

Supplementary Appendix

Who disciplines bank managers?

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This appendix contains additional information about data sources, turnover banks, the measure of bank soundness, regressions for bank soundness excluding the loss dummy, regressions that test the link between dismissals and the occurrence of recessions, a correlation matrix for the key variables of interest, and additional descriptive statistics about failures and mergers in the sample banks to complement the findings reported in the paper.

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A. Sources of turnover data

The Financial Times, New York Times, Wall Street Journal, American Banker, Forbes, BBC News, BusinessWeek, SEC Info, Investor's Business Daily, Business Wire, The Daily Record (Baltimore, Maryland), Orange County Register (California), The Herald (Rock Hill, South Carolina), Herald Tribune, Sarasota Herald-Tribune (Florida), Charlotte Observer (North Carolina), Columbus Dispatch, Virginia Lawyers Weekly, The Associated Press, Bangor Daily News (Maine), Arkansas Business, Patriot Ledger (Quincy, MA), Baltimore Business Journal, Sacramento Business Journal (California), Philadelphia Business Journal, The Philadelphia Inquirer, Birmingham News (Alabama), Los Angeles Times, Charleston Gazette (West Virginia), Florida Times-Union (Jacksonville, FL), Milwaukee Journal Sentinel (Wisconsin), Wisconsin State Journal (Madison, WI), Miami Herald, The Seattle Times, Plain Dealer (Cleveland, Ohio), Star Tribune (Minneapolis, MN), The Post-Standard (Syracuse, NY), Knight-Ridder/Tribune Business News, The Salina Journal (Kansas), The Providence Journal (Rhode Island), Kansas City Star, The Press Enterprise Co, The Indianapolis Star, New Hampshire Business Review, Black Enterprise, Business Services Industry, Crain's Detroit Business, Kansas City Business Journal, Dallas Business Journal, Hartford Courant (Connecticut), Buffalo News (New York), Washington Post, Fairfield County Business Journal, San Francisco Business Times, Rochester Business Journal, St. Petersburg Times (Florida), United Press International, The Atlanta Journal and Constitution, National Mortgage News, The Times Union (Albany, NY), Intelligencer Journal, St. Louis Post-Dispatch (Missouri), New Haven Register, Arkansas Democrat-Gazette (Little Rock), The Honolulu Advertiser (Honolulu, HI), The Record (Bergen County, NJ), The Post-Standard (Syracuse, NY), Omaha World Herald (Nebraska), Times-Picayune (New Orleans, LA), Des Moines Register, The Washington Post and Bnet, The Commercial Appeal (Memphis, TN), Hawaii Inc., PR Newswire, The Augusta Chronicle (Georgia), News & Record (Greensboro, NC), St Louis Business Journal, The Lexington Herald Leader (Kentucky), The Business Journal (Tampa Bay Florida), East Bay Business Times (California), Columbus Business First (Ohio), The Business Review (Albany New York), Denver Business Journal, Las Vegas Review-Journal, The State (Columbia, SC), The Houston Chronicle (Texas), Lancaster New Era (Lancaster, PA.), El Paso Times (El Paso, Texas), Providence Journal-Bulletin (Rhode Island), St. Louis Post-Dispatch (Missouri), Rocky Mountain News (Denver, Colorado), Atlanta Business Chronicle, The Wichita Eagle, The Tennessean, Winston-Salem Journal, Florida Trend, The Seattle Post-Intelligencer, La Crosse Tribune (Wisconsin), The Capital Times (Madison, WI), The Journal News, Morning Call (Allentown, PA), The Associated Press State & Local Wire, The Boston Herald, Columbus Ledger-Enquirer, The Baltimore Sun, The Olympian (Olympia, Washington), Dayton Daily News (Ohio), The Bradenton Herald, Vermont Business Magazine, The Boston Globe, Knoxville News-Sentinel (Tennessee), Business First-Buffalo, Chicago Tribune, Seattleite and Puget Sound Business Journal, San Diego Daily Transcript, The Herald-Sun - Durham, North Carolina, The Dallas Morning News, Cox News Service, The Pantograph (Bloomington, IL), Business for Central New Jersey, The Business Journal-San Jose, Facts on File World News Digest, Citigroup Inc.CNNMoney.com

