

A FINANCIAL RISK AND FRAUD MODEL COMPARISON OF BEAR STEARNS AND LEHMAN BROTHERS: WAS THE RIGHT OR WRONG FIRM BAILED OUT?

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Abstract

In March 2008, the US government bailed out a failing Bear Stearns by arranging a sale to JP Morgan Chase, with US government guarantees for many Bear Stearns' toxic assets that came with the acquisition. In September 2008, the US government failed to bail out a failing Lehman Brothers, which then went into bankruptcy. Soon thereafter, the US government established a bailout program for many other failing financial institutions. This paper uses financial risk and fraud models to attempt to answer the question as to why Bear Stearns was bailed out, but Lehman Brothers was not. Based on the analysis, was the right or wrong firm bailed out? In summary, these financial risk and fraud models show potential for developing effective risk management monitoring and stronger corporate governance in order to enhance relationships between management, financial reporting, and the stability of the economic system in crisis and post-crisis conditions.

Keywords: Financial Risk, Fraud Models, Risk Management Monitoring

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1 Introduction

At the beginning of 2008, there were 5 bulge bracket US investment banks – Bear Stearns, Lehman Brothers, Merrill Lynch, Goldman Sachs, and Morgan Stanley. In March 2008, Bear Stearns was in financial distress and was acquired by JP Morgan Chase in a deal with substantial US government support. In September 2008, Lehman Brothers and Merrill Lynch were in financial distress. There was no US government support for Lehman brothers, and it went into bankruptcy. Merrill Lynch was acquired by Bank of America. Shortly thereafter, Goldman Sachs and Morgan Stanley both became bank holding companies. Thus, by the end of 2008, all 5 bulge bracket investment banks were either gone, or no longer investment banks.

The financial institution problems in 2008 resulted in the US government's decision to spend almost \$800 billion dollars for the Troubled Asset Relief Program (TARP), the bailout program for financial institutions that were judged to be "too big to fail". This bailout was controversial, and many questioned both the cause of this financial crisis and the need for bailouts.

The Financial Crisis Inquiry Commission (Commission) was a ten-member commission appointed by the U.S. government with the goal of

investigating the causes of the financial crisis of 2007-2010. At the end of January, 2011, the Commission finished its report and concluded: "*the greatest tragedy would be to accept the refrain that no one could have seen this coming and thus find nothing could have been done. If we accept this notion, it will happen again.*" The Commission also concluded that the financial crisis was an "avoidable" disaster caused by widespread failures in government regulation, corporate mismanagement and heedless risk-taking by Wall Street. It found that the Securities and Exchange Commission (SEC) had failed to require big banks to hold more capital to cushion potential losses and to halt risky practices and that the Federal Reserve Bank "*neglected its mission by failing to stem the tide of toxic mortgages*" (Chan 2011).

Citing dramatic breakdowns in taking on too much risk, the Commission portrayed incompetence with the following examples. A Citigroup executive conceded that they paid little attention to mortgage-related risks. Executives at American International Group were blind to its \$79 billion exposure to credit-default swaps. Merrill Lynch managers were surprised when seemingly secure mortgage investments suddenly suffered huge losses. The banks hid their excessive leverage with derivatives, off-balance-sheet entities and other accounting tricks. Their speculations were aided by a giant "shadow

banking system" in which banks relied heavily on short-term debt. The Commission concluded: "when the housing and mortgage markets cratered, the lack of transparency, the extraordinary debt loads, the short-term loans and the risky assets all came home to roost" (Chan 2011).

The Commission had also cited another avoidable failure, the inconsistent treatment by the federal government in helping to bail out Bear Stearns in March, 2008 but letting Lehman Brothers go into bankruptcy in September, 2008. By using financial risk and fraud models, Bear Stearns and Lehman Brothers can be compared during their March-September 2008 financial crisis periods. This

comparison can help to provide the answer to the following question: was the wrong firm bailed out?

2 Financial Statements

By coincidence, the last annual financial statements for Bear Stearns and Lehman Brothers were both November 30, 2007, due to Bear Stearns' acquisition by JP Morgan Chase in March, 2008 and Lehman Brothers' bankruptcy in September, 2008. These financial statements are shown for Bear Stearns in Tables 1-3 and for Lehman Brothers in Tables 4-6 with both firms' stock prices for each fiscal year-end shown in Tables 2 and 5.

Table 1. Bear Stearns Companies Inc Balance Sheets, November 30, 2007 and 2006 (in millions)

