

Private Equity Investment in U.S. Banks

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The views expressed herein are those of the authors and do not necessarily represent those of the Federal Reserve Bank of Boston or the Federal Reserve System.

Private equity (PE) investment in banks

- A PE firm is an investment management company.
- Purchases private firms and/or takes public firms private.
- Adds value via changes in operations, scope, finances.
- Objective: Sell-off the targeted firm at a gain.

Banks have long supplied capital in PE deals (Fang, Ivashina, and Lerner 2013), but private equity investments in U.S banks were rare and very small.

- Heavy banking regulation interferes with PE ability to make changes.
- Relatively short-run PE investment horizon is not preferred.
- Risk-taking PE behavior is at odd with regulators' stability concerns.

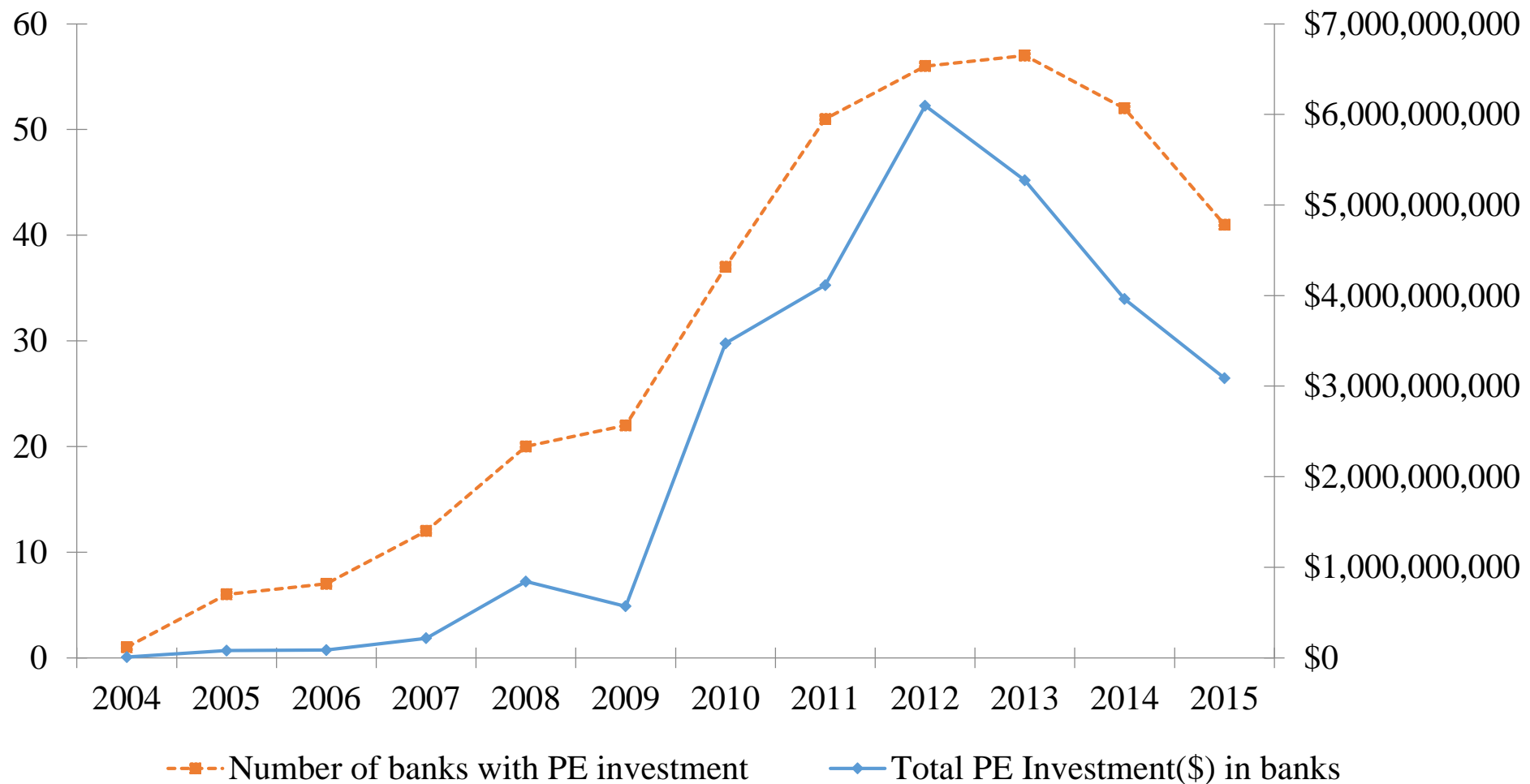
The 2007-2009 financial crisis was a **game-changer**:

- Banks suffered great losses and needed to be recapitalized.
- Undeployed capital raised by PE during pre-crisis years became source of funds for “capital-starved” banks (Piper Jaffray, 2008).
- In September 2008, Federal Reserve issued guidelines for expanded PE investments in U.S. commercial banks and relaxed the BHC Act conditions.
- The old stance: a company obtaining a board seat with 10 to 24.9% of voting stock was required to have a BHC registration.

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- In September 2008, Federal Reserve issued guidelines for expanded PE investments in U.S. commercial banks and relaxed the BHC Act conditions.
- The new stance: an investor would not be subject to the BHC Act under three conditions:
 1. A “minority investor” owning less than 1/3 of total (voting and non-voting) equity **and** less than 15% of voting equity.
 2. A “minority investor” having a single director.
 3. A “minority” investor having no more than two director seats and not exceeding 25% of voting members, and there is another shareholder which has a BHC registration “*controlling the banko in the spirit of the BHC Act*”.

