

# How Does Bank Trading Activity Affect Performance? An Investigation Before and After the Crisis

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First Version: March 2013

This version: May 2014

## Abstract

We examine how bank trading activity affects the profitability, risk, and stock returns of U.S. bank holding companies (BHCs). Specifically, we ask whether trading activity benefits BHC shareholders or whether traders capture the rents from this activity. Bank trading activity creates two agency problems – an internal conflict between traders and shareholders, and an external conflict between the bank and taxpayers. Theoretical models argue that traders have an incentive to take greater risks when they are compensated with short-term bonuses. Shareholders bear the losses of traders' risk-taking, and taxpayers may also suffer if a BHC requires government support. Using quarterly regulatory data from 2000 to 2012, we find that a BHC's trading activities are positively correlated with its riskiness and negatively correlated with profitability, especially during and after the 2007-2009 crisis. There is no evidence that trading activity is associated with higher stock returns or positive alpha, whether before, during, or after the crisis. We find that aggregate BHC salaries consume 60% or more of trading profits, consistent with traders capturing most of the rents from this activity. The adverse effects of trading on BHC performance are greatest for BHCs that pay the highest salaries. These results hold when controlling for changes in traditional lending and off-balance-sheet activities. We show that BHCs with a higher market share of trading assets make a greater contribution to systemic risk.

**Keywords:** Bank holding companies, trading, agency conflict, risk, profitability, stock returns, compensation, financial crisis.

**JEL Classifications:** G2, G21

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Table I: Summary Statistics

Table I provides summary statistics for 418 publicly-listed US bank holding companies (BHCs) based on quarterly data reported on Form FR Y-9C from 1Q 2000 to 2Q 2012. Panel A provides descriptive statistics, with more complete definitions in Appendix I. Panel B reports the pairwise correlations between these variables. Cell values greater than 0.700 or less than -0.700 are shown in bold and underlined. Total Assets (TA) is based on the consolidated entity in millions of US dollars. Z-score is (Equity/Total Assets plus Return on Assets), divided by the standard deviation of ROA over the previous 8 quarters. Expected default frequency (EDF) is the estimated probability of default using the KMV-Merton model. Idiosyncratic Risk is the standard deviation of return residuals from daily Fama-French plus momentum regressions over a quarter, times the square root of number of observations in a quarter. Return on Assets (ROA) is the ratio of quarterly pre-tax income before extraordinary items-to-total assets, annualized by multiplying by 4. Return on Equity (ROE) is the ratio of quarterly pre-tax income before extraordinary items-to-total equity, annualized by multiplying by 4. Buy-and-hold return (BHR) is the total return from holding a stock over a quarter. Buy-and-hold abnormal return (BHAR) is the total return from holding a stock over a quarter less the total return on the CRSP value-weighted index. Alpha is the constant from a regression of a BHC's daily total stock return on the Fama-French factors (SMB, HML, MKTRF) plus momentum (UMD) over a given quarter. Marginal expected shortfall (MES) is the one-day expected loss on a BHC's total stock return based on a 2% daily decline in the overall stock market. Trading Assets/TA is the ratio of quarterly average trading assets-to-total assets. Loans/TA is loans net of allowances-to-total assets. Securitized assets/TA is the sum of off-balance sheet assets securitized over the past quarter-to-total assets. Trading Revenue / TA is the ratio of trading revenues-to-total assets. Non-Trading Operating Income/TA is net interest income + noninterest income – trading revenues, scaled by total assets. Market share of trading assets is the ratio of a bank's trading assets to the sum of all BHC's trading assets in a given quarter. Similarly, market share of loans and of securitized assets are a bank's share of the total amount for a given quarter. Equity/TA is the ratio of total equity-to-total assets. Non-deposit funding/short-term funding is the sum of short-term funding sources less deposits-to-total short-term funding. Deposits/TA is deposits-to-total assets. TARP is a dummy set to 1 once a BHC receives funding under the Troubled Asset Relief Program (TARP). Total salaries / Op. Inc. is aggregate BHC salaries-to-operating income.

Panel A: Key variables

Variables	N	Mean	Std Dev	Median
Total assets (TA)	15,282	27,256	163,827	1,787
Z-score	13,091	45.35	41.33	33.99
Expected default frequency (EDF)	13,779	9.50%	22.29%	0.01%
Idiosyncratic risk	14,240	16.70%	13.96%	12.52%
Return on assets (ROA)	15,282	1.04%	1.69%	1.38%
Return on equity (ROE)	15,282	9.82%	26.23%	15.01%
BHR	14,339	1.25%	19.41%	1.01%
BHAR	14,339	0.07%	19.23%	-0.87%
Alpha	13,713	0.02%	0.33%	0.01%
Marginal expected shortfall (MES)	10,698	1.86%	1.43%	1.78%
Trading assets/TA	14,325	0.45%	2.31%	0.00%
Loans/TA	15,282	65.46%	12.85%	67.05%
Securitized assets/TA	15,282	1.75%	16.98%	0.00%
Trading revenue/TA	15,212	0.01%	0.05%	0.00%
Non-Trading Operating Income/TA	15,212	1.18%	0.38%	1.14%
Market share of trading assets	15,282	0.33%	3.09%	0.00%
Market share of loans	15,282	0.33%	1.58%	0.03%
Market share of securitized assets	15,282	0.29%	2.58%	0.00%
Equity/TA	15,282	9.32%	2.35%	9.09%
Non-deposit funding/Short-term funding	14,865	8.43%	8.17%	6.44%
Deposits/TA	15,282	75.08%	9.98%	76.85%
TARP dummy	15,282	0.14	0.35	0.00
Total salaries/TA	15,075	0.41%	0.15%	0.39%
Total salaries/Op. Inc.	15,075	34.48%	7.30%	34.21%