	2007	2006
ASSETS		
Cash and cash equivalents	\$21,406	\$4,595
Cash and securities deposits	12,890	8,804
Collateralized agreements:		
Securities purchased to resell	43,477	58,486
Securities borrowed	82,245	80,523
Receivables:		
Customers	41,115	29,482
Brokers, dealers, and others	12,407	6,864
Financial instruments at fair value	138,242	125,168
Mortgage loan special purpose entities	33,553	30,245
Property, equipment and leasehold improvements, net of accum. depreciation	605	480
Other assets	9,422	5,786
Total Assets	\$395,362	\$350,433
LIABILITIES & STOCKHOLDERS' EQUITY		
Short-term borrowings	\$27,242	\$45,435
Financial instruments sold but not yet purchased at fair value	43,807	42,257
Collateralized financings:		
Securities sold under agreements to repurchase	102,373	69,750
Securities loaned	3,935	11,451
Other secured borrowings	12,361	3,275
Payables:		
Customers	83,204	72,989
Brokers, dealers and others	5,402	4,520
Accrued liabilities	6,102	4,977
Mortgage loan special purpose entities	30,605	29,080
Long-term borrowings	68,538	54,570
Total Liabilities	\$383,569	\$338,304
Stockholders' Equity		
Preferred stock	352	359
Common stock	185	185
Additional paid-in capital	4,986	4,579
Acc. Other comprehensive (loss) income	2,470	2,066
Retained earnings	9,441	9,385
Treasury stock	-5,641	-4,445
Total Stockholders' Equity	11,793	12,129
Total Liabilities and Stockholders' Equity	\$395,362	\$350,433

Table 2. Bear Stearns Companies Inc Income Statement, November 30, 2007, 2006 and 2005 (in millions)

	2007	2006	2005
REVENUES			
Commissions	\$1,269	\$1,163	\$1,200
Principal transactions	1,323	4,995	3,836
Investment banking	1,380	1,334	1,037
Interest and dividends	11,556	8,536	5,107
Asset management	623	523	372
Total revenues	\$16,151	\$16,551	\$11,552
Interest expense	10,206	7,324	4,141
Revenues, net of interest expense	\$5,945	\$9,227	\$7,411
NON-INTEREST EXPENSES			
Employee compensation and benefits	3,425	4,343	3,553
Brokerage, exchange and clearance fees	279	227	222
Communications and technology	578	479	402
Occupancy	264	198	168
Business development	179	147	127
Professional fees	362	280	229
Other expenses	665	406	503
Total non-interest expenses	5,752	6,080	5,204
Income before taxes	\$193	\$3,147	\$2,207
Provision for income taxes	-40	1,093	745
Net income	\$233	\$2,054	\$1,462
Preferred stock dividends	21	21	24
Net income applicable to common stock	\$212	\$2,033	\$1,438
Basic earnings per share	\$1.68	\$15.79	\$11.42
Diluted earnings per share	\$1.52	\$14.27	\$10.31
Weighted average common shares outstanding:			
Basic	130	132	130
Diluted	146	149	147
Fiscal year-end stock price	\$10	\$170	\$150

Table 3. Bear Stearns Companies Inc Statement of Cash Flows, November 30, 2007, 2006 and 2005 (in millions)

	2007	2006	2005
Cash Flows From Operating Activities			
Net income	\$233	\$2,054	\$1,462
Adjustments to reconcile net income to cash provided by operating activities:			
Depreciation and amortization	14	10	10
Non-cash compensation	31	1,010	801
Equity in earnings of subsidiaries	-1,292	-493	-876
Decreases (increases) in assets:			
Securities purchased under resale agreements	-1,312	77	99
Financial instruments	-2,397	1,007	-34
Increases (decreases) in liabilities:			
Payables to customers	388	1,566	1,276
Accrued liabilities	2,071	-50	306
Cash provided by operating activities	(\$2,264)	\$5,181	\$3,044
Cash Flows From Investing Activities			
Receivables from subsidiaries	16,215	-23,468	-12,782
Investments in subsidiaries	1,170	-228	-321
Cash provided by (used) in investing activities	17,385	-23,696	-13,103
Cash Flows From Financing Activities			
Short-term borrowings	-10,622	9,898	4,524
Long-term borrowings	21,193	16,503	14,112
Deposit liabilities	254	363	426
Issuance of common stock	155	276	126
Retirement of long-term borrowings	-8,865	-7,143	-5,966
Purchase of treasury stock	-1,670	-1,374	-870
Cash dividends paid	-172	-155	-139
Cash provided by financing activities	273	18,368	12,213
Net change in cash and cash equivalents	\$15,394	(\$147)	\$2,154
Cash and equivalents at beginning of year	2,007	2,154	0
Cash and equivalents at end of year	\$17,401	\$2,007	\$2,154

Table 4. Lehman Brothers Holdings Inc Balance Sheet, November 30, 2007 and 2006 (in millions)

	2007	2006
ASSETS		
Cash and cash equivalents	\$7,286	\$5,987
Cash and securities deposits	12,743	6,091
Collateralized agreements:		
Securities purchased to resell	162,635	117,490
Securities borrowed	138,599	107,666
Receivables:		
Customers	29,622	18,470
Brokers, dealers, and others	11,005	7,449
Financial instruments at fair value	313,129	226,596
Other assets	8,056	7,165
Property, equipment and leasehold improvements, net of accum. depreciation	3,861	3,269
Goodwill net of amortization	4,127	3,362
Total Assets	\$691,063	\$503,545
LIABILITIES & STOCKHOLDERS' EQUITY		
Short-term borrowings	\$28,066	\$20,638
Financial instruments sold but not yet purchased at fair value	149,617	125,960
Collateralized financings:		
Securities sold under agreements to repurchase	181,732	133,547
Securities loaned	53,307	23,982
Other secured borrowings	22,992	19,028
Payables:		
Customers	61,206	41,695
Brokers,dealers and others	3,101	2,217
Accrued liabilities	16,039	14,697
Deposit liabilities at banks	29,363	21,412
Long-term borrowings	123,150	81,178
Total Liabilities	\$668,573	\$484,354
Stockholders' Equity		
Preferred stock	1095	1095
Common stock	61	61
Additional paid-in capital	9,733	8,727
Acc. Other comprehensive (loss) income	-2,573	-1,727
Retained earnings	19,698	15,857
Treasury stock	-5,524	-4,822
Total Stockholders' Equity	22,490	19,191
Total Liabilities and Stockholders' Equity	\$691,063	\$503,545