PE investment in U.S. commercial banks



Our data:

- Collected data on 88 PE investments in U.S. bank holding companies (79 PE deals in publicly traded U.S banks) made between 2004 and 2016.
- SNL, Capital IQ, Bloomberg Terminal.
- SEC Edgar for deal details and accuracy of PE firm identity.
- Y9-Cs and Call Reports for financial statements.
- CRSP and OTC database for stock price information.

Two Research Questions :

1. Were PE investors able to earn acceptable returns on these deals, despite being constrained by bank regulation (leverage, liquidity, product restrictions)?
2. Did PE investments increase business risk and/or financial risk at the targeted banks, as historically feared by U.S. bank regulators?

Anatomy of PE-Bank Deals:

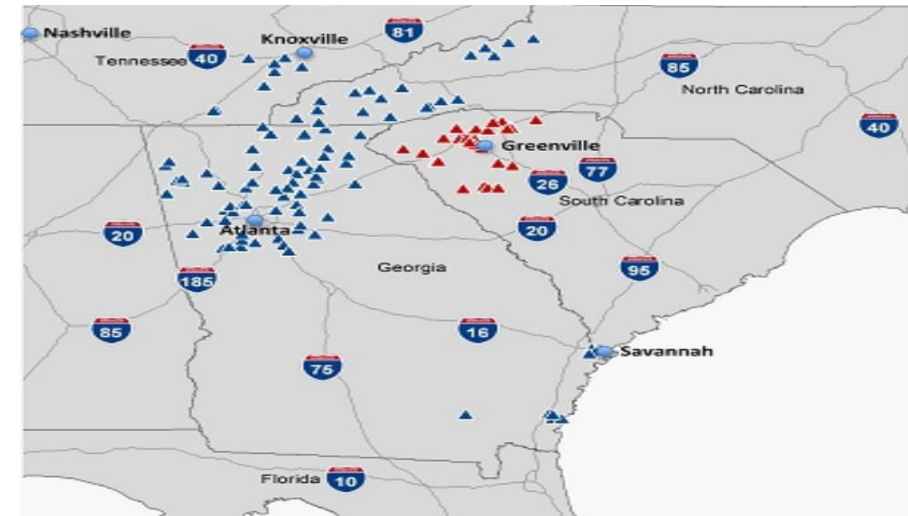
Patriot Financial Partners, CapGen Capital Group V & Palmetto Bancshares Inc. (Nasdaq:PLMT)

- On May 25, 2010 Private Placement Agreement: Patriot and CapGen invested \$23.3 mil (19.2%) and CapGen \$55 mil (45.4%) in PLMT.
- Patriot obtained 1 board seat (James L. Lynch). Capgen obtained 2 board seats: (Robert B. Goldstein; John P. Sullivan).
- April 22, 2015, Exit via **Merger by United Community Banks @ \$19.25**. MCAP: **\$240.5 mil**.
- MOIC=1.98; IRR=14.85%
- (MOIC(S&P)=1.51; IRR(S&P)=8.99%.

Acquirer	Date of Merger	Merger Completion	Premium (one-day prior)
United Community Banks, Inc.	4/22/2015	132 Days	6.6%

Source: Author's calculations based on Y9-C, SNL, SEC Edgar, Bloomberg.

PLMT's Reported Financial Statements			
	2010:Q1	2009:Q4	2009:Q1
Balance Sheet:			
Total Assets(\$ mil)	1,348	1,437	1,402
Deposits (%)	85.43%	85.78%	85.99%
Loans(%)	75.04%	72.67%	83.25%
NPL(%)	8.39%	6.75%	4.02%
Regulatory Capital:			
Tier 1-Leverage	5.30%	5.55%	8.67%
Tier 1-Risk-based	6.82%	6.99%	9.72%
Total Risk-based	8.09%	8.25%	10.75%
Income Statement (reported):			
Net Interest Inc(\$ mil)	-\$4.05	-\$11.71	-\$5.03
Net Income(\$ mil)	-\$5.29	-\$10.05	-\$1.99
ROA-Annualized(%)	-1.57%	-2.79%	-0.57%





About CapGen Financial Partners

CapGen is a private equity firm that invests in financial services businesses with a particular focus on community and regional financial institutions, specialty finance and related services. CapGen seeks to invest in high quality medium-sized financial services related businesses. These may include banks, finance and leasing companies. Potential portfolio companies may be privately owned, publicly held or divisions of large institutions subject to divestiture.

CapGen generally focuses its investments on companies which already have demonstrated the viability of their businesses. Therefore, CapGen specializes in providing long-term capital for recapitalizations, management led buyouts, and expansion capital for growth opportunities.

The New York-based firm was founded by Eugene Ludwig, who previously served as U.S. Comptroller of the Currency and Vice Chairman of Bankers Trust / Deutsche Bank. Additional information may be found at CapGen's web site at www.capgen.com.



Founded in 2007, Patriot Financial Partners is a private equity firm focused on investing in community banks, thrifts and financial services related companies throughout the United States. Patriot's objective is to seek superior risk-adjusted returns by applying a hands-on, value-added investment model to non-control investments within the community banking sector, which consists of more than 1,000 public and privately-held depository institutions that have between \$500 million and \$5 billion of assets. Patriot has expanded its focus to include adjacent niche markets within the financial services sector.

