

The Impact of Supervision on Bank Performance

FEDERAL RESERVE BANK *of* NEW YORK

Beverly Hirtle, Anna Kovner, and Matthew Plosser

FDIC/JFSR 16th Annual Bank Research Conference – September 9, 2016



Disclaimer

The views expressed in this paper are those of the authors and do not necessarily reflect the position of the Board of Governors, the Federal Reserve Bank of New York, or the Federal Reserve System.



What is the impact of supervision?

- Supervision is distinct from regulation, but the two activities are often conflated
- Supervision:
 - Compliance with law and regulations (i.e. exams)
 - Monitors for unsafe and unsound practices
 - Remediation steps to correct unsafe and unsound practices

This paper seeks to estimate the distinct impact of supervision on bank outcomes



Does supervision affect bank outcomes?

Supervision may reduce firm risk...

- Heightened supervisory powers are associated with less risk-taking and increased operating efficiency in cross-country studies (Barth et al. (2013), Chortareas et al. (2012) and Klomp and Hahn (2012))
- Scheduled exams and enforcement actions result in lower bank risk (Agarwal et al. (2014), Rezende and Wu (2014), Deli and Staikouras (2011))

...at the expense of growth?

- Tougher supervisory standards are associated with slower loan growth (Bassett et al. 2012, Berger et al. 1998, Curry et al. 2008, Kiser et al. 2012, Krainer and Lopez 2009, Peek and Rosengren 1995, Swindle 1995)



How to overcome endogeneity?

- Supervisors focus on large, complex, or risky institutions
 - Naïve inference might conclude supervision generates large, complex, risky banks
- Empirical strategy:
 - Supervision in the US is conducted under authority delegated by the Board of Governors to local Reserve Banks
 - 12 Federal Reserve districts in the US → Locations reflect cities' importance as banking centers in 1913
 - Assignment based on location of the BHC headquarters

Identification Hypothesis: All else equal, the largest institutions in a FR District receive additional supervisory attention