Table 5. Lehman Brothers Holdings Inc Income Statement, November 30, 2007, 2006 and 2005 (in millions)

	2007	2006	2005
REVENUES			
Commissions	\$2,471	\$2,050	\$1,728
Principal transactions	9,197	9,802	7,811
Investment banking	3,903	3,160	2,894
Interest and dividends	41,693	30,284	19,043
Asset management	1,739	1,413	944
Total revenues	\$59,003	\$46,709	\$32,420
Interest expense	39,746	29,126	17,790
Revenues, net of interest expense	\$19,257	\$17,583	\$14,630
NON-INTEREST EXPENSES			
Employee compensation and benefits	9,494	8,669	7,213
Brokerage, exchange and clearance fees	859	629	548
Communications and technology	1,145	974	834
Occupancy	641	539	490
Business development	378	301	234
Professional fees	466	364	282
Other expenses	261	202	200
Total non-interest expenses	13,244	11,678	9,801
Income before taxes	\$6,013	\$5,905	\$4,829
Provision for income taxes	1,821	1,898	1,569
Net income	\$4,192	\$4,007	\$3,260
Preferred stock dividends	67	66	69
Net income applicable to common stock	\$4,125	\$3,941	\$3,191
Basic earnings per share	\$7.63	\$7.26	\$5.74
Diluted earnings per share	\$7.26	\$6.81	\$5.43
Weighted average common shares outstanding:			
Basic	541	543	556
Diluted	568	578	587
Fiscal year-end stock price	\$60	\$70	\$45

Table 6. Lehman Brothers Holdings Inc Statement of Cash Flows, November 30, 2007, 2006 and 2005 (in millions)

	2007	2006	2005
Cash Flows From Operating Activities			
Net income	\$4,192	\$4,007	\$3,260
Adjustments to reconcile net income to cash provided by operating activities:			
Depreciation and amortization	577	514	426
Non-cash compensation	1,791	1,659	51
Deferred tax provision (benefit)	304	-104	-329
Decreases (increases) in assets:			
Securities purchased under resale agreements	3	6,111	-475
Financial instruments	-55,488	-30,878	-22,496
Securities deposits	-4,296	-22,818	4,671
Receivables from brokers, dealers, and others	-3,556	5	-4,054
Increases (decreases) in liabilities:			
Payables to customers	17,395	9,899	4,834
Accrued liabilities	-1,401	765	-456
Cash provided by operating activities	(\$45,595)	(\$36,376)	(\$12,205)
Cash Flows From Investing Activities			
Purchase of property and equipment	-966	-586	-409
Investments in subsidiaries	-732	-206	-38
Cash provided by (used) in investing activities	-1,698	-792	-447
Cash Flows From Financing Activities			
Short-term borrowings	4,057	5,814	224
Long-term borrowings	86,302	48,115	23,705
Deposit liabilities	7,068	6,345	4,717
Issuance of common stock	84	119	230
Retirement of long-term borrowings	-46,255	-19,636	-14,233
Purchase of treasury stock	-2,246	-2,160	-2,229
Cash dividends paid	-418	-342	-302
Cash provided by financing activities	48,592	38,255	12,112
Net change in cash and cash equivalents	\$1,299	\$1,087	(\$540)
Cash and equivalents at beginning of year	5,987	4,900	5,440
Cash and equivalents at end of year	\$7,286	\$5,987	\$4,900

To help assess the risk management of both firms, their condensed balance sheets were compiled in Tables 7 and 8 for 2003 and 2007. A major problem was the traditional lack of classified balance sheets for banks. No current and long-term categories of assets and liabilities are typically provided by banks. For guidance, the following comments from Lehman Brothers' Atlanta office manager, who retired early at age 55, may be considered. In an interview, he said that over the years, the firm's culture had shifted from managing money for clients to proprietary trading for itself. A permissive management style increasingly favored short-term investment gains and unrealized profits through mark-to-market accounting over the sustainability of the company. He said: "the firm traded at the expense of the customers in some cases and on the trading desk, there was almost disdain for the customer" (Lewis 2011). This strategy was reinforced by Lehman Brothers' change in its balance sheet terminology for its investments from "Securities" in 2003 (as a brokerage firm for its customers) to "Financial

Instruments" in 2007 (as a trading firm for its own shareholders and management). Thus, such investments were classified as short-term assets in 2003 and as long-term assets in 2007 for both firms to summarize this strategic shift in investment banking over this period.

3 Financial Risk Ratios and Fraud Models

To help assess financial risk, the following financial risk ratios and fraud models have been successfully applied as investment strategies in an empirical market study: quality of earnings, quality of revenues, the Sloan accrual measure, the Beneish fraud model, the Dechow fraud model, and the Altman bankruptcy model (Grove et.al. 2010). These ratios and models are described in Appendix A.