Portfolio companies should have strong management teams with successful track records. Patriot is looking for banks with demonstrated growth in assets, loans and core deposits; a strong credit culture; growth in net income; and acceptable levels of capital.



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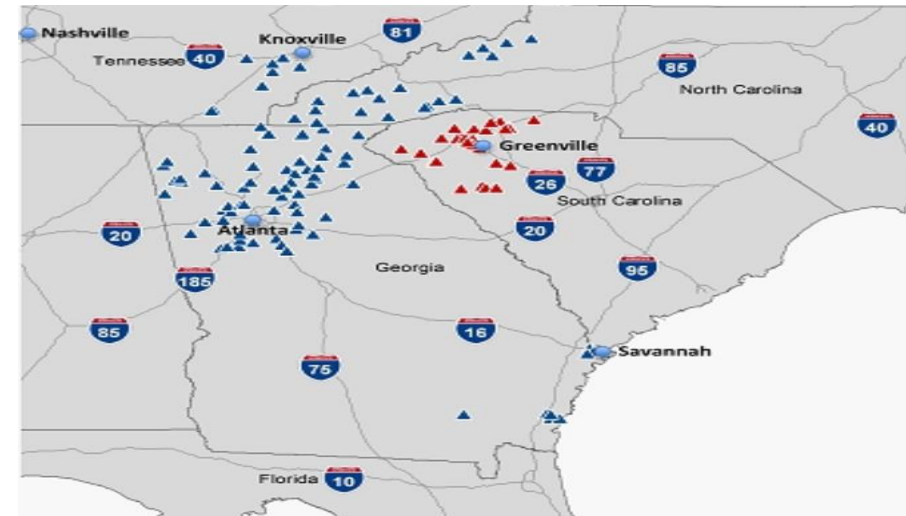
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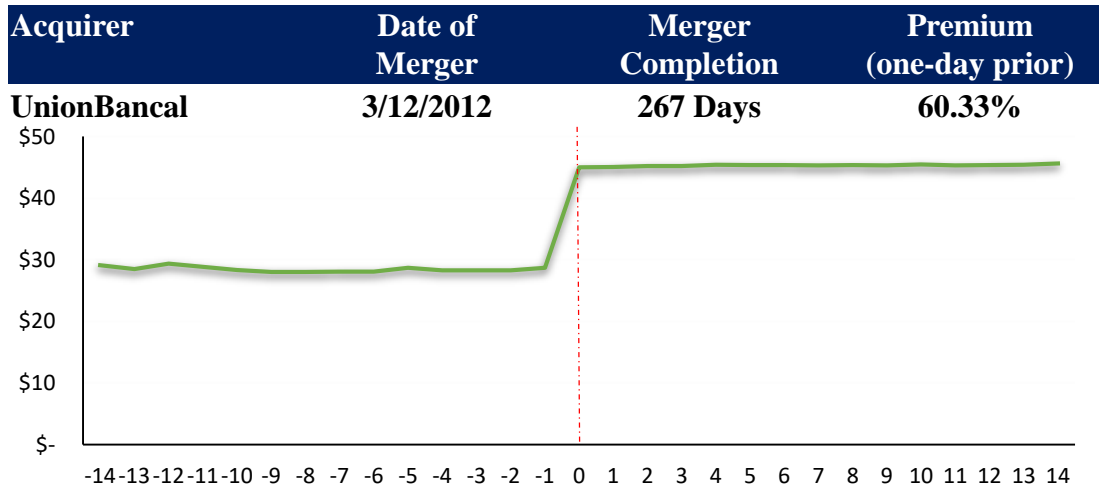
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Ford Financial Fund, L.P. & Pacific Capital Bancorp (Nasdaq:PCBC)

- On April 29, 2010 Ford purchased 225 mil shares @\$.20 and 445,000 convertible preferred @\$1,000. Investment:\$500 mil. **Obtained two board seats (Gerald Ford & Carl Webb).**
- August 31, 2010, preferred stock were converted into 2,275 mil shares (=445,000 x \$1,000/\$0.20). **Ownership:98%.**
- March 9, 2012, Ford held 75.9% due to dilution.
Investment Value:\$ 717.25 mil (25 mil shares x \$28.69)
- March 12, 2012, Exit via **Merger by UnionBancal** on @ \$45.03. Exit Value: \$1.13 bil. **MOIC=2.2950; IRR=38.68%**



PCBC's Reported Financial Statements			
	2010:Q1	2009:Q4	2009:Q1
Balance Sheet:			
Total Assets(\$ mil)	\$7,369.10	\$7,542.25	\$9,222.48
Deposits (%)	55.41%	52.39%	52.16%
Loans(%)	66.68%	68.75%	62.62%
NPL(%)	5.64%	5.27%	2.79%
Regulatory Capital:			
Tier 1-Leverage	4.29%	5.34%	6.82%
Tier 1-Risk-based	6.90%	7.81%	11.33%
Total Risk-based	9.64%	10.40%	14.11%
Income Statement (reported):			
Net Interest Inc(\$ mil)	-\$86.18	-\$18.68	-\$20.78
Net Income(\$ mil)	-\$80.46	-\$14.46	-\$5.51
ROA-Annualized(%)	-4.37%	-0.76%	-0.24%

