.114	0.103	0.128	0.125	0.158	0.144	0.062	0.063	0.291	0.277

Table 13: Market-based Risk and Value

OLS estimations of equation (3) for publicly traded banks. Data is a propensity matched sample of U.S. banks targeted (and not targeted) by private equity investors between 2004:Q1 and 2016:Q1. Post-exit bank-quarter observations are excluded. The dependent variables are market-based measures of bank performance. *PE Share* is the percent shareholdings of private equity investors in each quarter. *PE Block-holder* is a dummy equal to one if *PE Share* equals at least 5%. All variables are defined at Table 7. All regressions include bank fixed effects and time fixed effects. Standard errors are clustered by bank. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Dependent Variable:	*Return Volatility*	*Return Volatility*	*Idiosyncratic Risk*	*Idiosyncratic Risk*	*Systematic Risk*	*Systematic Risk*	*Implied Volatility*	*Implied Volatility*	*Tobin's Q*	*Tobin's Q*
PE Share	**0.0156****		**0.0159****		0.0031		**0.0059*****		**0.0613*****	
	(0.0076)		(0.0072)		(0.0034)		(0.0012)		(0.0227)	
PE Block-holder		-0.0049		-0.0046		-0.0008		**0.0011*****		**0.0168****
		(0.0064)		(0.0061)		(0.0015)		(0.0003)		(0.0070)
lnAssets	-0.0135**	-0.0134**	-0.0143**	-0.0142**	0.0011	0.0011	-0.0005***	-0.0007***	-0.0113	-0.0129*
	(0.0062)	(0.0060)	(0.0059)	(0.0057)	(0.0013)	(0.0012)	(0.0002)	(0.0002)	(0.0074)	(0.0073)
Constant	0.2106**	0.2092**	0.2198***	0.2186***	-0.0098	-0.0100	0.0105***	0.0126***	1.2495***	1.2715***
	(0.0876)	(0.0843)	(0.0838)	(0.0807)	(0.0178)	(0.0173)	(0.0024)	(0.0028)	(0.1045)	(0.1040)
Observations	8,718	8,718	8,715	8,715	8,718	8,718	8,040	8,040	8,040	8,040
Number of Banks	246	246	246	246	246	246	228	228	228	228
Number of Targets	79	79	79	79	79	79	79	79	79	79
R-squared (within)	0.173	0.173	0.147	0.147	0.268	0.268	0.284	0.226	0.465	0.464

Table 14: Balance-sheet Items

Partial results for OLS estimations of equation (3). Data is a propensity matched sample of U.S. banks targeted (and not targeted) by private equity investors between 2004:Q1 and 2016:Q1. Post-exit bank-quarter observations are excluded. The dependent variables are accounting-based measures of bank performance. *PE Share* is the percent shareholdings of private equity investors in each quarter. *PE Block-holder* is a dummy equal to one if *PE Share* equals at least 5%. All variables are defined at Table 7. All regressions include bank fixed effects and time fixed effects. Standard errors are clustered by bank. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable:	[1] *Asset Growth*	[2] *FTE Growth*	[3] *Branch Growth*	[4] *Loans*	[5] *Deposits*	[6] *Core Deposits*	[7] *Equity*
PE Share	-0.0483	-0.0446	-0.0404	**-0.0943*** **	-0.0181	0.0054	0.0155
	(0.1556)	(0.1183)	(0.0499)	(0.0326)	(0.0263)	(0.0187)	(0.0138
Observations	8,718	8,718	8,718	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246	246	246	246
No. of Targets	79	79	79	79	79	79	79
R-squared	0.023	0.014	0.022	0.220	0.304	0.198	0.062
PE Block-holder	0.0048	-0.0028	-0.0082	**-0.0198***	-0.0060	0.0053	0.0051
	(0.0259)	(0.0235)	(0.0190)	(0.0112)	(0.0086)	(0.0061)	(0.0037
Observations	8,718	8,708	8,708	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246	246	246	246
No. of Targets	79	79	79	79	79	79	79
R-squared	0.023	0.014	0.025	0.22	0.303	0.199	0.063

Dependent Variable:	[8] *Securities*	[9] *ABS & MBS*	[10] *Trading Exposures*	[11] *Real Estate Loans*	[12] *Business Loans*	[13] *Consumer Loans*	[14] *Nonperform-ing Loans*
PE Share	**0.1064*** **	**0.1077*** **	0.0012	**-0.0849** **	-0.0221	**0.0204*** **	-0.0039
	(0.0381)	(0.0279)	(0.0009)	(0.0332)	(0.0192)	(0.0078)	(0.0068)
Observations	8,718	8,718	8,064	8,718	8,718	8,718	8,718
No. of Banks	246	246	236	246	246	246	246
No. of Targets	79	79	79	79	79	79	79
R-squared	0.246	0.176	0.005	0.17	0.08	0.216	0.389
PE Block-	**0.0239** **	**0.0267*** **	**0.0007***	**-0.0293*** **	0.0028	**0.0063** **	-0.0006
	(0.0116)	(0.0088)	(0.0004)	(0.0105)	(0.0064)	(0.0025)	(0.0019)
Observations	8,718	8,718	8,064	8,718	8,718	8,718	8,718
No. of Banks	246	246	236	246	246	246	246
No. of Targets	79	79	79	79	79	79	79
R-squared	0.246	0.169	0.006	0.175	0.081	0.218	0.389