Similarly, traditional ratios have been used to assess financial risk and use the Yahoo.finance categories of ratios (Grove and Basilico 2011) as follows:

- **Valuation ratios:** price/book, price/earnings, price/sales, and price/operating cash flow
- **Profitability:** profit margin, top-line growth, and bottom-line growth
- **Management Effectiveness:** return on assets and return on equity
- **Financial Strength:** current ratio and debt/equity

Benchmark comparisons of all these ratios and models for Bear Stearns and Lehman Brothers were

compiled with four major banks (Citigroup, Wells Fargo, JP Morgan Chase, and GE which would be the third largest bank if its capital services division were spun off) and five fraudulent financial reporting companies (Enron, WorldCom, Qwest, Global Crossing, and Tyco). Table 7 shows the statements and calculations for Bear Stearns; Table 8 does the same for Lehman Brothers. Table 9 provides the comparisons for all the institutions examined.

Table 7. Statements and calculations for Bear Stearns

Risk Management Ratios and Models			
	2007	2006	2005
Income Statement			
Total Revenues	16 151	16 551	11 552
	-2%	43%	
Cost of sales (Interest expense)	10 206	7 324	4 141
Gross Profit (Net revenues)	\$5 945	\$9 227	\$7 411
Operating Expenses	\$5 752	\$6 080	\$5 204
EBITDA (without adding back interest expense)	207	3 157	2 217
Depreciation & Amortization	14	10	10
Change: Depreciation & Amortiz.	4	0	
Operating Income	193	3 147	2 207
Net Income Before Taxes	193	3 147	2 207
Income Tax Expense	-40	1 093	745
Taxes Paid See Notes	-40	1 093	745
Change: Current Taxes Payable	-1 133	348	
Net Income Core Earnings	233	2 054	1 462
Net Income GAAP	233	2 054	1 462
Preferred stock dividends	21	21	24
Earnings available to common	212	2 033	1 438
Balance Sheet			
Cash	34 296	13 399	11 129
Change: Cash	20897	2270	
AR net	53 522	36 346	37 233
Inventory			
Current Assets	87 818	49 745	48 362
Change: Current Assets	38 073	1 383	
Net Fixed Assets	605	480	451
Total Assets	395 362	350 433	292 635
Current Liabilities	315 031	283 734	238 354
Change: Current liabilities	31 297	45 380	
Deferred Income Taxes	0	0	0
Change: Working Capital	6 776	-43 997	
Short Term Debt	11 643	25 787	20 016
Long Term Debt	68 538	54 570	43 490
Total Stockholder's Equity	11 793	12 129	10 791
Additional Data			
Common Stock Share Price	\$10,00	\$170,00	\$150,00
Common Shares Outstanding	130	132	130
Diluted Common Shares outstanding	146	149	147
Diluted Earnings Per Share	\$1,52	\$14,27	\$10,31
Sales Per Basic Common Share	\$ 124,24	\$ 125,39	\$ 88,86
Operating Cash Flow	-2 264	5 181	3 044
Operating CF per Basic Common Share	\$ (17,42)	\$ 39,25	\$ 23,42

Table 7. Statements and calculations for Bear Stearns (continued)

Current Year	T	T-1	T-2
CA	\$ 87 818	\$ 49 745	
Cash	\$ 34 296	\$ 13 399	
STI	\$ -	\$ -	
CL	\$ 315 031	\$ 283 734	
LTI	\$ -	\$ -	
TA	\$ 395 362	\$ 350 433	\$ 292 635
TL	\$ 383 569	\$ 338 304	
LTD	\$ 68 538	\$ 54 570	
STD	\$ 11 643	\$ 25 787	
Pref. Stock			
AR	\$ 53 522	\$ 36 346	\$ 37 233
Inv.	\$ -	\$ -	
Sales	\$ 16 151	\$ 16 551	\$ 11 552
Earnings	\$ 233	\$ 2 054	
Tax provision	\$ (40)	\$ 1 093	
# shares out	130	132	
Price of Stock	\$10,00		
Cost of Sales	\$ 10 206	\$ 7 324	
Dep + Amort	\$ 14		
OCF	\$ (2 264)		
CAPEX	\$ 40		
Net Fixed Assets	\$ 605	480	

Dechow Fraud F-Score

Δ WC	\$ (14 121)		
Δ NCO	\$ 6 856		
Δ FIN	\$ (28 112)		
Avg. TA	\$ 372 898	\$ 321 534	
Accrual	-0,09487		
Δ AR	0,0461		
Δ Inv.	0,0000		
% Δ Cash Sales	-1,0588	-1025	17438
Δ Earnings	-0,0058		
Actual Issuance	1		
Predicted Value	-5,8495077	0,903492303	
Probability	0,00287304		
Constant	0,00343184		
F-Score	0,837171		

Red >1.0 Fraud Warning
Green < 1.0 No Fraud Warning

Altman Z-score

Market Cap	\$ 1 300		
WC	\$ (227 213)	\$ (233 989)	
EBIT	\$ 193		
	Variables	multiples	
X1 (WC/TA)	-0,5747	6,56	(3,7700)
X2 (RE/TA)	0,0093	3,26	0,0304
X3 (EBIT/TA)	0,0005	6,72	0,0033
X4 (mkt cap/TSE)	0,1102	1,05	0,1157