B. Turnovers in small and medium-sized U.S. banks 1990-2007

<i>Turnover period, banks, location, and type of turnover</i>							
<i>Turnover Period</i>	<i>Name</i>	<i>State</i>	<i>President</i>	<i>CEO</i>	<i>Chairperson</i>	<i>COO</i>	<i>CFO</i>
February 1990	Independence Bank of New Jersey	NJ	■				
December 1990	Madison National Bank	DC	■		■		
January 1991	Johnson County Bank	TN	■				
June 1991	Cass Bank & Trust	MO	■				
June 1991	Pacific Western Bank	CA	■				
May 1991	Chestnut Hill National Bank	PA		■			
December 1991	Truckee River Bank	CA	■				
January 1992	Great Country Bank	CT	■	■			
May 1992	First National Bank of Marin	CA	■				
May 1992	Clayco State Bank	MO	■				
July 1992	First National Bank	NY	■				
September 1992	Amity Bank	CT			■		
December 1992	First Bank Of Philadelphia	PA		■			
May 1993	Connecticut Bank Of Commerce	CT		■		■	
June 1993	Cicero Bank	NY	■				
July 1993	Connecticut Bank Of Commerce	CT					■
October 1993	Connecticut Bank Of Commerce	CT		■			
October 1993	Buffalo Bank	WV	■		■		
March 1994	Covenant Bank For Savings	NJ	■				
June 1994	First Commercial Bank	CA	■	■			
May 1994	Elverson National Bank	PA	■				
September 1994	Cupertino National Bank & Trust	CA	■			■	
August 1994	Greensboro National Bank	NC	■				
October 1994	Great Country Bank	CT	■	■			
January 1995	Bank of South Windsor	CT	■				
February 1995	First Commercial Bank Of Philadelphia	PA		■			
May 1995	Central Bank of Tampa	FL	■				
May 1995	Corporate Bank	CA	■	■			■
April 1995	United Missouri Bank USA	DE	■				
December 1995	Border Trust	ME				■	
April 1996	Hudson City Savings Institution	NY	■	■			
September 1996	Mercantile Bank Of Arizona	AZ	■	■	■		
September 1997	Mercantile-Safe Deposit & Trust	MD	■			■	
November 1997	Commerce Exchange Bank	OH		■	■		
January 1999	Park Bank	WI	■				
January 1999	Peoples National Bank of Commerce	FL	■				
August 1999	Franklin Bank National	MI	■				
September 1999	First Internet Bank	IN	■				
December 1999	American Bank	FL	■				
April 2000	South Carolina Community Bank	SC		■			
July 2000	Pennsylvania State Bank	PA	■	■			
January 2001	Summit National Bank	TX	■				
May 2001	Mutual Community Savings Bank	NC	■	■			
November 2001	Redlands Centennial Bank	CA	■	■			
February 2002	Commerce Bank Harrisburg	PA		■			
May 2002	Clover Leaf Bank	IL	■				
July 2002	Rock Hill Bank & Trust	SC	■			■	
September 2002	Bankannapolis	MD		■			
October 2002	Delaware County Bank & Trust	OH	■	■			
March 2003	Gold Bank	KS	■	■			
August 2003	Glenview State Bank	IL	■				
January 2005	Provident Bank Of Maryland	MD	■	■			
February 2005	Venture Bank	WA		■	■		
June 2005	Conway National Bank	SC	■		■		
August 2005	M Bank	MI	■	■			
December 2005	First FNCL Bank	TX	■				
June 2006	Douglass National Bank	MO	■		■		
September 2006	Harleysville National Bank & Trust	PA	■	■			
March 2007	Parkway Bank	AR	■				
April 2007	State Bank of Long Island	NY		■			
April 2007	Landmark Community Bank	TN	■	■			
August 2007	Pinnacle Bank	AR	■	■			

C. Measuring bank soundness using Z-Scores

The Z-Score is a frequently used measure of bank soundness (e.g., Stiroh, 2004). A number of reasons exist for the Z-Score's popularity.