Panel B: Correlation between variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Z-score	1.00																						
2 EDF	-0.37	1.00																					
3 Idiosyncratic risk	-0.36	<b>0.72</b>	1.00																				
4 Marginal expected shortfall	-0.10	0.18	0.04	1.00																			
5 Return on assets	0.41	-0.62	-0.56	-0.13	1.00																		
6 Return on equity	0.34	-0.61	-0.57	-0.13	<b>0.93</b>	1.00																	
7 BHR	0.10	-0.30	-0.15	-0.03	0.25	0.26	1.00																
8 Alpha	0.03	-0.19	0.04	0.02	0.17	0.19	0.65	1.00															
9 Trading assets/TA	-0.07	0.04	-0.05	0.16	0.01	0.02	-0.01	0.01	1.00														
10 Loans/TA	-0.05	0.08	0.12	-0.10	-0.08	-0.08	-0.06	-0.05	-0.30	1.00													
11 Securitized assets/TA	-0.02	0.01	-0.02	0.11	0.03	0.03	0.01	0.01	0.26	-0.07	1.00												
12 Trading revenue/TA	-0.06	0.00	-0.05	0.17	0.06	0.06	0.01	0.02	0.64	-0.25	0.25	1.00											
13 Non-trading Op. Income/TA	0.10	-0.27	-0.23	0.06	0.41	0.33	0.11	0.07	-0.02	0.05	0.11	0.07	1.00										
14 Market share of tr. assets	-0.05	0.03	-0.05	0.14	0.00	0.01	0.00	0.01	<b>0.82</b>	-0.22	0.07	0.47	-0.04	1.00									
15 Market share of loans	-0.04	0.01	-0.08	0.21	0.04	0.04	0.00	0.01	0.69	-0.18	0.15	0.41	0.04	<b>0.81</b>	1.00								
16 Market share of secz. assets	-0.03	0.03	-0.05	0.14	0.02	0.02	0.00	0.01	0.52	-0.12	0.46	0.27	0.05	0.53	<b>0.72</b>	1.00							
17 Total assets (TA)	-0.05	0.04	-0.06	0.21	0.01	0.01	-0.01	0.01	<b>0.73</b>	-0.22	0.12	0.39	-0.01	<b>0.87</b>	<b>0.93</b>	<b>0.71</b>	1.00						
18 Equity/TA	0.13	-0.24	-0.23	0.19	0.15	0.10	0.03	0.02	-0.03	-0.05	0.02	-0.03	0.21	-0.06	-0.01	-0.02	-0.02	1.00					
19 Non-depo funding/ST funding	-0.03	0.08	-0.07	0.21	0.03	0.05	-0.03	0.00	0.34	-0.24	0.32	0.22	-0.04	0.26	0.28	0.30	0.28	-0.08	1.00				
20 Deposits/TA	0.02	-0.02	0.12	-0.19	-0.09	-0.10	0.01	-0.02	-0.39	0.31	-0.28	-0.31	-0.04	-0.32	-0.37	-0.31	-0.34	-0.07	<b>-0.75</b>	1.00			
21 TARP dummy	-0.28	0.29	0.23	0.24	-0.25	-0.20	-0.02	0.03	0.03	-0.01	0.00	0.04	-0.10	0.05	0.06	0.06	0.09	0.08	-0.04	0.05	1.00		
22 Total salaries/TA	-0.02	-0.14	-0.11	0.03	0.11	0.09	0.04	0.02	0.06	0.02	0.13	0.22	<b>0.72</b>	0.00	0.03	0.06	0.01	0.07	-0.06	0.00	-0.06	1.00	
23 Total salaries/Op. Inc.	-0.19	0.21	0.24	-0.06	-0.42	-0.38	-0.11	-0.07	0.01	0.01	0.02	0.03	-0.15	-0.02	-0.07	-0.01	-0.04	-0.16	-0.08	0.12	0.05	0.48	1.00

Table II Determinants of Bank Risk and Profitability

Table II reports multivariate regressions on three measures of BHC risk and profitability: *Z-score*, *EDF* and *ROE*. *Z-score* is the sum of Equity/TA plus ROA, divided by the standard deviation of ROA over the previous 8 quarters. A higher *Z-score* implies a lower risk of default. *EDF* (%) refers to the expected default frequency estimated using the KMV-Merton model. A higher *EDF* implies a higher risk of default. *ROE* (%) is the ratio of quarterly pre-tax income before extraordinary items-to-total equity, annualized by multiplying by 4. All variables are defined in Table I and Appendix I. For each measure, we examine the relationship over the period before the financial crisis (1Q 2000-4Q 2006) and the period during and after the financial crisis (1Q 2007-2Q 2012). We also compare the coefficients on the measures of trading activity before and after the subprime crisis using the Seemingly Unrelated Regression test. The \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively. Panel A shows regression results without firm fixed effects, while Panel B includes firm fixed effects. Panel C restricts the sample to BHCs with \$2 million in trading assets or greater, which is the threshold set by the Federal Reserve when requiring BHCs to provide details in Form FR Y-9C, Schedule HC-D Trading Assets and Liabilities.

## Panel A: No Firm Fixed Effects

VARIABLES	Zscore		EDF(%)		ROE(%)	
	before	after	before	after	before	after
$LN(TA)_{t-1}$	2.382*	-1.320*	-0.481***	-0.880	1.796***	-0.180
	[0.058]	[0.074]	[0.001]	[0.202]	[0.000]	[0.761]
$Equity/TA_{t-1}$	191.35***	246.24***	-34.56***	-333.13***	-60.01***	193.28***
	[0.010]	[0.000]	[0.002]	[0.000]	[0.000]	[0.000]
$Non-deposit\ funding_{t-1}$	-43.51**	12.36	15.89***	31.10**	-2.74	35.96***
	[0.023]	[0.450]	[0.005]	[0.026]	[0.539]	[0.004]
$Tr\ Assets/TA_{t-1}$	-171.20***	-98.37***	6.06	64.24	-26.07	-44.07*
	[0.000]	[0.002]	[0.726]	[0.261]	[0.215]	[0.084]
$Loans/TA_{t-1}$	2.40	-42.01***	-2.59	28.48***	9.10***	-32.55***
	[0.861]	[0.000]	[0.134]	[0.000]	[0.002]	[0.000]
$Secz./TA_{t-1}$	0.231	-0.263	0.639	17.530	1.738	-7.823
	[0.966]	[0.983]	[0.610]	[0.230]	[0.358]	[0.343]
$Tarp$		-8.391***		4.761**		3.472
		[0.000]		[0.025]		[0.117]
$Constant$	22.65	57.17***	10.16***	23.35***	3.64	7.19
	[0.147]	[0.000]	[0.000]	[0.008]	[0.299]	[0.373]
Firm fixed effects	No	No	No	No	No	No
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Diff. of coeff. on						
$Tr\ Assets/TA_{t-1}$		72.831		58.179		-18.000
		[0.141]		[0.373]		[0.622]
Observations	6,472	6,592	6,500	6,131	7,236	6,672
Adjusted R-squared	0.03	0.23	0.07	0.34	0.07	0.14

Panel B: Including Firm Fixed Effects

VARIABLES	Zscore		EDF(%)		ROE(%)	
	before	after	before	after	before	after
$LN(TA)_{t-1}$	-8.616 [0.255]	2.399 [0.648]	4.333*** [0.003]	6.578* [0.057]	-2.579 [0.101]	-5.349 [0.337]
$Equity/TA_{t-1}$	148.37 [0.185]	96.54* [0.055]	-89.59*** [0.002]	-409.49*** [0.000]	-82.13*** [0.001]	222.00*** [0.004]
$Non-deposit\ funding_{t-1}$	-12.272 [0.531]	4.967 [0.767]	-0.331 [0.943]	-5.205 [0.684]	-3.322 [0.386]	25.034* [0.080]
$Tr\ Assets/TA_{t-1}$	60.95 [0.598]	-109.27*** [0.000]	-161.30 [0.239]	201.69*** [0.000]	34.59 [0.570]	-86.92** [0.037]
$Loans/TA_{t-1}$	22.862 [0.289]	21.298 [0.224]	-2.436 [0.498]	1.518 [0.899]	-0.091 [0.984]	29.206** [0.047]
$Secz./TA_{t-1}$	-20.065 [0.245]	-30.374 [0.394]	0.446 [0.300]	77.355*** [0.000]	0.236 [0.708]	-17.991 [0.357]
$Tarp$		1.186 [0.726]		6.278*** [0.001]		5.485** [0.015]
$Constant$	95.501 [0.106]	-3.669 [0.932]	-23.053** [0.024]	-8.780 [0.768]	43.341*** [0.001]	3.038 [0.949]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Diff. of coeff. on $Tr\ Assets/TA_{t-1}$		-170.226 [0.122]		362.990*** [0.012]		-121.505* [0.089]
Observations	6,472	6,592	6,500	6,131	7,236	6,672
Adjusted R-squared	0.45	0.52	0.40	0.64	0.44	0.40