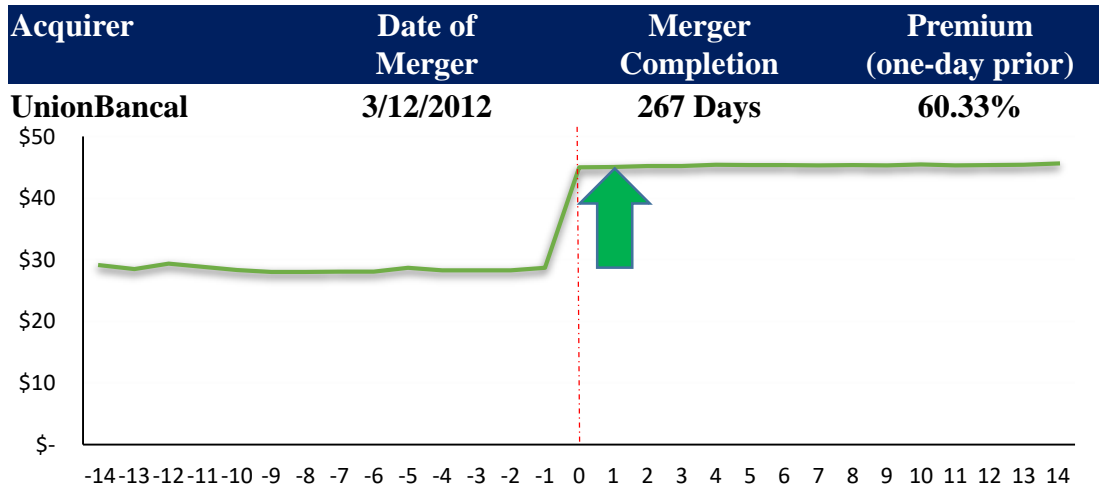


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Summary of PE-Bank Deals

Duration of non-bank PE deals is about 4 years (Guo, Hotchkiss, Song 2011; Fang, Ivashina, Lerner 2013)

	PE Investment (\$mil.)	PE Ownership (%)	Public Dum.	OTC Dum.	Number Of PE Directors	Exit Dum.	Duration (Years)	M&A Compl (Days)		
Average	\$74.21	23.98%	0.95	0.12	0.89	0.73	4.14	201.00	23.05%	\$552.77
Median	\$22.77	13.61%	1.00	0.00	1.00	1.00	4.94	195.00	15.68%	\$316.20
Std Dev.	\$159.12	23.23%	0.22	0.32	1.11	0.44	2.30	81.00	22.75%	\$810.80
Min	\$0.02	2.39%	0.00	0.00	0.00	0.00	0.00	52.00	-5.58%	\$26.90
Max	\$2,025.00	100.00%	1.00	1.00	5.00	1.00	11.09	400.00	94.17%	\$5,311.87
N	88	88	82	11	82	66	66	46	46	46

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Bank Characteristics of PE Targets Before PE Entry

Bank Characteristics	PE-Target Banks	Other Public Banks	Difference in Means [1]-[2]	Difference in industry-adj Means [1]-[2]
	Mean [1]	Mean [2]		
Assets(\$bil.)	4.0682	37.5276	-33.4595	-31.5000***
Age	20.0913	28.8837	-8.7924	-3.1808**
Z-Score	31.9550	37.3313	-5.3763	-2.3999***
Std(ROA)	0.0196	0.0168	0.0028	0.0025***
ROA	0.0005	0.0060	-0.0055	-0.0046***
Sharpe	0.6270	1.1260	-0.4990	-0.2966***
Loans	0.7155	0.6621	0.0534	0.0405***
Core Deposits	0.6281	0.6174	0.0107	0.0263***
Securities	0.2102	0.2497	-0.0394	-0.0249***
ABS&MBS	0.0922	0.1099	-0.0177	-0.0105***
Equity	0.0947	0.1005	-0.0058	-0.0016
Interest Income /Assets	0.0345	0.0326	0.0019	0.0013***
Interest Expense /Assets	0.0118	0.0091	0.0027	0.0002**
Noninterest Income /Assets	0.0090	0.0127	-0.0036	-0.0033***
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ROA	0.0005	0.0060	-0.0055	-0.0046***
Sharpe	0.6270	1.1260	-0.4990	-0.2966***
Loans	0.7155	0.6621	0.0534	0.0405***
Core Deposits	0.6281	0.6174	0.0107	0.0263***
Securities	0.2102	0.2497	-0.0394	-0.0249***
ABS&MBS	0.0922	0.1099	-0.0177	-0.0105***
Equity	0.0947	0.1005	-0.0058	-0.0016
Interest Income /Assets	0.0345	0.0326	0.0019	0.0013***
Interest Expense /Assets	0.0118	0.0091	0.0027	0.0002**
Noninterest Income /Assets	0.0090	0.0127	-0.0036	-0.0033***
Operating Income/Assets	0.0072	0.0207	-0.0135	-0.0065***
Noninterest Expense/Assets	0.0322	0.0337	-0.0015	-0.0010

Bank Characteristics of PE Targets Before PE Entry

Bank Characteristics	PE-Target Banks	Other Public Banks	Difference in Means [1]-[2]	Difference in industry-adj Means [1]-[2]
	Mean [1]	Mean [2]		
Assets(\$bil.)	4.0682	37.5276	-33.4595	-31.5000***
Age	20.0913	28.8837	-8.7924	-3.1808**
Z-Score	31.9550	37.3313	-5.3763	-2.3999***
Std(ROA)	0.0196	0.0168	0.0028	0.0025***
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Abnormal announcement returns