First, it can be shown that the Z-Score is inversely related to the probability of a financial institution's insolvency, i.e., the probability that the value of its assets falls below the value

of its debt. The probability of default is given by $p(ROA < E/A) = \int_{-\infty}^{E/A} \phi(ROA) dROA$. If

ROA is normally distributed, then $p(ROA < E/A) = \int_{-\infty}^z N(0,1) dROA$, where z is the Z-Score.

In other words, if returns are normally distributed, the Z-Score measures the number of standard deviations a return realization has to fall in order to deplete equity. Even if μ is not normally distributed, z is the lower bound on the probability of default (by Tchebycheff inequality).

Second, an important practical advantage of the Z-Score is that it can be computed in an easy and transparent fashion for all banks in the sample as only accounting information is needed (in contrast, market-based measures such as distance to default require markets that are non-existent or illiquid for many of the banks in our sample).

Third, the Z-Score, although it not explicitly incorporates an institution's exposure to individual products such as CDOs or subprime mortgages, ultimately reflects such exposures in case these risks come to bite and translate into either lower returns, lower capitalization, or higher standard deviations of returns.

Since the Z-Scores in our sample are skewed, we use a log-transformation of this variable in our empirical tests (Laeven and Levine, 2009).

D. Regressions for forced and voluntary turnovers excluding the loss dummy

We present estimates from conditional logit models explaining the probability of forced (Column I, II, and III) or voluntary turnovers (Column IV). The two samples consist of banks that experienced forced (Column I, II, and III) or voluntary turnovers (Column IV) and two corresponding groups of banks that did not experience turnovers based on size, location, and time period for 1990-2007. In Column I, II, and III, the dependent variable takes on the value one if forced turnover of CEO, chairperson, president, CFO, or COO is observed or zero otherwise. In Column IV, the dependent variable takes on the value one if a voluntary turnover is observed or zero otherwise. *Total assets (log)* captures size, and *Regulatory capital* is defined as equity capital plus subordinated debt over total assets. We control for the level of subordinated debt using the ratio of *Subordinated debt/Total assets*, and we control for the level of insured deposits by including the ratio of *Core deposits/Total assets*. Core deposits are deposits up to USD 100,000. *ROE* is the bank's return on equity capital. To account for BHC holding company membership, we use the variable *BHC member dummy* that takes on the value one if the bank is part of a bank holding company or zero otherwise. *Z-Score (log)* is a measure of risk, calculated as the natural log of the bank's equity capital plus return on assets divided by the standard deviation of return on assets. *Dividend cut dummy* takes on the value one if the dividend payment in period t is less than the dividend payment in period $t-1$ or zero otherwise. *Distress awareness dummy* takes on the value one if the total capital ratio falls below 6 percent or zero otherwise. Type I error denotes the false classification of no turnover as turnover (false positive) and Type II error denotes the false classification of an actual turnover as no turnover (false negative). Robust z statistics are presented in parentheses, and errors are clustered by years. All explanatory variables are lagged by one period. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	I	II	III	IV
	Forced turnovers	Forced turnovers	Forced turnovers	Voluntary turnovers
<i>Total assets (log)</i>	0.18 (0.09)	0.29 (0.15)	0.91 (0.48)	-1.49 (-0.64)
<i>Regulatory capital</i>	-10.07 (-1.44)	-8.99 (-1.28)	-6.87 (-1.09)	-1.54 (-0.25)
<i>Subordinated debt/Total assets</i>	0.17*** (3.83)	0.02 (0.17)	-0.08 (-0.05)	-0.28 (-0.21)
<i>Core deposits/Total assets</i>	1.43** (1.96)	0.52 (0.38)	1.26 (1.03)	4.08 (1.62)
<i>ROE</i>	-1.97 (-1.04)	-7.38 (-1.05)	-6.97 (-0.51)	7.57 (0.42)
<i>BHC member dummy</i>	0.34 (1.04)	0.25 (0.71)	0.19 (0.40)	-0.72 (-0.81)
<i>Z-Score (log)</i>	-1.08*** (-3.61)	-0.99*** (-3.63)	-1.27*** (-2.95)	0.93 (1.45)
<i>Dividend cut dummy</i>	0.83 (0.79)	0.81 (0.75)	1.36 (1.18)	0.06 (0.04)
<i>Distress awareness dummy</i>	-0.68 (-1.10)	-1.11 (-0.56)	-1.19 (-0.55)	-18.53 (-0.00)
<i>Subordinated debt/Total assets</i> \times <i>Z-Score (log)</i>		-0.34 (-0.87)	-0.45 (-1.00)	-0.63 (-0.31)
<i>Core deposits/Total assets</i> \times <i>Z-Score (log)</i>		-0.76 (-1.11)	-0.13 (-0.23)	1.24 (0.65)
<i>Distress awareness dummy</i> \times <i>Z-Score (log)</i>		-0.17 (-0.17)	0.11 (0.11)	-0.93 (-0.00)
<i>Total assets (log)</i> \times <i>Z-Score (log)</i>			0.52*** (2.77)	-1.00** (-2.31)
<i>BHC member dummy</i> \times <i>Z-Score (log)</i>			-0.27 (-0.62)	-0.86 (-1.27)
<i>ROE</i> \times <i>Z-Score (log)</i>			0.87 (0.23)	26.38 (1.61)
Observations	278	278	278	180
Number of turnovers	59	59	59	25
Turnovers predicted correctly	30	33	33	8
Type I error	0.30	0.27	0.36	0.12
Type II error	0.15	0.14	0.16	0.10
<i>F</i> -test for interaction terms	n/a	1.91	17.11***	7.04
Pseudo <i>R</i> -squared	0.26	0.28	0.30	0.22