Panel C: Including Firm Fixed Effects, Sample restricted to BHCs with Trading Assets of \$2 million or greater

VARIABLES	Zscore		EDF(%)		ROE(%)	
	before	after	before	after	before	after
$LN(TA)_{t-1}$	-23.296* [0.054]	8.601* [0.088]	2.582* [0.086]	7.118* [0.081]	-2.090 [0.198]	2.940 [0.598]
$Equity/TA_{t-1}$	192.772 [0.364]	56.595 [0.450]	-90.384 [0.117]	-388.952*** [0.000]	-119.932*** [0.001]	178.905* [0.068]
$Non-deposit\ funding_{t-1}$	7.426 [0.802]	-30.034* [0.065]	10.069 [0.128]	11.507 [0.593]	-10.832*** [0.010]	10.829 [0.594]
$Tr\ Assets/TA_{t-1}$	40.879 [0.735]	-90.468*** [0.004]	-167.948 [0.189]	180.296*** [0.000]	35.529 [0.540]	-81.678** [0.019]
$Loans/TA_{t-1}$	27.867 [0.375]	18.867 [0.434]	-3.994 [0.524]	3.917 [0.812]	1.549 [0.685]	-6.623 [0.746]
$Secz./TA_{t-1}$	-10.965 [0.503]	5.745 [0.839]	0.046 [0.954]	75.369*** [0.000]	0.450 [0.664]	-8.996 [0.635]
$Tarp$		-4.162 [0.333]		12.359*** [0.000]		-1.209 [0.722]
$Constant$	241.762** [0.026]	-48.689 [0.331]	-7.620 [0.527]	-29.506 [0.465]	46.927*** [0.002]	-38.070 [0.543]
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes
Quarter effect	Yes	Yes	Yes	Yes	Yes	Yes
Diff. of coeff. on $Tr\ Assets/TA_{t-1}$		-131.347 [0.251]		348.244*** [0.009]		-117.206* [0.070]
Observations	2,359	2,135	2,382	1,990	2,600	2,147
Adjusted R-squared	0.45	0.60	0.36	0.67	0.36	0.42

Table III Impact of Deposits and Equity Capital during and after the crisis

Table III examines how more stable funding through deposits or greater equity capitalization affects the sensitivity of BHC risk and profitability measures to trading activity. Panel A interacts *TrAssets/TA* with the *High Deposit* dummy, which indicates whether a BHC belongs to the top tercile of average *Deposits/TA* before the crisis. Panel B interacts *TrAssets/TA* with the *High Equity Capital* dummy, which indicates whether a bank belongs to the top tercile of average *Equity Capital/TA* before crisis. The dependent variables are the proxies of bank risk (*Z-score*, *EDF*, *Idiosyncratic Risk*) and bank return (*ROA* and *ROE*). All variables are defined in Table I and Appendix I. The regressions are run for the period during and after the financial crisis (1Q 2007-2Q 2012) for the full sample of 418 BHCs. The results are robust when restricting the sample by removing observations without significant trading assets (\$2 million or more). Standard errors are clustered at BHC level and p-values are reported in brackets. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Impact of Deposits

VARIABLES	Zscore	EDF (%)	Idiosyn	ROA (%)	ROE (%)
$LN(TA)_{t-1}$	5.807 [0.266]	5.462 [0.131]	-0.057*** [0.001]	-0.329 [0.163]	-1.333 [0.747]
$Equity/TA_{t-1}$	75.107 [0.136]	-389.798*** [0.000]	-2.247*** [0.000]	4.503 [0.148]	172.192** [0.021]
$Non-deposit\ funding_{t-1}$	5.127 [0.764]	-5.859 [0.654]	-0.122* [0.066]	1.519* [0.090]	23.289* [0.100]
$Tr\ Assets/TA_{t-1}$	-116.767*** [0.000]	222.270*** [0.000]	0.498*** [0.000]	-8.261*** [0.000]	-120.809*** [0.001]
$High\ Deposit\ dummy$	-39.872* [0.072]	-29.781* [0.055]	-0.257*** [0.000]	-11.255*** [0.000]	-197.231*** [0.000]
$High\ Deposit \times Tr\ Assets/TA_{t-1}$	23.536 [0.700]	-1,001.529** [0.034]	-0.737*** [0.001]	11.424*** [0.001]	156.681*** [0.001]
$Loans/TA_{t-1}$	24.355 [0.180]	1.601 [0.897]	-0.234*** [0.002]	1.206 [0.128]	35.952** [0.015]
$Secz./TA_{t-1}$	-28.604 [0.412]	77.303*** [0.000]	0.061 [0.276]	-1.810 [0.207]	-15.956 [0.384]
$Tarp$	2.040 [0.551]	6.357*** [0.001]	0.017 [0.143]	0.136 [0.332]	5.537** [0.013]
$Constant$	-43.330 [0.441]	27.863 [0.507]	1.236*** [0.000]	3.005 [0.249]	-16.337 [0.727]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6,281	5,776	5,966	6,299	6,299
Adjusted R-squared	0.52	0.62	0.61	0.40	0.39

Table III Impact of Deposits and Equity Capital during and after the crisis (cont.)

Panel B: Impact of Equity Capital

VARIABLES	Zscore	EDF (%)	Idiosyn	ROA (%)	ROE (%)
$LN(TA)_{t-1}$	5.796 [0.267]	5.202 [0.156]	-0.058*** [0.001]	-0.326 [0.170]	-1.259 [0.761]
$Equity/TA_{t-1}$	75.097 [0.137]	-389.964*** [0.000]	-2.246*** [0.000]	4.497 [0.148]	172.102** [0.021]
$Non-deposit\ funding_{t-1}$	5.152 [0.763]	-5.443 [0.678]	-0.121* [0.067]	1.520* [0.090]	23.274* [0.100]
$Tr\ Assets/TA_{t-1}$	-113.189*** [0.000]	222.129*** [0.000]	0.463*** [0.002]	-7.413*** [0.002]	-111.540*** [0.004]
$High\ Equity\ Capital\ dummy$	-41.561*** [0.000]	63.558 [0.480]	-0.119*** [0.000]	-1.085 [0.117]	-20.541* [0.086]
$High\ Equity \times Tr\ Assets/TA_{t-1}$	6.807 [0.919]	-370.124 [0.232]	-0.683** [0.015]	8.669*** [0.008]	133.225** [0.013]
$Loans/TA_{t-1}$	24.406 [0.180]	-0.093 [0.994]	-0.237*** [0.002]	1.241 [0.117]	36.447** [0.014]
$Secz./TA_{t-1}$	-28.688 [0.410]	77.334*** [0.000]	0.062 [0.278]	-1.831 [0.208]	-16.199 [0.384]
$Tarp$	2.039 [0.552]	6.550*** [0.001]	0.017 [0.137]	0.133 [0.343]	5.491** [0.014]
$Constant$	-43.313 [0.442]	1.098 [0.970]	1.103*** [0.000]	2.933 [0.262]	-17.537 [0.709]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	6,281	5,776	5,966	6,299	6,299
Adjusted R-squared	0.52	0.62	0.61	0.40	0.39

Table IV Trading Activity, Stock Returns and Alpha

Table IV reports the relationship between trading activity and stock returns. In each quarter, we form four portfolios based on ratio of Trading Assets/TA in the prior quarter. Group 0 are BHCs with no trading assets at any point. Groups 1, 2 and 3 are terciles of Trading Assets/TA, with Group 1 the lowest and Group 3 the highest. We calculate the equal-weighted return for each portfolio in a given month, then regress the time-series of monthly portfolio returns on the Fama-French factors (SMB, HML, MKTRF) plus momentum (UMD). Alpha is the intercept (or constant) from this regression. P-values are reported in brackets. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively. The difference in coefficients across groups is tested using seemingly-unrelated regressions. Panel A shows the results for the full sample (Q1 2000 to Q2 2012), Panel B for the pre-crisis period (Q1 2000 to Q4 2006), Panel C for the crisis (Q1 2007 to Q4 2009), and Panel D for the post-crisis period (Q1 2010 to Q2 2012).