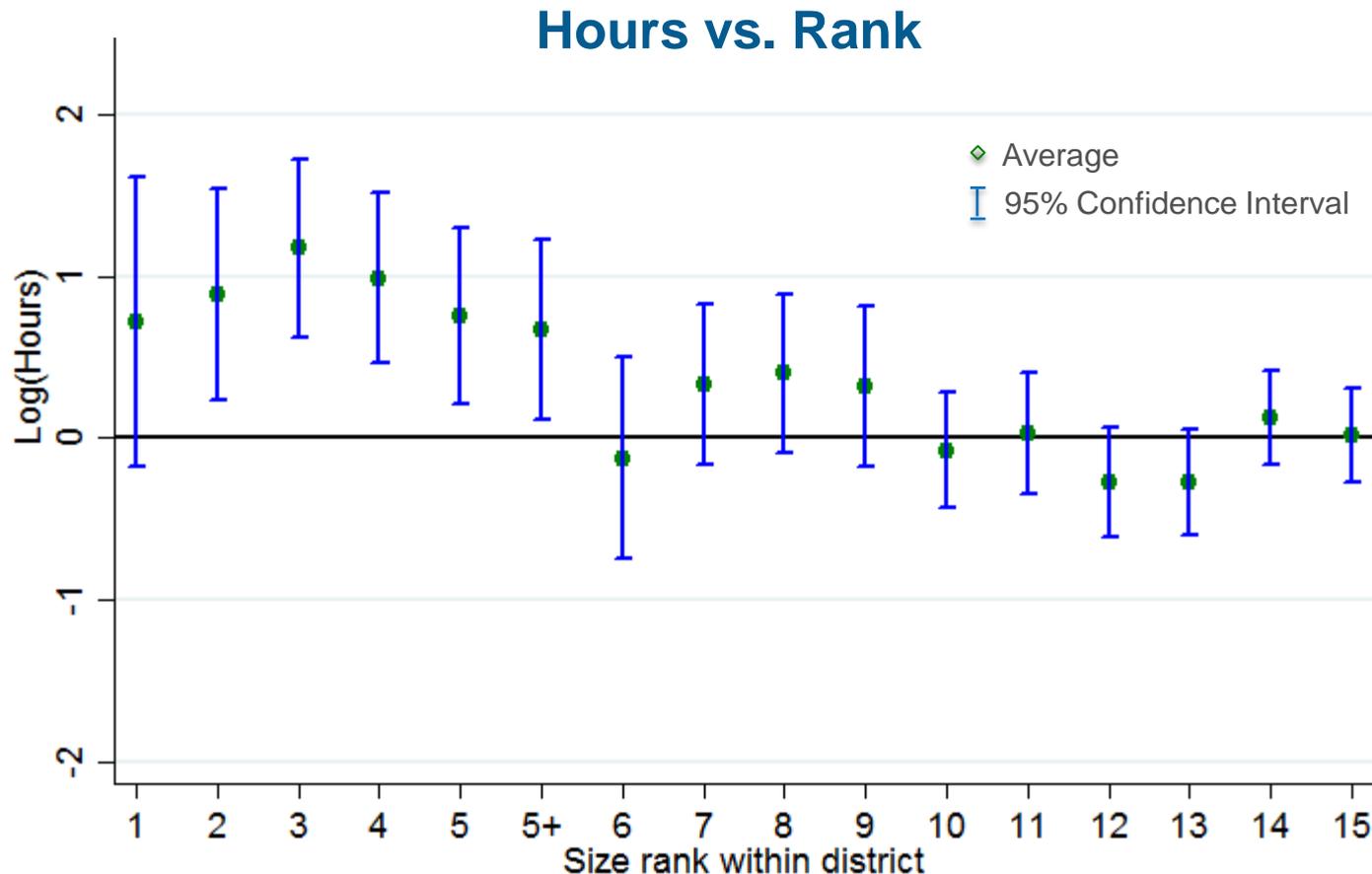
Validating identification hypothesis

- Confidential data on Federal Reserve supervisor hours
- Quarterly panel, aggregated to the parent BHC
 - Sample period: 2006Q1 – 2014Q4
 - Hours are reported for ~60% of BHCs and ~96% of assets
 - Linked with consolidated financials from Y-9Cs (BHC filings)
- Potential issues:
 - Reporting standards can vary across districts
 - Particular subsidiaries may demand more/less attention
- We verify our proxy for attention in the hours sample, but implement it on a longer sample (1991-2014)



Top ranked receive more supervisory hours...

- More hours are spent on Top 5 firms (and firms within 25% of #5 assets)



Note: Log(hours) on the y-axis are the residuals from a regression of log of supervisory hours on district-time fixed effects, controls for bank characteristics, the log of assets and the log of assets squared. Size rank is determined by book asset size within a district-quarter. Points reflect the average residual for a rank and brackets designate the 95% confidence interval.



... even after considering various controls

In(supervisory hours)	(1)	(2)	(3)	(4)	(5)
Top Five	3.492*** (18.12)	0.818*** (3.51)	0.725*** (4.05)	0.730*** (4.07)	
Top Five Plus (TOP)					0.730*** (4.26)
log(Assets)		2.244*** (3.14)	1.389** (2.22)	1.426** (2.31)	1.214* (1.96)
log(Assets) Squared		-0.049** (-2.21)	-0.020 (-0.99)	-0.021 (-1.06)	-0.015 (-0.74)
log(Entities)		0.427*** (4.34)	0.423*** (5.64)	0.421*** (5.95)	0.418*** (5.92)
Public Indicator			0.068 (0.80)	0.042 (0.49)	0.048 (0.56)
Bank Type Controls			+	+	+
Balance Sheet Controls				+	+
Observations	14955	14908	14908	14908	14908
District-Quarter FE	Yes	Yes	Yes	Yes	Yes
Adj. R-squared	0.22	0.31	0.51	0.52	0.52

Table 2

Note: Contains results from regressions of log of supervisory hours on a dummy indicating Top 5 or Top 5+ (Top) size-rank in a district and controls. Bank Type Controls: Asset share for SMBs >\$10bn, SMBs <\$10bn, and National Banks. Balance Sheet Controls: Loans/Assets, Deposits/Liabilities, and HHI of assets. Each regression includes district-quarter fixed effects. Observations are BHC-quarters from 2006Q1 to 2014Q4. Standard errors are clustered by BHC. *** p<0.01, ** p<0.05, * p<0.1.