Event Window	CAPM (CRSP index)		Fama-French 3 Factor + Momentum		CAPM (KBW Index)	
	CAR	t-value	CAR	t-value	CAR	t-value
(-1,0)	0.0090	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***

Abnormal announcement returns

Event Window	CAPM (CRSP index)		Fama-French 3 Factor + Momentum		CAPM (KBW Index)	
	CAR	t-value	CAR	t-value	CAR	t-value
<div> CAR(-1,+1) averaged 3.41% in non-bank PE deals (Dahiya et al. 2013-World Bank Paper). </div>		1.03	0.0092	1.08	-0.0129	-0.06
		-0.98	-0.0050	-0.84	-0.0137	-0.69
		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***

Typical PE industry performance metrics

Multiple on invested capital (MOIC):

- Accumulated returns over the life of the investment as a percent of invested capital.

$$MOIC = \frac{\sum_{t=0}^{T2} \text{payments to capital}_t + \sum_{T1}^{T2} p_t \cdot \text{shares sold}_t}{\sum_{t=0}^{T1} p_t \cdot \text{shares purchased}_t}$$

Gross internal rate of return (IRR):

- Annualized percent return in investment.

$$0 = \sum_{t=0}^{T2} \frac{p_t \cdot \text{shares sold}_t + \text{payments to capital} - p_t \cdot \text{shares purchased}_t}{(1 + R)^t}$$

Typical PE industry performance metrics

	<i>MOIC</i>	<i>MOIC(S&P)</i>	Premium	<i>IRR</i>	<i>IRR(S&P)</i>	Premium
Mean	1.4764	1.3119	0.1645	0.1266	0.0842	0.0424
Median	1.4006	1.2630	0.1376	0.1383	0.0963	0.0420

MOICs on nonbank PE deals in 2008 averaged 1.3 (Gompers, Kaplan, Mukharlyamov 2015).

IRRs in non-bank buyout and VC deals averaged 11%-13% (Harris, Jenkinson and Kaplan 2014).

Estimations of Bank Risk

- Propensity-matched data from 2004:Q1 to 2016:Q1.
 - Matching based on ex-ante bank characteristics among public banks
 - 8,718 quarterly observations (79 targets, 167 non-targets).
 - Robustness using 1-1 Match (with/without replacement)
 - Robustness using nearest neighborhood (N=2)

- Fixed Effect OLS Estimation on the matched sample:

$$\textit{Risk Measure}_{it} = a + b \cdot \textit{PE}_{it-1} + c \cdot \textit{Controls}_{it-1} + B_i + T_t + \varepsilon_{it}$$

- Variable of Interest: PE presence.
 - PE Blockholder Dummy (Ownership $\geq 5\%$)
 - PE Share (continuous variable)
- Controls:
 - Bank-characteristics (Log(Assets), bank-fixed effect, time-fixed effect)
 - Robustness with a large set of bank controls.

Estimations of Bank Risk

Accounting-based Risk Measure is one of 3 different measures.

➤ **Z-Score:**

$$\frac{\text{Equity/Assets} + \mu(\text{ROA})}{\sigma(\text{ROA})}$$

➤ **Std Deviation of ROA:**

$$\sigma(\text{ROA})$$

➤ **Sharpe Ratio:**

$$\frac{\mu(\text{ROE}) - Rf}{\sigma(\text{ROE})}$$

Estimations of Bank Risk

Market-based Risk Measure is one of 4 different measures.

➤ **Stock Return Volatility:**

$\sigma(\text{Daily Stock Return})$

➤ **Idiosyncratic Bank Risk:**

$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma^2(e_i)$, where $\sigma^2(e_i)$ is *idiosyncratic variance*.

➤ **Systematic Risk:**

$\sigma_i^2 = \beta_i^2 \sigma_m^2 + \sigma^2(e_i)$, where $\beta_i^2 \sigma_m^2$ is *the systematic variance*.

➤ **Black-Scholes-Merton Implied Volatility**

$$V_E = V_A e^{-\delta T} N(d_1) - X e^{-rT} N(d_2) + (1 - e^{-\delta T}) V_A$$

$$\sigma_E = (V_A e^{-\delta T} N(d_1) \sigma_A) / V_E$$

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➤ **Black-Scholes-Merton Implied Volatility**

$$V_E = V_A e^{-\delta T} N(d_1) - X e^{-rT} N(d_2) + (1 - e^{-\delta T}) V_A \quad (1)$$