## Panel A: Full Sample (Q1 2000 to Q2 2012)

Group	Buy-and-hold returns			Regression of Monthly Portfolio Returns				
	N	BHR	BHAR	Alpha	SMB	HML	MKTRF	UMD
Gp0 (no Tr. Assets)	9,992	1.01*** [<.0001]	-0.26 [0.2010]	-0.003 [0.288]	0.466*** [0.000]	0.740*** [0.000]	0.484*** [0.000]	-0.106** [0.027]
Gp1 (low Tr. Assets)	1,919	1.45*** [0.0005]	-0.19 [0.6434]	-0.004 [0.205]	0.666*** [0.000]	1.128*** [0.000]	0.541*** [0.000]	-0.077 [0.288]
Gp2 (med. Tr. Assets)	1,195	1.23** [0.0300]	-0.27 [0.6434]	-0.002 [0.556]	0.486*** [0.001]	0.962*** [0.000]	0.546*** [0.000]	-0.122* [0.078]
Gp3 (high Tr. Assets)	1,531	0.72 [0.1552]	-0.77* [0.0895]	-0.004 [0.217]	0.043 [0.743]	0.986*** [0.000]	0.814*** [0.000]	-0.174*** [0.009]
Gp0 minus Gp3	11,523	0.29 [0.5958]	0.50 [0.3105]	0.001 [0.796]	0.423*** [0.005]	-0.246 [0.168]	-0.329** [0.021]	0.068 [0.515]
Gp1 minus Gp3	3,450	0.74 [0.2619]	0.58 [0.3471]	0.000 [0.918]	0.622*** [0.001]	0.142 [0.551]	-0.273 [0.111]	0.097 [0.398]

## Panel B: Pre-Crisis (Q1 2000 to Q4 2006)

Group	Buy-and-hold returns			Regression of Monthly Portfolio Returns				
	N	BHR	BHAR	Alpha	SMB	HML	MKTRF	UMD
Gp0 (no Tr. Assets)	5,438	4.33*** [<.0001]	2.73*** [<.0001]	0.005* [0.054]	0.346*** [0.000]	0.484*** [0.000]	0.336*** [0.000]	-0.093** [0.043]
Gp1 (low Tr. Assets)	1,172	3.98*** [<.0001]	1.87*** [<.0001]	0.005* [0.068]	0.432*** [0.000]	0.389*** [0.002]	0.482*** [0.000]	0.090 [0.223]
Gp2 (med. Tr. Assets)	502	3.54*** [<.0001]	1.40*** [0.0061]	0.004 [0.305]	0.339*** [0.006]	0.271* [0.094]	0.514*** [0.000]	0.145 [0.137]
Gp3 (high Tr. Assets)	824	2.71*** [<.0001]	0.63* [0.0898]	0.001 [0.811]	0.001 [0.994]	0.473*** [0.001]	0.774*** [0.000]	-0.013 [0.872]
Gp0 minus Gp3	6,262	1.62*** [0.0002]	2.1*** [<.0001]	0.005 [0.211]	0.345** [0.013]	0.011 [0.943]	-0.438*** [0.000]	-0.079 [0.393]
Gp1 minus Gp3	1,996	1.28** [0.0138]	1.24** [0.0144]	0.004 [0.249]	0.431*** [0.002]	-0.083 [0.612]	-0.291** [0.028]	0.103 [0.255]



Table IV Trading Activity, Stock Returns and Alpha (cont.)

## Panel C: Crisis (Q1 2007 to Q4 2009)

Group	Buy-and-hold returns			Regression of Monthly Portfolio Returns				
	N	BHR	BHAR	Alpha	SMB	HML	MKTRF	UMD
Gp0 (no Tr. Assets)	2,677	-7.15*** [<.0001]	-6.67*** [<.0001]	-0.024*** [0.001]	0.183 [0.532]	0.838*** [0.002]	0.330** [0.025]	-0.215** [0.049]
Gp1 (low Tr. Assets)	442	-5.72*** [<.0001]	-5.28*** [<.0001]	-0.019* [0.058]	0.868** [0.048]	1.628*** [0.000]	0.175 [0.397]	-0.106 [0.493]
Gp2 (med. Tr. Assets)	392	-3.55*** [0.0083]	-3.12** [0.0154]	-0.011 [0.179]	0.143 [0.695]	1.461*** [0.000]	0.190 [0.288]	-0.259* [0.056]
Gp3 (high Tr. Assets)	410	-5.04*** [0.0004]	-4.45*** [0.0008]	-0.014* [0.067]	-0.593* [0.079]	1.459*** [0.000]	0.504*** [0.003]	-0.265** [0.031]
Gp0 minus Gp3	3,087	-2.12 [0.1589]	-2.22 [0.1166]	-0.010 [0.238]	0.777** [0.038]	-0.621 [0.174]	-0.174 [0.472]	0.051 [0.763]
Gp1 minus Gp3	852	-0.68 [0.7145]	-0.83 [0.6464]	-0.005 [0.667]	1.461*** [0.002]	0.169 [0.758]	-0.329 [0.237]	0.160 [0.429]

## Panel D: Post-Crisis (Q1 2010 to Q2 2012)

Group	Buy-and-hold returns			Regression of Monthly Portfolio Returns				
	N	BHR	BHAR	Alpha	SMB	HML	MKTRF	UMD
Gp0 (no Tr. Assets)	1,877	3.36*** [<.0001]	0.52 [0.3388]	0.013* [0.068]	0.930** [0.020]	1.420*** [0.001]	0.488*** [0.007]	-0.533** [0.023]
Gp1 (low Tr. Assets)	305	2.17 [0.1140]	-0.68 [0.5773]	0.005 [0.476]	0.510 [0.209]	1.379*** [0.001]	0.904*** [0.000]	-0.436* [0.072]
Gp2 (med. Tr. Assets)	301	3.55*** [0.0016]	0.65 [0.4727]	0.006 [0.269]	0.873** [0.011]	1.028*** [0.003]	0.840*** [0.000]	-0.525*** [0.010]
Gp3 (high Tr. Assets)	297	3.33*** [0.0088]	0.53 [0.5915]	0.010 [0.132]	0.843** [0.024]	1.568*** [0.000]	0.905*** [0.000]	-0.927*** [0.000]
Gp0 minus Gp3	2,174	0.03 [0.9843]	-0.01 [0.9956]	0.003 [0.761]	0.086 [0.870]	-0.148 [0.762]	-0.416* [0.065]	0.394 [0.216]
Gp1 minus Gp3	602	-1.16 [0.5313]	-1.21 [0.4407]	-0.005 [0.620]	-0.333 [0.524]	-0.189 [0.689]	-0.001 [0.997]	0.491* [0.069]