Altman Z-score (3,6206)
Green >2.6 bankruptcy unlikely
Yellow 1.1 to 2.6 uncertain
Red <1.1 bankruptcy likely

Table 7. Statements and calculations for Bear Stearns (continued)

Beneish Fraud Z-score			
	Variable	NMMI good	MMI bad
Days' Sales in Receivables	1,509	1,031	1,465
Gross Margin Index	1,515	1,014	1,193
Asset Quality Index	0,906	1,039	1,254
Sales Growth Index	0,976	1,134	1,607
Change in WC	\$ 6 776		
Change in Cash	\$ 20 897		
Current Taxes Payable	\$ (1 133)		
Total Accruals to Total Assets Index	(0,033)	0,018	0,031
Z-score	(1,57)	Red > -1.99 Fraud Warning Green < -1.99 No Fraud Warning	
Sloan Accrual Measure			
Free Cash Flow	\$ (2 304)	Red > 0.10 Bad	
Sloan Accrual Measure	0,0068	Green < 0.10 Good	
Quality of Earnings			
Quality of Earnings	-9,7167	Red < 1.0 Bad Green > 1.0 Good	
Quality of Revenue			
Cash Collected	\$ (1 025)	Red < 1.0 Bad	
Quality of Revenue	(0,0635)	Green > 1.0 Good	
Traditional Ratio Analysis			
	Company Ratio	Benchmark	
Valuation Ratios			
Price/Book	0,11	4,1	Less than Benchmark
Book Value	91		
Price/Earnings	6,58	35,7	Less than Benchmark
Diluted EPS	1,52		
Price/Sales	0,08	1,9	Less than Benchmark
Price/Cash Flow	-0,57	15,1	Less than Benchmark
Income Statement Profitability			
Profit Margin	1%	4% to 8%	Outside Benchmark Range
Top-Line Growth	-2%	5% to 15%	Outside Benchmark Range
Bottom-Line Growth	-89%	5% to 15%	Outside Benchmark Range
Management Effectiveness			
Return on Assets	0%	8% to 12%	Outside Benchmark Range
Return on Equity	2%	9% to 13%	Outside Benchmark Range
Financial Strength			
Current Ratio	0,28	1 to 2	Outside Benchmark Range
Debt/Equity	6,80	.5 to 1	Outside Benchmark Range

Table 8. Statements and calculations for Lehman Brothers

Risk Management	Ratios	and Models	2007	2006	2005
Income Statement					
Total Revenues			59 003	46 709	32 420
			26%	44%	
Cost of sales (Interest expense)			39 746	29 126	17 790
Gross Profit (Net revenues)			\$19 257	\$17 583	\$14 630
Operating Expenses			\$13 244	\$11 678	\$9 801
EBITDA (without adding back interest expense)			6 590	6 419	6 310
Depreciation & Amortization			577	514	1481
Change: Depreciation & Amortiz.			63	-967	
Operating Income			6 013	5 905	4 829
Net Income Before Taxes			6 013	5 905	4 829
Income Tax Expense			1 821	1 945	1 569
Taxes Paid See Notes			1 821	1 945	1569
Change: Current Taxes Payable			-124	376	
Net Income Core Earnings			4 192	4 007	3 260
Net Income GAAP			4 192	4 007	3 260
Preferred stock dividends			67	66	69
Earnings available to common			4 125	3 941	3 191
Balance Sheet					
Cash			20 029	12 078	10 644
Change: Cash			7951	1434	
AR net			43 277	27 971	21 643
Inventory					
Current Assets			63 306	40 049	32 287
Change: Current Assets			23 257	7 762	
Net Fixed Assets			3 861	3 269	2 885
Total Assets			691 063	503 545	410 063
Current Liabilities			545 423	404 271	484 370
Change: Current liabilities			141 152	-80 099	
Deferred Income Taxes			0	0	0
Change: Working Capital			-117 895	87 861	
Short Term Debt			359 415	280 145	119 096
Long Term Debt			123 150	81 178	57 473
Total Stockholder's Equity			22 490	18 096	16 794
Additional Data					
Common Stock Share Price			\$60,00	\$70,00	\$45,00
Common Shares Outstanding			541	543	556
Diluted Common Shares outstanding			568	578	587
Diluted Earnings Per Share			\$7,26	\$6,81	\$5,43
Sales Per Basic Common Share			109,06p.	86,02p.	58,31p.
Operating Cash Flow			45 595	36 376	7 488
Operating CF per Basic Common Share			84,28p.	66,99p.	13,47p.