Table 15: Income Statement Items

Partial results for OLS estimations of equation (3). Data is a propensity matched sample of U.S. banks targeted (and not targeted) by private equity investors between 2004:Q1 and 2016:Q1. Post-exit bank-quarter observations are excluded. The dependent variables are accounting-based measures of bank performance. *PE Share* is the percent shareholdings of private equity investors in each quarter. *PE Block-holder* is a dummy equal to one if *PE Share* equals at least 5%. All variables are defined at Table 7. All regressions include bank fixed effects and time fixed effects. Standard errors are clustered by bank. ***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable:	[1] *Interest Income*	[2] *Interest Expense*	[3] *Net Interest Income*	[4] *Loan Loss Provisions*	[5] *Net Charge-offs*
PE Share	-0.00384	-0.00149	**0.01350****	**-0.01346****	-0.00160
	(0.00280)	(0.00127)	(0.00623)	(0.00585)	(0.00156)
Observations	8,718	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246	246
No. of Targets	79	79	79	79	79
R-squared (within)	0.136	0.919	0.395	0.241	0.203
PE Block-holder	0.00078	**-0.00070****	**0.00504*****	**-0.00282****	-0.00033
	(0.00073)	(0.00027)	(0.00142)	(0.00117)	(0.00029)
Observations	8,718	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246	246
No. of Targets	79	79	79	79	79
R-squared (within)	0.134	0.919	0.397	0.238	0.203

Dependent Variable:	[6] *Noninterest Income*	[7] *Operating Income*	[8] *Noninterest Expense*	[9] *Net Income*
PE Share	0.00143	**0.02681****	-0.00041	**0.02258****
	(0.00224)	(0.01054)	(0.00511)	(0.00885)
Observations	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246
No. of Targets	79	79	79	79
R-squared (within)	0.032	0.279	0.020	0.128
PE Block-holder	0.00106	**0.00880****	0.00132	**0.00478****
	(0.00068)	(0.00252)	(0.00127)	(0.00197)
Observations	8,718	8,718	8,718	8,718
No. of Banks	246	246	246	246
No. of Targets	79	79	79	79
R-squared (within)	0.033	0.280	0.021	0.125

Figure 1
Total private equity investment in U.S. commercial banking companies in each year.

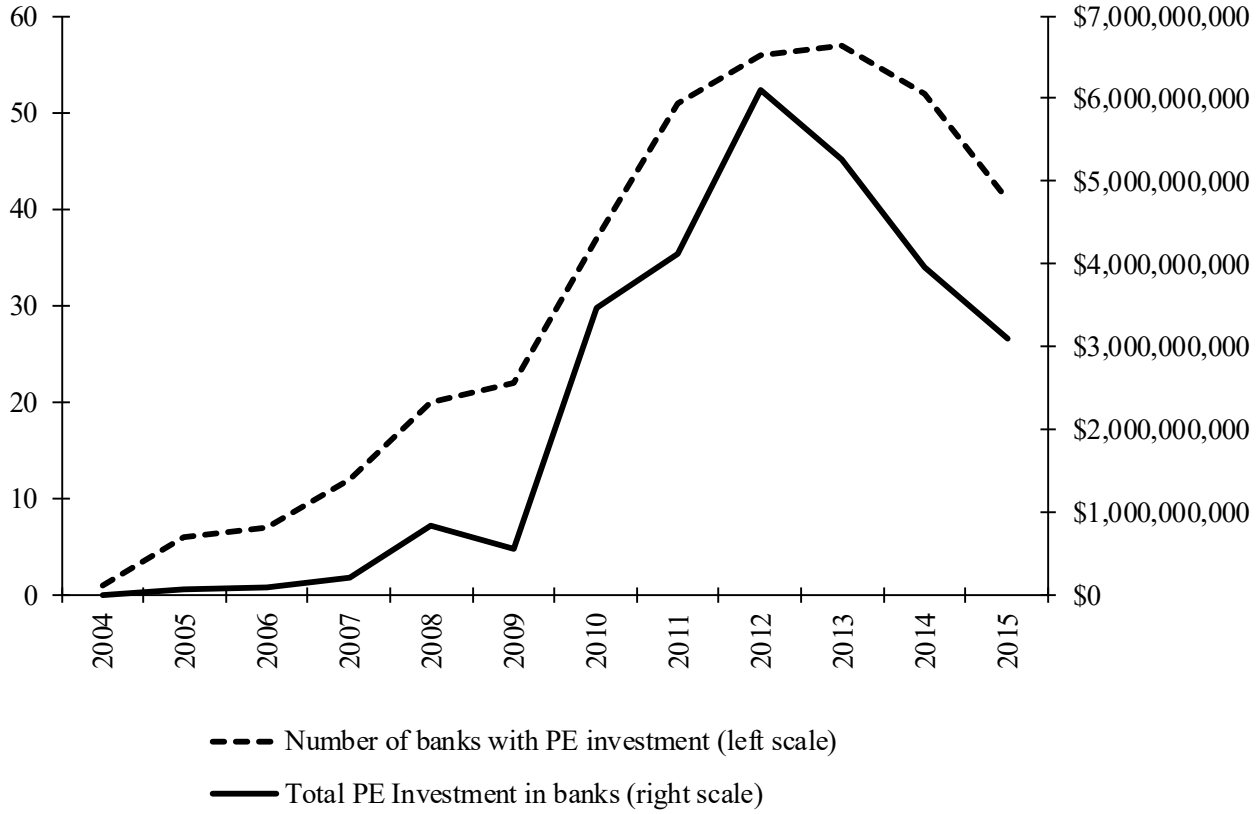

Figure 2

Number new (PE Entry) and completed (PE Exit) private equity investments in U.S. commercial banking companies per year. (Data includes only the first three months of 2016.)