Table V Trading Activity and BHC Salaries

Table V reports the relationship between trading activity and BHC salaries. The regressions are run using quarterly data for the full sample period (1Q 2000-2Q 2012) for BHCs engaged in trading activity. Panel A shows the regressions using Total Salaries / Total Assets for each bank on a quarterly basis, where the aggregate BHC salaries and benefits are reported in Form FR Y-9C (BHCK4135). Panel B shows the relationship for only the CEO's salary and bonus, based on annual data from ExecuComp. The CEO regressions are for a reduced sample due to data availability. Income statement variables are summed over the year, while balance sheet ratios are based on calendar year-end. Panel C shows the results when regressing (Total Salaries – CEO pay)/Total Assets. In each panel, Columns (1), (4) and (5) show results for the full sample, Column (2) shows results when Trading Revenues are positive, and Column (3) when trading revenues are negative. All variables are defined in Table I and Appendix I. Standard errors are clustered at BHC level and p-values are reported in brackets. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

Panel A: Determinants of Total Salaries/Total Assets (Quarterly, trading BHCs only)

	(1) Full period	(2) Tr. Rev. $\geq 0$	(3) Tr. Rev. $< 0$	(4) Full period	(5) Full period
Tr. Rev./TA <sub>t</sub>	0.596*** [0.003]	0.595*** [0.002]	-0.433 [0.130]	0.302*** [0.000]	0.207*** [0.000]
Dummy (Tr. Rev. <sub>t</sub> <0)	-0.000 [0.772]				
Tr. Rev./TA <sub>t</sub> × Dummy (Tr. Rev. <sub>t</sub> <0)	-1.010** [0.013]				
[Tr. Rev./TA <sub>t</sub> ] squared					39.335*** [0.005]
Non-Trading Op. Inc./TA <sub>t</sub>				0.179*** [0.000]	0.320*** [0.000]
[Non-Trading Op. Inc./TA <sub>t</sub> ] squared					-3.435*** [0.002]
LN(TA) <sub>t-1</sub>	-0.001*** [0.000]	-0.001*** [0.000]	-0.001 [0.107]	-0.001*** [0.000]	-0.001*** [0.000]
Equity/TA <sub>t-1</sub>	0.008*** [0.007]	0.008*** [0.009]	0.017 [0.137]	0.004** [0.032]	0.003* [0.071]
Non-deposit funding <sub>t-1</sub>	0.000 [0.956]	0.000 [0.824]	-0.001 [0.611]	-0.000 [0.884]	0.000 [0.833]
Tarp	-0.000 [0.699]	-0.000 [0.767]	-0.000 [0.476]	0.000 [0.750]	0.000 [0.833]
Constant	0.010*** [0.000]	0.010*** [0.000]	0.009*** [0.008]	0.007*** [0.000]	0.005*** [0.000]
Quarter effect	Yes	Yes	Yes	Yes	Yes
Firm effect	Yes	Yes	Yes	Yes	Yes
Observations	5,143	4,745	398	5,143	5,143
Adjusted R-squared	0.79	0.79	0.79	0.85	0.87

Table V Trading Activity and Bank Salaries (cont.)

Panel B: Determinants of CEO Salaries and Bonus/Total Assets (Annual, trading BHCs only)

	(1) Full period	(2) Tr. Rev. $\geq 0$	(3) Tr. Rev. $< 0$	(4) Full period	(5) Full period
Tr. Rev./TA <sub>t</sub>	0.001 [0.749]	0.001 [0.622]	-0.005 [0.897]	-0.002 [0.148]	-0.004** [0.030]
Dummy (Tr. Rev. <sub>t</sub> $< 0$ )	0.0000 [0.884]				
Tr. Rev./TA <sub>t</sub> $\times$ Dummy (Tr. Rev. <sub>t</sub> $< 0$ )	-0.013** [0.025]				
[Tr. Rev./TA <sub>t</sub> ] squared					0.136** [0.014]
Non-Trading Op. Inc./TA <sub>t</sub>				0.001** [0.033]	0.001 [0.311]
[Non-Trading Op. Inc./TA <sub>t</sub> ]squared					-0.001 [0.868]
LN(TA) <sub>t-1</sub>				-0.000** [0.034]	-0.000** [0.035]
Equity/TA <sub>t-1</sub>				0.000 [0.977]	-0.000 [0.949]
Non-deposit funding <sub>t-1</sub>				0.000 [0.753]	0.000 [0.883]
Tarp				-0.000 [0.335]	-0.000 [0.313]
Constant	0.000*** [0.000]	0.000*** [0.000]	0.000 [0.770]	0.001** [0.031]	0.001** [0.027]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	630	593	37	630	630
Adjusted R-squared	0.67	0.69	0.88	0.50	0.50

Table V Trading Activity and Bank Salaries (cont.)

Panel C: Determinants of (Total Salaries - CEO Salaries and Bonus)/Total Assets (Annual, trading BHCs only)

	(1) Full period	(2) Tr. Rev. $\geq 0$	(3) Tr. Rev. $< 0$	(4) Full period	(5) Full period
Tr. Rev./TA <sub>t</sub>	0.806*** [0.002]	0.769*** [0.002]	0.820 [0.254]	0.318** [0.030]	0.211 [0.454]
Dummy (Tr. Rev. <sub>t</sub> $< 0$ )	-0.001 [0.300]				
Tr. Rev./TA <sub>t</sub> $\times$ Dummy (Tr. Rev. <sub>t</sub> $< 0$ )	-3.904*** [0.003]				
[Tr. Rev./TA <sub>t</sub> ] squared					7.654 [0.421]
Non-Trading Op. Inc./TA <sub>t</sub>				0.275*** [0.000]	0.186 [0.129]
[Non-Trading Op. Inc./TA <sub>t</sub> ] squared					0.693 [0.520]
LN(TA) <sub>t-1</sub>				-0.002** [0.020]	-0.002** [0.031]
Equity/TA <sub>t-1</sub>				0.011 [0.492]	0.011 [0.512]
Non-deposit funding <sub>t-1</sub>				-0.002 [0.442]	-0.003 [0.339]
Tarp				-0.000 [0.578]	-0.000 [0.606]
Constant	0.018*** [0.000]	0.017*** [0.000]	0.045*** [0.000]	0.017*** [0.009]	0.020*** [0.003]
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	630	593	37	630	630
Adjusted R-squared	0.81	0.83	0.98	0.91	0.91