Table 8. Statements and calculations for Lehman Brothers (continued)

Current Year	T	T-1	T-2
CA	\$ 63 306	\$ 40 049	
Cash	\$ 20 029	\$ 12 078	
STI	\$ -	\$ -	
CL	\$ 545 423	\$ 404 271	
LTI	\$ -	\$ -	
TA	\$ 691 063	\$ 503 545	\$ 410 063
TL	\$ 668 573	\$ 485 449	
LTD	\$ 123 150	\$ 81 178	
STD	\$ 359 415	\$ 280 145	
Prof. Stock			\$ 21
AR	\$ 43 277	\$ 27 971	643
Inv.	\$ -	\$ -	
Sales	\$ 59 003	\$ 46 709	\$ 32 420
Earnings	\$ 4 192	\$ 4 007	
Tax provision	\$ 1 821	\$ 1 945	
# shares out	541	543	
Price of Stock	\$60,00		
Cost of Sales	\$ 39 746	\$ 29 126	
Dep + Amort	\$ 577		
OCF	\$ 45 595		
CAPEX	\$ 630		
Net Fixed Assets	\$ 3 861	3 269	

Dechow Fraud F-Score

Δ WC	\$ (125 846)		
Δ NCO	\$ 164 261		
Δ FIN	\$ 37 298		
Avg. TA	\$ 597 304	\$ 456 804	
Accrual	0,12676		
Δ AR	0,0256		
Δ Inv.	0,0000		
% Δ Cash Sales	0,0821	43697	40381
Δ Earnings	-0,0018		
Actual Issuance	1		
Predicted Value	-5,624376494	1,128623506	
Probability	0,003595836		
Constant	0,003431842		
F-Score	1,047785806		

Red >1.0 Fraud Warning
Green < 1.0 No Fraud Warning

Altman Z-score

Market Cap	\$ 32 460		
WC	\$ (482 117)	\$ (364 222)	
EBIT	\$ 6 013		
	Variables	multiples	
X1 (WC/TA)	-0,6976	6,56	(4,5766)
X2 (RE/TA)	0,0163	3,26	0,0531
X3 (EBIT/TA)	0,0087	6,72	0,0585
X4 (mkt cap/TSE)	1,4433	1,05	1,5155

Altman Z-score **(2,9495)** Green >2.6 bankruptcy unlikely
Yellow 1.1 to 2.6 uncertain
Red <1.1 bankruptcy likely

Table 8. Statements and calculations for Lehman Brothers (continued)

Beneish Fraud Z-score			
	Variable	NMMI good	MMI bad
Days' Sales in Receivables	1,225	1,031	1,465
Gross Margin Index	1,153	1,014	1,193
Asset Quality Index	0,988	1,039	1,254
Sales Growth Index	1,263	1,134	1,607
Change in WC	\$ (117 895)		
Change in Cash	\$ 7 951		
Current Taxes Payable	\$ (124)		
Total Accruals to Total Assets Index	(0,183)	0,018	0,031
Z-score	(2,43)	Red > -1.99 Fraud Warning Green < -1.99 No Fraud Warning	
Sloan Accrual Measure			
Free Cash Flow	\$ 44 965	Red > 0.10 Bad	
Sloan Accrual Measure	-0,0683	Green < 0.10 Good	
Quality of Earnings			
Quality of Earnings	10,8767	Red < 1.0 Bad Green > 1.0 Good	
Quality of Revenue			
Cash Collected	\$ 43 697	Red < 1.0 Bad	
Quality of Revenue	0,7406	Green > 1.0 Good	
Traditional Ratio Analysis			
	Company Ratio		Benchmark
Valuation Ratios			
Price/Book	1,44	4,1	Less than Benchmark
Book Value	42		
Price/Earnings	8,26	35,7	Less than Benchmark
Diluted EPS	7,26		
Price/Sales	0,55	1,9	Less than Benchmark
Price/Cash Flow	0,71	15,1	Less than Benchmark
Income Statement Profitability			
Profit Margin	7%	4% to 8%	Within Benchmark Range
Top-Line Growth	26%	5% to 15%	Outside Benchmark Range
Bottom-Line Growth	5%	5% to 15%	Outside Benchmark Range
Management Effectiveness			
Return on Assets	1%	8% to 12%	Outside Benchmark Range
Return on Equity	19%	9% to 13%	Outside Benchmark Range
Financial Strength			
Current Ratio	0,12	1 to 2	Outside Benchmark Range
Debt/Equity	21,46	.5 to 1	Outside Benchmark Range