Matched Panel – Quarterly Data 1991-2014

- Panel of top BHCs matched to two nearest neighbors
 - Keep only common support (drops the very largest BHCs)

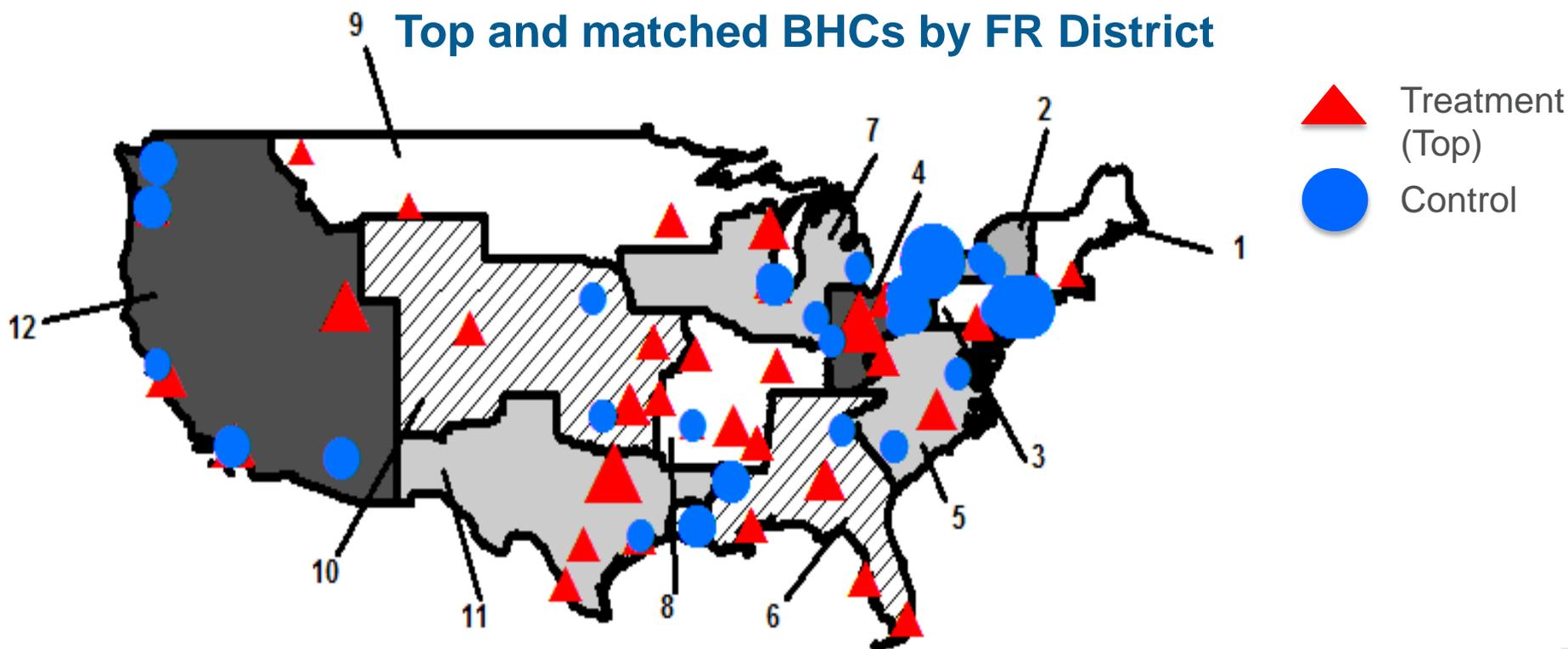
Control Variables	TOP			Matches			Δ Means	p-value
	Mean	SD	N	Mean	SD	N		
Log of Assets	16.07	0.86	3,027	16.10	0.89	6,054	-0.03	0.77
Log of Entities	3.14	0.81	3,027	3.19	0.88	6,054	-0.06	0.59
% SMB Assets (> \$10B)	5.94	22.88	3,027	4.88	20.84	6,054	1.05	0.67
% SMB Assets (<= \$10B)	7.16	22.17	3,027	9.14	25.03	6,054	-1.98	0.53
% Nat. Bank Assets	40.34	44.02	3,027	40.11	44.75	6,054	0.24	0.97
% Loans/Assets	61.29	12.63	3,027	62.00	10.82	6,054	-0.71	0.66
% of Deposits/Liabilities	83.81	9.25	3,027	83.29	10.01	6,054	0.52	0.70
HHI of Assets	0.19	0.07	3,027	0.18	0.08	6,054	0.00	0.88
Public Indicator	0.83	0.37	3,027	0.84	0.36	6,054	-0.01	0.85
Rank	4.28	1.72	3,027	10.61	5.51	6,054	-6.33***	0.00