Table VI: Trading Activity, Salaries and BHC Performance

Table VI examines the relationship between trading activity, salaries and BHC performance. In each quarter, we split our sample into six portfolios based on two dimensions: terciles of Trading Revenues/Total Assets and terciles of Salaries/Total Assets. All portfolios are based on values from the prior quarter. This table reports the average Z-score, EDF, and ROE for four portfolios: low trading revenues-low salaries (“low-low”), low trading revenues-high salaries, high trading revenues-low salaries, and high trading revenues-high salaries (“high-high”). We report the difference in means between low-low and high-high, where the statistical significance is based on a parametric difference-of-means test. To calculate the buy-and-hold returns (BHR) and alpha, we calculate the equal-weighted return for each portfolio in each month, then regress the time-series of monthly portfolio returns on the Fama-French factors (SMB, HML, MKTRF) plus momentum (UMD). Alpha is the intercept (or constant) from this regression. The difference in mean BHR and alpha between the low-low and high-high portfolios is based on seemingly-unrelated regressions. \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

	Full sample (Q1 2000 to Q4 2012)		Pre-crisis (Q1 2000 to Q4 2006)		During-crisis (Q1 2007 to Q4 2009)		After-crisis (Q1 2010 to Q2 2012)	
	Low Salaries	High Salaries	Low Salaries	High Salaries	Low Salaries	High Salaries	Low Salaries	High Salaries
<b>Z-Score</b>								
Low Trading Revs.	55.12	38.46	68.22	54.88	33.27	26.07	39.13	12.48
High Trading Revs.	41.47	30.82	58.87	36.48	24.83	21.01	25.10	26.60
<i>Low/Low - High/High</i>		24.29***		31.74***		12.26***		12.52***
<b>EDF (%)</b>								
Low Trading Revs.	7.059	12.445	2.321	3.916	21.718	26.132	6.216	17.833
High Trading Revs.	9.644	10.136	1.463	2.307	25.773	32.271	8.445	9.150
<i>Low/Low - High/High</i>		-3.08**		0.01		-10.55**		-2.93
<b>ROE (%)</b>								
Low Trading Revs.	16.014	4.437	22.059	15.114	2.947	-10.563	8.090	-9.072
High Trading Revs.	15.526	11.313	22.318	18.678	6.513	-5.918	9.665	6.699
<i>Low/Low - High/High</i>		4.70***		3.38***		8.86**		1.39
<b>Buy-and-Hold Returns (BHR)</b>								
Low Trading Revs.	1.81%	0.21%	4.91%	4.65%	-8.48%	-10.18%	2.98%	2.28%
High Trading Revs.	3.72%	1.33%	5.20%	3.20%	0.20%	-3.39%	4.80%	0.82%
<i>Low/Low - High/High</i>		0.49%		1.71%*		-5.09%*		2.16%
<b>Alpha</b>								
Low Trading Revs.	-0.20%	-0.80%	0.80%	0.40%	-2.10%	-3.00%	0.50%	0.50%
High Trading Revs.	0.20%	-0.20%	0.90%	0.20%	-0.10%	-1.20%	1.20%	-0.10%
<i>Low/Low - High/High</i>		0.01%		0.59%		-0.84%		0.64%

Table VII Trading Activity and Systemic Risk

Table VII reports multivariate regressions of systemic risk, which is measured as Marginal Expected Shortfall (MES) of capital from Acharya et al. (2012, 2013). A higher MES implies a higher contribution to systemic risk. We include four specifications in this table. In column (1) we include *Mkt share of Tr. Assets*<sub>*t-1*</sub> to measure the degree of trading activity. In column (2) we add the interaction of *Mkt share of Tr. Assets*<sub>*t-1*</sub> and *Crisis* dummy. The *Crisis* dummy is set to 1 from Q1 2007 to Q4 2009, and zero otherwise. In column (3) we include the *Mkt share of loans*<sub>*t-1*</sub> and *Mkt share of Secz*<sub>*t-1*</sub>. Column (4) includes the interaction of the *Crisis* dummy with *Mkt share of Tr. Assets*<sub>*t-1*</sub>. All control variables are described in Table I and Appendix I. The \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

VARIABLES	(1)	(2)	(3)	(4)
<i>LN(TA)</i> <sub><i>t-1</i></sub>	0.00591*** [0.000]	0.00590*** [0.000]	0.00579*** [0.000]	0.00578*** [0.000]
<i>Equity/TA</i> <sub><i>t-1</i></sub>	0.04027** [0.026]	0.04023** [0.026]	0.04054** [0.025]	0.04059** [0.025]
<i>Non-deposit funding</i> <sub><i>t-1</i></sub>	0.00482 [0.363]	0.00480 [0.368]	0.00493 [0.359]	0.00497 [0.355]
<i>Mkt share of Tr. Assets</i> <sub><i>t-1</i></sub>	0.06497*** [0.000]	0.06278*** [0.001]	0.05666*** [0.003]	0.05609*** [0.003]
<i>Mkt sh of secz</i> <sub><i>t-1</i></sub>		0.00224 [0.900]	-0.00199 [0.912]	-0.00049 [0.980]
<i>Mkt sh of loans</i> <sub><i>t-1</i></sub>			0.03747 [0.539]	0.04330 [0.424]
<i>Tarp</i>	0.00256** [0.013]	0.00255** [0.013]	0.00254** [0.013]	0.00255** [0.013]
<i>Crisis dummy</i>	0.00586*** [0.000]	0.00585*** [0.000]	0.00597*** [0.000]	0.00598*** [0.000]
<i>Crisis dummy</i> × <i>Mkt share of Tr. Assets</i> <sub><i>t-1</i></sub>				-0.00353 [0.565]
<i>Constant</i>	-0.03856*** [0.000]	-0.03850*** [0.000]	-0.03781*** [0.000]	-0.03779*** [0.000]
Firm fixed effects	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes
Observations	10,442	10,442	10,442	10,442
Adjusted R-squared	0.67	0.67	0.67	0.67

Table VIII Robustness using Three Periods

Table VIII tests the robustness of the results reported in Table II to splitting the sample into three sub-periods: before the financial crisis (1Q 2000-4Q 2006), during the financial crisis (1Q 2007-4Q2009), and after the financial crisis (1Q 2010-2Q 2012). All variables are defined in Table II. At the bottom of the table, we report tests of the differences between the coefficients on the measures of trading activity before vs. during the financial crisis, and before vs. after the financial crisis. The \*, \*\*, and \*\*\* indicate significance at 10%, 5%, and 1%, respectively.