E. Forced turnovers in poorly and well performing banks during recession periods

We show the numbers of turnovers, separately for poorly and well performing banks, and we also present information on recession years in the U.S in Panel A. The recession information is obtained from the NBER website (<http://www.nber.org/cycles/cyclesmain.html>). Recession years are the years 1990, 1991, 2001, and 2007. A bank is defined as a poorly performing institution if its *ROE* is below or equal to the median *ROE* in the industry, and a well performing bank is a bank whose *ROE* is above the median *ROE*. Panel B and C present slope coefficients (and *z*-statistics) for Poisson models where the dependent variable is the number of turnovers in poorly (well) performing banks and the explanatory variable is a recession dummy. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel A: Overview about turnovers in poorly and well performing banks and recession years			
I	II	III	IV
Number of turnovers	Turnovers in poorly performing banks	Turnovers in well performing banks	Number of recession years
59	30	29	4
Panel B: Poisson model for the number of turnovers in poorly performing banks			
	Slope coefficient for recession dummy		0.98***
	<i>z</i> -Statistic		(2.67)
	Pseudo <i>R</i> -squared		0.10
Panel C: Poisson model for the number of turnovers in well performing banks			
	Slope coefficient for recession dummy		-2.07**
	<i>z</i> -Statistic		(-2.04)
	Pseudo <i>R</i> -squared		0.12