Table 4



Matches are dispersed across the US

- Districts may not be banking markets, and sometimes cross state borders
- BHC HQ determines FR district, not operational footprint



Note: Illustrates the headquarters location of Top banks and their matches in 2014Q1. Shapes are sized based on total assets where the categories are in billions of dollars. Size rank is determined by book asset size within a district-quarter. Top includes the top 5 banks plus any additional banks within 25% of the book assets of the 5th largest bank. Numbers indicate Federal Reserve Districts.

Example of Matching



First Midwest Bankcorp

Headquarters
Ticker
Branches
District
Rank
Assets (2014:Q4)

Waterbury, CT
 WBS
 CT, MA, RI, NY
 District 1 (Boston)
 4
 \$24 billion

Itasca, IL
 FMBI
 IN, IA, IL
 District 7 (Chicago)
 8
 \$24 billion

Pittsburgh, PA
 FNB
 PA, OH, MD, WV
 District 4 (Cleveland)
 6
 \$24 billion



Empirical model with district fixed effects

- We ultimately estimate the *within* difference between a BHC and its matches depending on treatment status, controlling for district quarter financial conditions
- Panel regression of outcomes on scrutiny proxy:

$$Y_{ijt} = \beta Top_{ijt} + \mathbf{\Pi}_{it} + \alpha_{jt} + \epsilon_{ijt}$$

- Y_{ijt} is the outcome measure at time t , for BHC i
- Top_{ijt} is an indicator for treatment
- $\mathbf{\Pi}_{it}$ is a vector of district-quarter fixed-effects
- j indexes the treated firms and indicates to which treatment BHC it is matched (for treatment BHCs $i = j$)
- α_{jt} is a fixed effect for a treatment observation and its matches
- Cluster standard errors by BHC



Results: Risk/Return accounting measures

Dependent Variable (Y)	Top (β)
Earnings	
ROA	-0.019
SD of ROA	-0.164**
Sharpe Ratio of ROA	1.354**
Log Z-Score	0.228**
Balance Sheet	
% of RWA/Assets	-0.613
Tier 1 Ratio	-0.221
% of NPL	-0.236**
SD of NPL / Loans	-0.123***
% of Loan Loss Reserves (LLR)	-0.065
SD of LLR / Loans	-0.010
% Asset growth (YoY)	-0.495

Table 6

- Similar ROA
- But less volatile
- Better return per unit 'risk'
- Greater distance to default

- Lower level and volatility of non-performing loans
- More predictable loan losses

Note: Regresses dependent variable on a Top indicator, a dummy indicating the matching group, and district-quarter fixed effects. Sample is top fifteen BHCs and their matches. SD of accounting based measures based on 8Qs forward. The Z-score is accounting based measure of distance to default. Standard errors are clustered by BHC. *** p<0.01, ** p<0.05, * p<0.1.



Results: Risk/Return market measures

Dependent Variable (Y)	Top (β)
Market	
Market Cap/Equity	0.153***
Quarterly Excess Return %	0.005
SD of Daily Return	-0.002**
Sharpe Ratio	0.002
Bottom decile of Return	-0.031*

Table 6

- Higher market valuation
- Lower volatility
- Less likely to be in bottom decile of excess returns
- Market pricing consistent with lower risk

Note: Regresses dependent variable on a Top indicator, a dummy indicating the matching group, and district-quarter fixed effects. Sample is top fifteen BHCs and their matches. Excess return based on Fama-French 3 Factor model. Standard errors are clustered by BHC. *** p<0.01, ** p<0.05, * p<0.1.