$$\sigma_E = (V_A e^{-\delta T} N(d_1) \sigma_A) / V_E \quad (2)$$

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Share	-44.9888*** (7.8450)	-48.5471*** (7.8050)	0.0149*** (0.0024)	0.0157*** (0.0025)	-1.7594*** (0.3150)	-1.5929*** (0.3841)
Log(Assets)	7.1110** (2.2898)	6.0751 (2.5099)	-0.0015** (0.0006)	-0.0017*** (0.0004)	0.3891*** (0.1234)	0.8794*** (0.2829)
Loans		15.6914 (14.5539)		-0.0038 (0.0036)		1.6543 (1.3688)
Loan HHI		1.3112 (8.7802)		0.0007 (0.0024)		-0.6323 (0.7133)
NPL		-217.6665*** (62.6207)		0.1124*** (0.0144)		-17.8126*** (1.8667)
Equity		221.4424*** (56.5304)		-0.0351 (0.0147)		-2.1068 (1.8683)
ROE		0.0366 (0.0288)		-0.0000 (0.0000)		0.0022 (0.0038)
Interest Expense		204.8809 (151.5427)		0.0073 (0.0306)		12.2318 (12.8106)
MBS/ABS Securities		9.3312 (15.1754)		-0.0013 (0.0027)		-0.5219 (1.1111)
Deposits		-5.8797 (10.6548)		0.0010 (0.0022)		-0.2925 (0.5599)
Constant	34.9850 (31.8016)	-85.5234** (40.6474)	0.0244*** (0.0082)	0.0335*** (0.0071)	-4.1336** (1.7408)	-11.0026** (4.7462)
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.114	0.233	0.158	0.291	0.291	0.277

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Share	-44.9888*** (7.8450)	-48.5471*** (7.8050)	0.0149*** (0.0024)	0.0157*** (0.0025)	-1.7594*** (0.3150)	-1.5929*** (0.3841)
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Constant	34.9850 (31.8016)	-85.5234** (40.6474)	0.0244*** (0.0082)	0.0335*** (0.0071)	-4.1336** (1.7408)	-11.0026** (4.7462)
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.114	0.233	0.158	0.291	0.291	0.277

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Share	-44.9888*** (7.8470)	-48.5471*** (7.8050)	0.0149*** (0.0024)	0.0157*** (0.0025)	-1.7594*** (0.3150)	-1.5929*** (0.3841)
Log(Assets)	7.1110** (2.2898)	6.0751 (2.5000)	-0.0015** (0.0000)	-0.0017*** (0.0004)	0.3891*** (0.1234)	0.8794*** (0.2829)
Loans				0.0038 (0.0036)		1.6543 (1.3688)
Loan HHI				0.0007 (0.0024)		-0.6323 (0.7133)
NPL		-217.6665*** (62.6207)		0.1124*** (0.0144)		-17.8126*** (1.8667)
Equity		221.4424*** (56.5304)		-0.0351 (0.0147)		-2.1068 (1.8683)
ROE		0.0366 (0.0288)		-0.0000 (0.0000)		0.0022 (0.0038)
Interest Expense		204.8809 (151.5427)		0.0073 (0.0306)		12.2318 (12.8106)
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Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
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Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.114	0.233	0.158	0.291	0.291	0.277

$$[-44.99 \times 0.10] / 33.59 = -13.39\%$$

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Share	-44.9888*** (7.8450)	-48.5471*** (7.8050)	0.0149*** (0.0024)	0.0157*** (0.0025)	-1.7594*** (0.3150)	-1.5929*** (0.3841)
Log(Assets)	7.1110** (2.2898)	6.0751 (2.5099)	-0.0015** (0.0006)	-0.0017*** (0.0004)	0.3891*** (0.1234)	0.8794*** (0.2829)
Loans		15.6914 (14.5539)		-0.0038 (0.0036)		1.6543 (1.3688)
Loan HHI		1.3112 (8.7802)		0.0007 (0.0024)		-0.6323 (0.7133)
NPL		-217.6665*** (62.6207)		0.1124*** (0.0144)		-17.8126*** (1.8667)
Equity		221.4424*** (56.5304)		-0.0351 (0.0147)		-2.1068 (1.8683)
ROE		0.0366 (0.0288)		-0.0000 (0.0000)		0.0022 (0.0038)
Interest Expense		204.8809 (151.5427)		0.0073 (0.0306)		12.2318 (12.8106)
MBS/ABS Securities		9.3312 (15.1754)		-0.0013 (0.0027)		-0.5219 (1.1111)
Deposits		-5.8797 (10.6548)		0.0010 (0.0022)		-0.2925 (0.5599)
Constant	34.9850 (31.8016)	-85.5234** (40.6474)	0.0244*** (0.0082)	0.0335*** (0.0071)	-4.1336** (1.7408)	-11.0026** (4.7462)
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.114	0.233	0.158	0.291	0.291	0.277

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Blockholder	-10.9971*** (2.7452)	-12.0214*** (2.5482)	0.0037*** (0.0008)	0.0039*** (0.0008)	-0.3562*** (0.1213)	-0.3531*** (0.1152)
Log(Assets)	7.6415*** (2.8606)	6.5928** (2.6095)	-0.0016* (0.0006)	-0.0019** (0.0005)	0.4073*** (0.1240)	0.4473*** (0.1074)
Loans		17.4539 (14.8847)		-0.0044 (0.0037)		2.1639*** (0.4370)
Loan HHI		-1.4307 (9.1653)		0.0003 (0.0026)		-0.5951 (0.7297)
NPL		-214.8747*** (54.3962)		0.1113*** (0.0134)		-15.4934*** (1.9325)
Equity		219.9808*** (54.8313)		-0.0346** (0.0139)		-0.3666 (1.3804)
ROE		0.0355 (0.0285)		-0.0000 (0.0000)		0.0064*** (0.0018)
Interest Expense		183.2612 (151.1328)		0.1469 (0.0331)		-16.6447** (6.6471)
MBS/ABS Securities		6.8325 (15.1256)		-0.0005 (0.0028)		0.2461 (0.5327)
Deposits		-6.1748 (10.0829)		0.0011 (0.0025)		-1.1640** (0.4488)
Constant	-79.0111* (40.2928)	-91.7297 (42.3076)	0.0269*** (0.0087)	0.0355*** (0.0079)	-4.3968** (1.7483)	-5.2550*** (1.6139)
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.103	0.222	0.144	0.276	0.277	0.381