Table 9. Financial Risk and Fraud Red Flags

	Bear	Lehman	Wells	World	Global		Bear	Red Flag Totals:						
	Stearns	Brothers	Citigroup	Fargo	JP Morgan	GE	Enron	Com	Qwest	Crossing	Tyco	S+Leh	4	5
												B	Other	Fraud
													Banks	Cos.
Ratio Summary														
Newer Models														
Dechow Fraud F Score	N (No)	Y	N	N	N	N	Y	N	N	Y	Y	1	0	3
Altman Z Score	Y (YES)	Y	Y	Y	Y	Y	P (Poss)	Y	Y	Y	P	2	4	5
Beneish Fraud Z Score	Y	N	Y	N	N	N	Y	N	N	Y	N	1	1	2
DSRI	Y	P	N	N	N	P	P	Y	N	N	P	2	1	3
GMI	Y	P	P	P	N	N	Y	P	P	Y	N	2	2	4
AQI	N	N	N	N	P	N	N	N	N	N	Y	0	1	1
SGI	N	P	P	N	P	N	Y	N	P	Y	P	1	2	4
TATA	N	N	N	N	N	N	N	P	N	N	N	0	0	1
Sloan Accrual	N	N	N	N	N	N	N	N	Y	Y	N	0	0	2
Quality of Earnings	Y	N	Y	N	Y	N	N	N	Y	Y	N	1	2	2
Quality of Revenue	Y	Y	Y	N	N	N	Y	N	Y	Y	Y	2	1	4
Traditional Ratios														
Valuation Ratios														
Price to Book	N	N	N	N	N	Y	Y	N	N	N	Y	0	1	2
Price to Earnings	N	N	Y	N	N	N	Y	N	Y	Y	Y	0	1	4
Price to Sales	N	N	Y	Y	Y	Y	N	N	N	N	Y	0	4	1
Price to OCF	Y	N	N	N	N	N	N	N	N	N	Y	1	0	1
Profitability														
Profit Margin	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	1	4	5
Top-Line Growth	Y	Y	Y	N	Y	N	Y	Y	Y	Y	Y	2	2	5
Bottom-Line Growth	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	2	2	4
Management Effectiveness														
Return on Assets	Y	Y	Y	N	N	N	Y	Y	Y	Y	Y	2	1	5
Return on Equity	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	2	3	4
Financial Strength														
Current Ratio	Y	Y	Y	N	N	Y	N	Y	Y	Y	Y	2	2	4
Debt to Equity	Y	Y	Y	Y	Y	Y	N	N	N	N	Y	2	4	1
Totals: Red Flags	14	12	16	6	8	9	14	9	13	16	16	26	38	69
%	64%	55%	73%	27%	36%	41%	64%	41%	59%	73%	73%	59%	43%	63%

4 Analysis of the Comparisons

The financial risk ratios and fraud models are discussed in the order they appear in Tables 7 and 8 for Bear Stearns and Lehman Brothers, respectively. The Dechow fraud or risk management model signals a red flag for Lehman Brothers, but not for Bear Stearns. The Altman bankruptcy model predicts bankruptcy for both firms. The Beneish fraud or risk management model signals a red flag for Bear Stearns, but not for Lehman Brothers. Several of the ratio index inputs to the Beneish model also show red flag signals for both firms. The Sloan accrual measure is not a red flag for both firms. The quality of earnings is a red flag for Bear Stearns, but not Lehman Brothers. The quality of revenues is a red flag for both firms. Concerning the traditional ratios, the valuation ratios only show one out of eight possible red flags for both firms together. However, all the other traditional ratios in profitability, management effectiveness and financial strength show red flags for both firms.

Concerning benchmark comparisons in Table 9, Bear Stearns and Lehman Brothers show aggregate red flags from all these ratios and models 64% of the time and 55% of the time, respectively. The four big banks, Citigroup, Wells Fargo, JP Morgan Chase, and GE show red flags 73%, 27%, 36%, and 41% of the time, respectively or an average of 44%. The five financial reporting fraud firms, Enron, WorldCom, Qwest, Global Crossing, and Tyco show red flags 64%, 41%, 59%, 73%, and 73% of the time or an average of 62% of the time. In summary, Bear Stearns and Lehman Brothers are quite similar in red flags, 64% and 55% or an average of 59% of the time which is between the big banks' average of 44% and the fraud firms' average of 62% as shown in Table 9 although they are closer to the fraud firms' risk management profiles. From the percentage of red flags, Lehman Brothers appears to be slightly stronger than Bear Stearns and much stronger than Citigroup. These numbers suggest that Lehman Brothers was at least as worthy of a bailout as both Bear Stearns, which was bailed out in March 2008, and Citigroup, which later was bailed out with funds through TARP.

5 Conclusions

In summary, the financial risk and fraud models used in this analysis show potential for developing effective risk management monitoring and stronger corporate governance in order to enhance relationships between management, financial reporting, and the stability of the economic system in crisis and post-crisis conditions. The analysis shows that both Bears Stearns and Lehman Brothers seemed to be in similar, very weak financial positions. Bear Stearns bailout may have been helped by Wall Street connections, like Henry Paulsen, the U.S. Treasury Secretary and former CEO of Goldman Sachs. However, possibly the U.S. federal government later thought that Lehman

Brothers was "too big to save" since it was twice the size of Bear Stearns. Then, after the Lehman Brothers bankruptcy ignited the world financial crisis, the federal government reversed its thinking and bailed out the largest 19 U.S. banks since they were now "too big to fail." This bailout occurred despite the fact that all these banks had received unqualified audit opinions on their financial statements and internal controls in their last annual reports before the bailout. No "going concern" qualified audit opinions were issued for possible bankruptcies in these banks. Thus, audit opinions appear not to be a tool for assessing the risk of financial distress for these institutions.

In response to an email about this issue of why Bear Stearns was saved and Lehman Brothers let go into bankruptcy, Lynn Turner, former SEC chief accountant, replied: "Both were highly risky with very, very arrogant CEOs and chairmen. Neither has a great board but Bear Stearns may have had better connections on their board and in this instance, Lehman Brothers being second was fatal. Both depended way too much on very short term financing, including overnight commercial paper or repo's---a very ill advised and highly risky strategy for any company let alone one with very little capital."

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Appendix A. Financial Risk Ratios and Models

Six different emerging models and ratios have been used to develop a red flag approach in screening for and identifying financial risk problems in publicly held companies in addition to traditional ratios. The models are available from the authors in an Excel file.