VARIABLES	<i>Z-score</i>			<i>EDF (%)</i>			<i>ROE(%)</i>		
	before	during	after	before	during	after	before	during	after
LN(TA) <sub>t-1</sub>	-8.616 [0.255]	-15.709** [0.027]	6.754 [0.457]	4.333*** [0.003]	-16.549*** [0.004]	23.304*** [0.001]	-2.579 [0.101]	20.898* [0.083]	-36.801*** [0.000]
Equity/TA <sub>t-1</sub>	148.366 [0.185]	-25.066 [0.686]	138.689* [0.054]	-89.593*** [0.002]	-509.038*** [0.000]	-251.174** [0.010]	-82.126*** [0.001]	474.842*** [0.004]	-33.053 [0.752]
Non-deposit funding <sub>t-1</sub>	-12.272 [0.531]	-15.573 [0.480]	32.635 [0.256]	-0.331 [0.943]	-14.633 [0.391]	20.907 [0.231]	-3.322 [0.386]	11.786 [0.540]	-4.921 [0.820]
Tr Assets/TA <sub>t-1</sub>	60.954 [0.598]	-118.430*** [0.003]	-25.938 [0.567]	-161.302 [0.239]	187.270*** [0.000]	26.865 [0.575]	34.589 [0.570]	-64.231 [0.260]	-41.106* [0.094]
Loans/TA <sub>t-1</sub>	22.862 [0.289]	-29.732 [0.164]	18.261 [0.432]	-2.436 [0.498]	-47.635** [0.027]	22.436 [0.237]	-0.091 [0.984]	130.837*** [0.000]	-90.802*** [0.000]
Secz. /TA <sub>t-1</sub>	-20.065 [0.245]	-12.197 [0.821]	-0.725 [0.984]	0.446 [0.300]	57.295** [0.031]	-50.887 [0.401]	0.236 [0.708]	18.475 [0.454]	21.587 [0.513]
Tarp		6.029* [0.052]			11.581*** [0.000]			4.232 [0.180]	
Constant	95.501 [0.106]	207.949*** [0.001]	-43.715 [0.552]	-23.053** [0.024]	236.328*** [0.000]	-170.018*** [0.004]	43.341*** [0.001]	-311.367*** [0.003]	363.945*** [0.000]
Firm effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Diff. in coeff. on <i>Tr Assets/TA<sub>t-1</sub></i>		-179.384 [0.109]			348.572** [0.011]			-98.820 [0.217]	
Diff. in coeff. on <i>Tr Assets/TA<sub>t-1</sub></i>			-86.891 [0.466]			188.168 [0.188]			-75.695 [0.240]
Observations	6,472	3,840	2,752	6,500	3,571	2,560	7,236	3,899	2,773
Adjusted R-squared	0.45	0.57	0.70	0.40	0.68	0.76	0.44	0.42	0.51

# Appendix I: Definition of Variables (alphabetical order)

Variables	Definition
Alpha	<p><u>Method 1</u>: First we form a portfolio first based on prior quarter trading assets/TA<sub>t-1</sub> (one-way sorting) or prior quarter trading revenues/TA<sub>t-1</sub> and salaries/TA<sub>t-1</sub>(two-way sorting), then calculate the equal-weighted portfolio return for a given month. Next, we regress this monthly portfolio return on the Fama-French factors (SMB, HML, MKTRF) plus momentum (UMD). Alpha is the intercept (or constant) from this regression. The alpha calculated based on Method 1 is portfolio – month specific. In our quarterly regressions, we sum the three portfolio-month alphas in a given quarter.</p> <p><u>Method 2</u>: We regress each BHC's daily stock returns on the Fama-French factors plus momentum (UMD) within each quarter. The alpha is the intercept (or constant) from this regression. The alpha based on Method 2 is BHC-quarter specific.</p>
Buy-and-hold abnormal return (BHAR)	The buy-and-hold abnormal return (BHAR) is calculated as $\prod_{i=1}^T(1 + r_i) - \prod_{i=1}^T(1 + r_{mi})$ , where $r_i$ is monthly stock returns in a given calendar quarter and $r_{mi}$ is the monthly return on the CRSP value-weighted index.
Buy-and-hold return (BHR)	The buy-and-hold return (BHR) calculated as $\prod_{i=1}^T(1 + r_i) - 1$ , where $r_i$ is monthly stock returns in a given calendar quarter.
CEO salary and bonus	The value in millions of US dollars of the CEO's base salary and bonus during the fiscal year, as reported by ExecuComp database.
Deposits	Sum of deposits in domestic offices, both noninterest bearing (BHDM6631) and interest-bearing (BHDM6636), plus deposits in foreign offices, both noninterest bearing (BHFN6631) and interest-bearing (BHFN6636).
Deposits / TA	The ratio of deposits-to-total assets.
Expected Default Frequency (EDF)	Expected Default Frequency (EDF) in percent, estimated based on KMV-Merton model. See: Bharath and Shumway (2008).
Equity / TA	The ratio of total equity (BHCKG105)-to-total assets (BHCK2170).
Group 0	BHCs with no significant trading assets (less than \$2 million) in any quarter.
Groups 1, 2, and 3	BHCs with trading assets are sorted into terciles with Group 1 containing observations with the smallest quantity of trading assets and Group 3 containing the highest quantity in each quarter.
High Deposits dummy	High Deposits is an indicator that equals to 1 if a bank is in the top tercile of deposits and 0 otherwise. We calculate the average Deposits/TA ratio over the pre-crisis period and sort the sample into terciles by the average equity to asset ratio.
High Equity dummy	High Equity is an indicator that equals to 1 if a bank is in the top tercile of equity capital and 0 otherwise. We calculate the average Equity/TA ratio over the pre-crisis period and sort the sample into terciles by the average equity to asset ratio.
Idiosyncratic Risk	The standard deviation of daily return residuals from Fama-French regressions (four-factors including momentum) over a quarter, times the square root of number of observations in a quarter.
Loans	The sum of loans available for sale (BHCK5369) and loans held to