Accounting-based Risk Measures

Dependent Variable:	Z-Score (1)	Z-Score (2)	Std(ROA) (3)	Std(ROA) (4)	Sharpe (5)	Sharpe (6)
PE Blockholder	-10.9971*** (2.7452)	-12.0214*** (2.5482)	0.0037*** (0.0008)	0.0039*** (0.0008)	-0.3562*** (0.1213)	-0.3531*** (0.1152)
Log(Assets)	7.6415*** (2.8606)	6.5928** (2.6095)	-0.0016* (0.0006)	-0.0019** (0.0005)	0.4073*** (0.1240)	0.4473*** (0.1074)
Loans		17.4539 (14.8847)		-0.0044 (0.0037)		2.1639*** (0.4370)
Loan HHI		-1.4307 (9.1653)		0.0003 (0.0026)		-0.5951 (0.7297)
NPL		-214.8747*** (54.3962)		0.1113*** (0.0134)		-15.4934*** (1.9325)
Equity		219.9808*** (54.8313)		-0.0346** (0.0139)		-0.3666 (1.3804)
ROE		0.0355 (0.0285)		-0.0000 (0.0000)		0.0064*** (0.0018)
Interest Expense		183.2612 (151.1328)		0.1469 (0.0331)		-16.6447** (6.6471)
MBS/ABS Securities		6.8325 (15.1256)		-0.0005 (0.0028)		0.2461 (0.5327)
Deposits		-6.1748 (10.0829)		0.0011 (0.0025)		-1.1640** (0.4488)
Constant	-79.0111* (40.2928)	-91.7297 (42.3076)	0.0269*** (0.0087)	0.0355*** (0.0079)	-4.3968** (1.7483)	-5.2550*** (1.6139)
Bank Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Std Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,718	8,718	8,718	8,718	8,718	8,718
Number of Banks	246	246	246	246	246	246
R-squared	0.103	0.222	0.144	0.276	0.277	0.381

Market-based Risk Measures

	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>
<i>PE Share</i>	0.0156** (0.0076)	0.0159** (0.0072)	0.0031 (0.0034)	0.0059*** (0.0012)
	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>
<i>PE Blockholder</i>	-0.0049 (0.0064)	-0.0046 (0.0061)	-0.0008 (0.0015)	0.0011*** (0.0003)

Market-based Risk Measures

	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>
<i>PE Share</i>	0.0156** (0.0076)	0.0159** (0.0072)	0.0031 (0.0034)	0.0059*** (0.0012)
	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>
<i>PE Blockholder</i>	-0.0049 (0.0064)	-0.0046 (0.0061)	-0.0008 (0.0015)	0.0011*** (0.0003)

Market-based Risk Measures

	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>	<i>Tobin's Q</i>
<i>PE Share</i>	0.0156** (0.0076)	0.0159** (0.0072)	0.0031 (0.0034)	0.0059*** (0.0012)	0.0613*** (0.0227)
	<i>Return Volatility</i>	<i>Idiosyncratic Risk</i>	<i>Systematic Risk</i>	<i>Implied Volatility</i>	<i>Tobin's Q</i>
<i>PE Blockholder</i>	-0.0049 (0.0064)	-0.0046 (0.0061)	-0.0008 (0.0015)	0.0011*** (0.0003)	0.0168** (0.0070)

**While bank value increases,
Risk increases too.**

Income Statement Items

(Percent of Assets; Annualized Values)

	<i>Interest Income</i>	<i>Interest Expense</i>	<i>Net Interest Income</i>	<i>Loan Loss Provisions</i>	<i>Noninterest Income</i>	<i>Operating Income</i>	<i>Noninterest Expense</i>	<i>Net Income</i>
<i>PE Share</i>	-0.0038	-0.0015	0.0135**	-0.0135**	0.0014	0.0268**	-0.0004	0.0226**
	(0.0028)	(0.0013)	(0.0062)	(0.0059)	(0.0022)	(0.0105)	(0.0051)	(0.0089)
	<i>Interest Income</i>	<i>Interest Expense</i>	<i>Net Interest Income</i>	<i>Loan Loss Provisions</i>	<i>Noninterest Income</i>	<i>Operating Income</i>	<i>Noninterest Expense</i>	<i>Net Income</i>
<i>PE Blockholder</i>	0.0008	-0.0007**	0.0050***	-0.0028**	0.0011	0.0088**	0.0013	0.0048**
	(0.0007)	(0.0003)	(0.0014)	(0.0012)	(0.0007)	(0.0025)	(0.0013)	(0.0020)

Income Statement Items

(Percent of Assets; Annualized Values)