What contributes to lower volatility?

Dependent Variable (Y)	Top (β)
Earnings Volatility	
SD of NIM	-0.007**
SD of Noninterest Income	-0.017**
SD of Loan Loss Provisions	-0.011*
SD of NIE Less Comp. and FA	-0.007
Abs. Value of Disc. LLP %	-0.010***
Abs. Value of Disc. Security Gains	-0.002
Discretionary Earnings	-0.000
Abs. Value of Disc. Earnings	-0.005**

Table 7

- Top firms have lower volatility of:
 - Revenues
 - Net interest margin
 - Non-interest Income
- Expenses
 - Loan loss provisions
- Less ‘discretionary’ provisioning behavior

Note: Regresses dependent variable on a Top indicator, a dummy indicating the matching group, and district-quarter fixed effects. Sample is top fifteen BHCs and their matches. SD of accounting based measures based on 8Qs forward, with all measures normalized by total assets. Standard errors are clustered by BHC. *** p<0.01, ** p<0.05, * p<0.1.



Other outcomes

- Supervisory actions
 - Matters Requiring Attention, Matters Requiring Immediate Attention (MRA / MRIA)
 - Lower rates of MRA / MRIA, but not significantly so
 - More likely to be closed
 - Supervisory ratings are similar
 - No less likely to be changed
- Bank commitment to risk management
 - Some evidence that *TOP* firms are more likely to have a risk committee

Is there a trade-off in off-balance sheet risk?

- Hard to analyze because, risk is not tracked in regulatory data, by definition
- No consistent evidence that differences vary in crisis

Dependent Variable (Y)	Top (β)	Top x Crisis (β)
Off-Balance Sheet		
Net Securitiz. Inc./Assets	0.001	
Unused Commitments/Assets	0.004*	
Crisis Performance		
Excess Market Return	0.004	0.023
SD Market Return	-0.002***	0.003
ROA	-0.024	0.057
% of NPL	-0.271**	0.481

Table 8

Note: Regresses dependent variable on a Top indicator, a dummy indicating the matching group, and district-quarter fixed effects. Sample is top fifteen BHCs and their matches. SD of accounting based measures based on 8Qs forward. Standard errors are clustered by BHC. *** p<0.01, ** p<0.05, * p<0.1.



2SLS – Similar Results

- Hours data begin in 2006, so examining a different time period
- Increasing hours by 10% decreases:
 - NPLs (by 4%)
 - SD NPLs (by 4%)
 - SD ROA (by 6%)
 - Distance to default (by 2%)

Second Stage Coefficients	Ln(Hours)	F-Stat	N	Mean
Balance Sheet				
% of RWA/Assets	-0.012	12.65	14,564	73.38
Tier 1 Ratio	-1.024	13.64	14,545	12.71
% of NPL	-0.857*	13.6	14,495	2.28
SD of NPL/Loans	-0.321*	12.75	11,752	0.75
% of LLR	-0.094	13.52	14,599	1.71
SD of LLR/Loans	-0.073	12.26	11,737	0.23
% Asset Growth (YoY)	-0.825	13.94	14,335	7.49
Earnings				
ROA	0.110	13.39	14,510	0.55
SD of ROA	-0.524*	10.89	11,723	0.83
Sharpe Ratio of ROA	3.056*	11.35	11,695	4.08
Log Z-Score	0.732*	11.1	11,563	3.29
Market				
Market Cap/Equity	-0.042	11.15	7,803	1.21
Excess Return %	-0.003	12.44	7,532	-0.01
SD of Daily Return	-0.002	11.64	7,695	0.03
Sharpe Ratio	-0.008	11.16	7,836	0.02
Bottom decile of excess return	-0.000	12.46	7,701	0.11

Table 10

Conclusions

- Results suggest that greater supervisory attention:
 - Lowers volatility – Top firms are 10-30% less risky across accounting and market measures
 - Reflects both less variable loan losses and income
 - Suggestive evidence that market measures are less volatile with a commensurate trade-off in returns
- Caveats:
 - Does not speak to the efficiency of supervision
 - Open question of how supervision accomplishes these tasks