F. Correlation matrix

We show a correlation matrix for the variables used in the main regressions. *Turnover* takes on the value one if forced turnover of either CEO, chairperson, president, CFO, or COO is observed or zero otherwise. *Total assets (log)* is a proxy for bank size, and *Z-Score (log)* is the log-transformed measure of bank risk, calculated as equity capital plus return on assets divided by the standard deviation of return on assets. To account for BHC holding company membership, we use a dummy variable *BHC member dummy* that takes on the value one if the bank is part of a bank holding company or zero otherwise. We control for the level of subordinated debt with the ratio of *Subordinated debt/Total assets*, and we capture insured deposits by including the ratio of *Core deposits/Total assets*. Core deposits are deposits up to 100,000 USD. *Loss dummy* takes on the value one if the bank's earnings are negative or zero otherwise. *ROE* is the bank's return on equity. *Regulatory capital* is defined as equity capital plus subordinated debt over total assets. *Dividend cut dummy* takes on the value one if the dividend payment in period t is less than the dividend payment in period $t-1$ or zero otherwise. *Distress awareness dummy* takes on the value one if the bank's total capital ratio is below 6 percent or zero otherwise. Standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, and * $p < 0.1$.

	<i>Turnover</i>	<i>Total assets (log)</i>	<i>Z-Score (log)</i>	<i>BHC member dummy</i>	<i>Subordinated debt/Total assets</i>	<i>Core deposits/Total assets</i>	<i>Loss dummy</i>	<i>ROE</i>	<i>Regulatory capital</i>	<i>Dividend cut dummy</i>	<i>Distress awareness dummy</i>
<i>Turnover</i>	1										
<i>Total assets (log)</i>	0.02 (0.65)	1									
<i>Z-Score (log)</i>	-0.34*** (0.00)	0.09 (0.10)	1								
<i>BHC member dummy</i>	0.07 (0.19)	0.28*** (0.00)	0.10* (0.07)	1							
<i>Subordinated debt/Total assets</i>	0.20*** (0.00)	0.05 (0.34)	-0.19*** (0.00)	0.02 (0.73)	1						
<i>Core deposits/Total assets</i>	-0.00 (0.94)	-0.24*** (0.00)	0.10* (0.09)	0.01 (0.82)	0.02 (0.64)	1					
<i>Loss dummy</i>	0.41*** (0.00)	-0.06 (0.28)	-0.49*** (0.00)	-0.00 (0.99)	0.12** (0.03)	-0.14** (0.01)	1				
<i>ROE</i>	-0.12** (0.03)	0.00 (0.87)	0.28*** (0.00)	-0.04 (0.46)	-0.20*** (0.00)	0.02 (0.67)	-0.08*** (0.00)	1			
<i>Regulatory capital</i>	-0.22*** (0.00)	-0.21*** (0.00)	0.41*** (0.00)	-0.09 (0.13)	-0.09 (0.11)	0.02 (0.65)	-0.30*** (0.00)	0.17*** (0.00)	1		
<i>Dividend cut dummy</i>	0.08 (0.14)	-0.09 (0.11)	-0.09 (0.10)	0.07 (0.21)	0.04 (0.46)	0.07 (0.19)	0.13** (0.02)	0.04 (0.47)	-0.13** (0.02)	1	
<i>Distress awareness dummy</i>	0.19*** (0.00)	-0.05 (0.40)	-0.49*** (0.00)	-0.03*** (0.55)	0.15*** (0.00)	0.00*** (0.97)	0.32*** (0.00)	-0.21*** (0.00)	-0.47*** (0.00)	0.08 (0.14)	1

G. Mergers and failures in banks that experienced forced turnovers and in the main control group

We show whether banks in the treatment group and banks from the main control group were involved in mergers in Panel A. The table provides a breakdown of banks that were acquirers and those banks that were acquired. We also present details for the distribution of bank failures in the treatment and control group in Panel B.

	Treatment group: Banks with turnovers	Control group: Banks without turnovers
Panel A: M&A activities		
Banks involved in mergers	9	18
▪ <i>of which are acquirers</i>	4	8
▪ <i>of which are acquired</i>	5	10
Panel B: Bank failures		
Banks that failed	7	2
▪ <i>in year of turnover</i>	1	n/a
▪ <i>1 year after turnover</i>	1	n/a
▪ <i>between 2 and 5 years after turnover</i>	1	n/a
▪ <i>more than 5 years after turnover</i>	4	n/a