	<i>Interest Income</i>	<i>Interest Expense</i>	<i>Net Interest Income</i>	<i>Loan Loss Provisions</i>	<i>Noninterest Income</i>	<i>Operating Income</i>	<i>Noninterest Expense</i>	<i>Net Income</i>
<i>PE Share</i>	-0.0038	-0.0015	0.0135**	-0.0135**	0.0014	0.0268**	-0.0004	0.0226**
	(0.0028)	(0.0013)	(0.0062)	(0.0059)	(0.0022)	(0.0105)	(0.0051)	(0.0089)
	<i>Interest Income</i>	<i>Interest Expense</i>	<i>Net Interest Income</i>	<i>Loan Loss Provisions</i>	<i>Noninterest Income</i>	<i>Operating Income</i>	<i>Noninterest Expense</i>	<i>Net Income</i>
<i>PE Blockholder</i>	0.0008	-0.0007**	0.0050***	-0.0028**	0.0011	0.0088**	0.0013	0.0048**
	(0.0007)	(0.0003)	(0.0014)	(0.0012)	(0.0007)	(0.0025)	(0.0013)	(0.0020)

Balance Sheet Items

	<i>Asset Growth</i>	<i>FTE Growth</i>	<i>Branch Growth</i>	<i>Loans (Total)</i>	<i>Core Deposits</i>	<i>MBS+ABS Securities</i>	<i>Trading Assets</i>
	Growth rates			Percent of total assets			
<i>PE Share</i>	-0.0483 (0.1556)	-0.0446 (0.1183)	-0.0404 (0.0499)	-0.0943*** (0.0326)	0.0054 (0.0187)	0.1077*** (0.0279)	0.0012 (0.0009)
	<i>Asset Growth</i>	<i>FTE Growth</i>	<i>Branch Growth</i>	<i>Loans (Total)</i>	<i>Core Deposits</i>	<i>MBS+ABS Securities</i>	<i>Trading Assets</i>
	Growth rates			Percent of total assets			
<i>PE Blockholder</i>	0.0048 (0.0259)	-0.0028 (0.0235)	-0.0082 (0.0190)	-0.0198* (0.0112)	0.0053 (0.0061)	0.0267*** (0.0088)	0.0007* (0.0004)

Balance Sheet Items

	<i>Asset Growth</i>	<i>FTE Growth</i>	<i>Branch Growth</i>	<i>Loans (Total)</i>	<i>Core Deposits</i>	<i>MBS+ABS Securities</i>	<i>Trading Exposures</i>
	Growth rates			Percent of total assets			
<i>PE Share</i>	-0.0483 (0.1556)	-0.0446 (0.1183)	-0.0404 (0.0499)	-0.0943*** (0.0326)	0.0054 (0.0187)	0.1077*** (0.0279)	0.0012 (0.0009)
	<i>Asset Growth</i>	<i>FTE Growth</i>	<i>Branch Growth</i>	<i>Loans (Total)</i>	<i>Core Deposits</i>	<i>MBS+ABS Securities</i>	<i>Trading Exposures</i>
	Growth rates			Percent of total assets			
<i>PE Blockholder</i>	0.0048 (0.0259)	-0.0028 (0.0235)	-0.0082 (0.0190)	-0.0198* (0.0112)	0.0053 (0.0061)	0.0267*** (0.0088)	0.0007* (0.0004)

Balance Sheet Items

	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Share</i>	-0.0849** (0.0332)	-0.0221 (0.0192)	0.0204*** (0.0078)	-0.0054 (0.0096)	0.0246* (0.0145)	0.0179* (0.0099)
	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Blockholder</i>	-0.0293*** (0.0105)	0.0028 (0.0064)	0.0063** (0.0025)	0.0013 (0.0037)	0.0024 (0.0023)	0.0056** (0.0024)

Balance Sheet Items

Reshuffling Loan Portfolio

	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Share</i>	-0.0849** (0.0332)	-0.0221 (0.0192)	0.0204*** (0.0078)	-0.0054 (0.0096)	0.0246* (0.0145)	0.0179* (0.0099)
	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Blockholder</i>	-0.0293*** (0.0105)	0.0028 (0.0064)	0.0063** (0.0025)	0.0013 (0.0037)	0.0024 (0.0023)	0.0056** (0.0024)

Balance Sheet Items

**Rise in credit-risk in BUS
and CON loan sectors**

	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Share</i>	-0.0849** (0.0332)	-0.0221 (0.0192)	0.0204*** (0.0078)	-0.0054 (0.0096)	0.0246* (0.0145)	0.0179* (0.0099)
	<i>RE</i> <i>Loans</i>	<i>BUS</i> <i>Loans</i>	<i>CON</i> <i>Loans</i>	<i>NPL</i> <i>RE</i>	<i>NPL</i> <i>BUS</i>	<i>NPL</i> <i>CON</i>
	Percent of total assets			Percent of loans in each sector		
<i>PE Blockholder</i>	-0.0293*** (0.0105)	0.0028 (0.0064)	0.0063** (0.0025)	0.0013 (0.0037)	0.0024 (0.0023)	0.0056** (0.0024)

Conclusions

1. Unprecedented flow of PE investments in banks after 2008.
 - PE firms tended to select publicly held, young community banks.
 - PE-target banks were ex ante less profitable, but not necessarily poorly capitalized.
 - Operational efficiencies in Net Interest Income and Operating Income.
 - Market reacted positively: Bank market value went up and PE investors earned acceptable returns despite heavy regulation.
2. Market value of PE-targeted banks increased, but—as feared historically by regulators—the PE-targeted banks became riskier.
 - PE investments in banks are likely to increase instability, hence may be considered under special circumstances.

Private Equity Investment in U.S. Banks

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*The views expressed herein are those of the authors and do not necessarily
represent those of the Federal Reserve Bank of Boston or the Federal
Reserve System.*