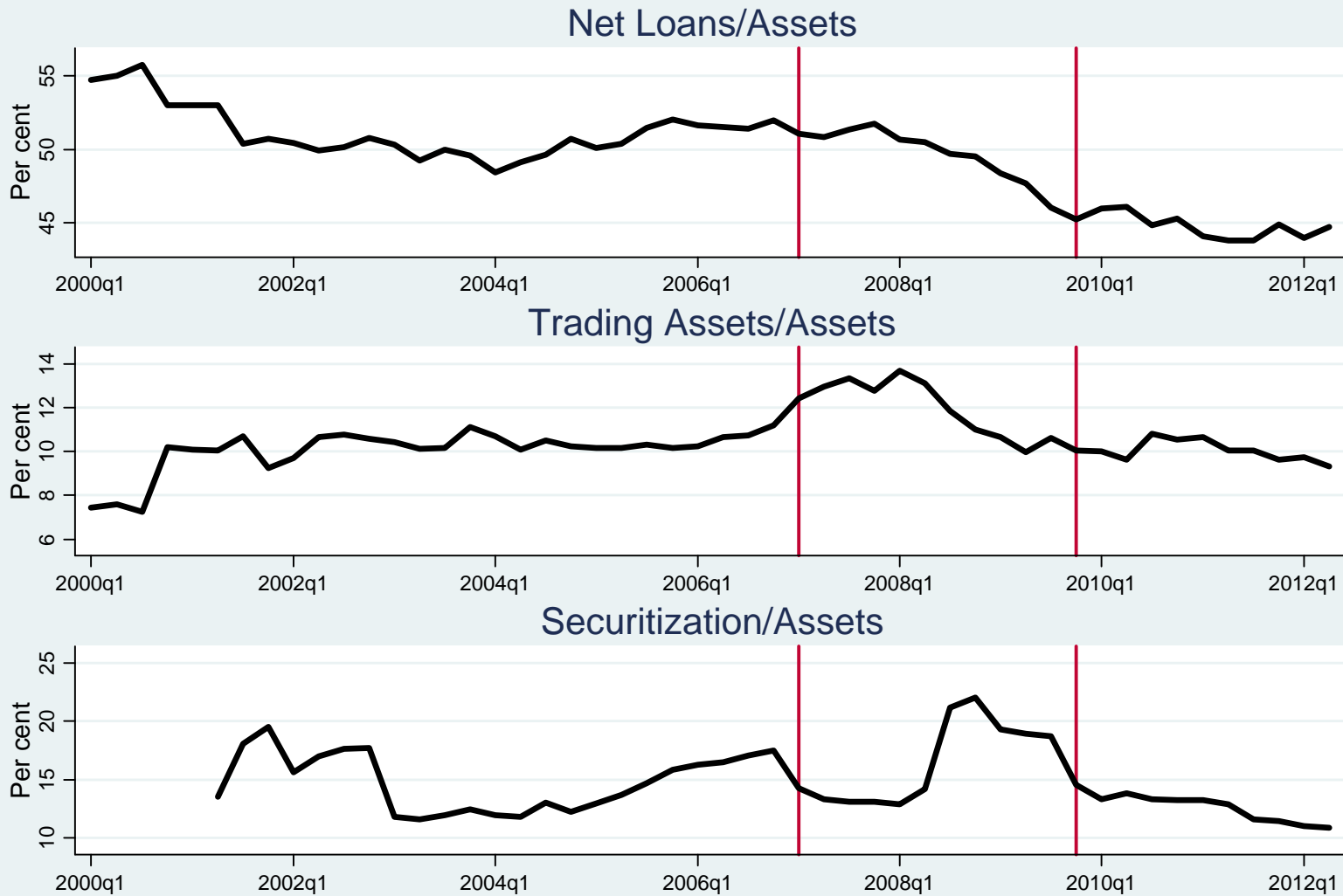


	maturity , net of allowances (BHCKB529), in millions of US dollars.
Loans/TA	The ratio of loans-to-total assets.
Marginal expected shortfall (MES)	The one-day loss expected on a BHC's total stock return based on a 2% daily decline in the overall stock market. A higher MES implies a higher risk of systemic risk. See Acharya et al. (2012, 2013).
Market share of Trading Assets (Mkt share of Tr. Assets), Loans (Mkt share of Loans) and Securitized Assets (Mkt share of Secz )	For each quarter we calculate the aggregate trading assets, loans, and securitized assets across all banks in our sample. The market share is the ratio of a given BHC's trading assets, loans, or securitized assets to the aggregate for that category.
Nondeposit funding / ST funding	The ratio of (ST funding – Deposits) / ST funding, where short-term funding is defined above.
Non-Trading Operating Income/TA	Net interest income + noninterest income – trading revenues, scaled by total assets.
Operating Income	Net interest income (BHCK4074) + noninterest income (BHCK4079)
ROA	The ratio of quarterly income before taxes and extraordinary items (BHCK4301)-to-total assets (BHCK2170), averaged over four quarters. We annualize this ratio by multiplying it with 4.
ROE	The ratio of quarterly income before taxes and extraordinary items (BHCK4301)-to-total equity. capital (BHCKG105), averaged capital over four quarters. We annualize this ratio by multiplying it with 4.
Salaries	Total BHC salaries and employee benefits in million of US dollars (BHCK4135).
Securitization Income	The sum of servicing fees (BHCKB492) and net securitization income (BHCKB4923).
Securitized Assets	The sum of off-balance-sheet assets securitized and sold during a quarter reported on Form FR Y-9C, Schedule HC-S, in millions of US dollars. These assets are classified as: family residential (BHCKB705), home equity lines (BHCKB706), credit card receivables (BHCKB707), auto loans (BHCKB708), other consumer loans (BHCKB709), commercial and industrial loans (BHCKB710), and all other assets (BHCKB711).
Securitized Assets / TA (Secz/TA)	The ratio of loans to securitized assets.
Short-term funding (ST funding)	Sum of deposits, Federal Funds (BHCMB993), repo (BHCKB995), commercial paper (BHCK2309), Federal Funds and other borrowed money with less than 1 year to maturity (BHCK2332), in millions of US dollars.
Size	The natural logarithm of total assets.
TARP dummy	A dummy variable set to 1 if a firm receives funding under the Troubled Asset Relief Program in a given quarter.
Total Assets (TA)	Total assets for the consolidated bank holding company, in millions of US dollars (BHCK2170).
Trading Assets (Tr Assets)	Quarterly average trading assets in millions of US dollars (BHCK3401).
Trading Assets / Total Assets (TrAssets/TA)	The ratio of quarterly average trading assets-to-total assets.
Trading Revenue (Tr Rev)	Trading revenue (BHCKA220) + Interest income from trading

	assets (BHCK4069) reported on Schedule HI, in US dollars in millions.
Trading Revenue / Total Assets (TrRev/TA)	The ratio of trading revenues-to-total assets.
Z-score	The sum of Equity/TA and ROA, divided by standard deviation of ROA estimated over rolling windows of 8 quarters.

Figure I: Asset Shares by Business Line  
(weighted average based on total assets)

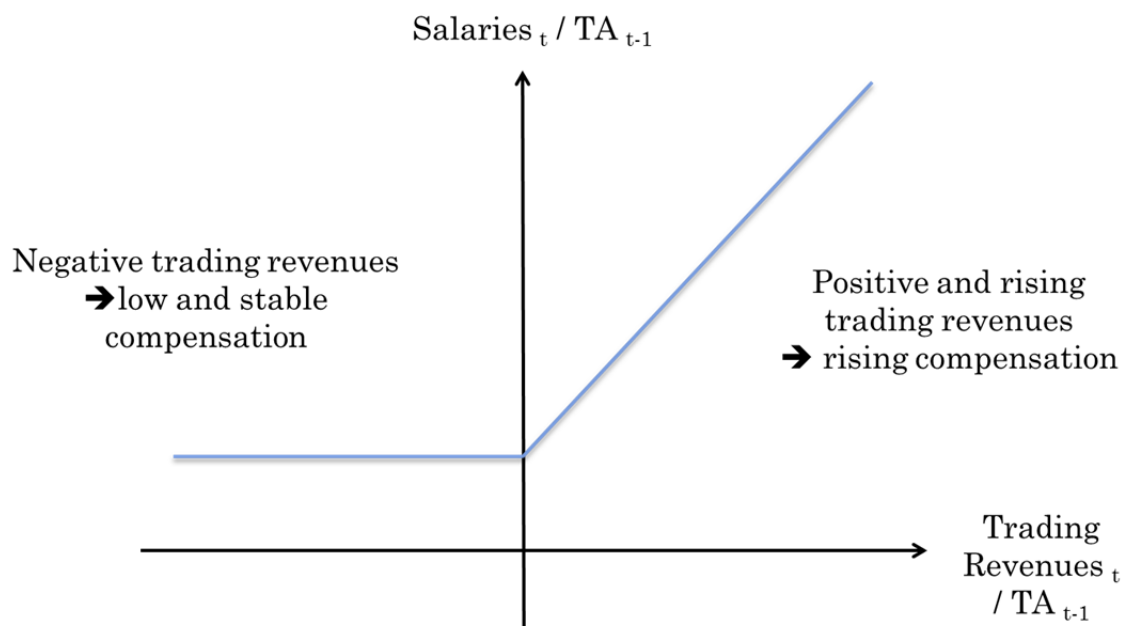
Vertical lines are 1Q2007 and 4Q2009



Source: Federal Reserve Form FR Y-9C.

Figure II: Relationship between BHC Salaries and Trading Revenues

Panel A: Hypothesized relationship



Panel B: Empirical relationship