A.1 Quality of Earnings

The quality of earnings ratio is a quick and simple way to judge the quality of a company's reported net income. The ratio is operating cash flow for the period divided by net income for the period. The red flag benchmark is a ratio of less than 1.0 (Schilit 2003). Also, large fluctuations in this ratio over time may be indicative of financial reporting problems, i.e., Enron's quality of earnings ratios were 4.9, 1.4, and 2.3 over its last three years of operation. In its last year of operation, Enron forced its electricity customers to prepay in order to receive any electricity which dramatically increased its operating cash flows and quality of earnings ratio. Quality of earnings is also meant to measure whether a company is artificially inflating earnings, possibly to cover up operating problems. This ratio may indicate that a company has earnings which are not actually being converted into operating cash. Methods for inflating earnings (but not operating cash flows) include early booking of revenue, recognizing phony revenues, or booking one-time gains on sales of assets.

A.2 Quality of Revenues

The quality of revenues ratio is similar to the quality of earnings, except that the emphasis is on cash relative to sales rather than cash relative to net income. It is the ratio of cash collected from customers (revenues plus or minus the change in accounts receivable) to the company's revenue. Similar to the quality of earnings ratio, the red flag benchmark is a ratio of less than 1.0 (Schilit 2003). For example, Enron's quality of revenues went down from 0.98 to 0.92 in its last year of operation. Since manipulation of revenue recognition is a common method for covering up poor results, this simple metric can help uncover schemes used to inflate revenues without the corresponding cash collection. Common methods include extending increased credit terms to spur revenues but with slow collections, shifting future revenues into the current period, or booking asset sales as revenue.

A.3 Sloan Accrual Measure

The Sloan accrual measure (1996 and updated as discussed by Robinson 2007) is based on the analysis of accrual components of earnings. It is calculated as follows: net income less free cash flows (operating cash flow minus capital expenditures) divided by average total assets. The red flag benchmark is a ratio of more than 0.10. For example, Sloan calculated that JetBlue had a ratio of 0.50 and his employer, Barclays Global Investors, shorted the stock and made over 12% in less than one year. This ratio is used to help determine the quality of a company's earnings based on the amount of accruals included in income. If a large portion of a company's earnings are based more on accruals, rather than operating and free cash flows, then, it is likely to have a negative impact on future stock price since the income is not coming from the company's actual operations (Sloan 1996). Since many of the accrual components of net income are subjective, managers are able to manipulate earnings to make the company appear more profitable. In essence, the Sloan accrual measure is used to help determine the sustainability of a company's earnings.

A.4 Altman Z-Score

The Altman (1968 and updated in 2005) Z-Score is a multivariate statistical formula used to forecast the probability a company will enter bankruptcy within the next two years. The model contains five ratios which are listed below with their coefficients, based on Altman's research. The model was originally developed in 1968 for evaluating the bankruptcy risk of traditional public firms, such as manufacturing, energy, and retail, but it can also be applied to non-traditional and service public firms, such as software, consulting, and banking, as well as private firms. All three versions of the model are available on the Bloomberg software subscription package. The red flag bankruptcy prediction of the original model is a Z-Score of less than 1.8, with a score between 1.8 and 3.0 indicating possible bankruptcy problems (Altman 2005). For example, Altman had previously predicted that General Motors would "absolutely" seek bankruptcy protection and "they still come up very seriously in the Z-Score test into the bankrupt zone after a 30 to 60 day reorganization" (Del Giudice 2009).

A.4.1 (Working Capital / Total Assets) x 1.2

This ratio is a measure of a firm's working capital (or net liquid assets) relative to capitalization. A company with higher working capital will have more short-term assets and, thus, will be able to meet its short term obligations more easily. This ratio is one of the strongest indicators of a firm's ultimate discontinuance because low or negative working capital signifies the firm may not be able to meet its short-term capital needs.

A.4.2 (Retained Earnings / Total Asset) x 1.4

This ratio is a measure of a firm's cumulative profits relative to size. The age of the firm is implicitly considered due to the fact that relatively young firms have a lower ratio and the incidence of business failures is much higher in a firm's early years.

A.4.3 (EBIT / Total Assets) x 3.3

A healthy company will be able to generate income using its assets on hand. If this ratio is low, it demonstrates that profitability is poor and the company is in danger of bankruptcy as it is more vulnerable to market downswings which affect earnings.

A.4.4 (Market Value of Equity / Book Value of Total Liabilities) x 0.6

This ratio adds a market emphasis to the bankruptcy model. The theory is that firms with high capitalizations would be less likely to go bankrupt because their equities have higher values. In addition, it will gauge the market expectations for the company which should take into account relevant future financial information.

A.4.5 (Sales / Total Assets) x 0.999

This ratio, also known as total asset turnover, demonstrates how effective the company is utilizing its assets to generate revenue. If this number is low, it indicates that the company is not being run efficiently which creates a higher bankruptcy risk.

A.5 Z-Score (Beneish Fraud Model)

Beneish (1999) developed a statistical model used to detect financial statement fraud and earnings management through a variety of metrics. There are five key ratios used in the model, which are the Sales Growth Index (SGI), Gross Margin Index (GMI), Asset Quality Index (AQI), Days Sales in Receivables Index (DSRI), and Total Assets to Total Accruals (TATA). Each of these measures with its model coefficient, based upon Beneish's research, is outlined below. There is also a constant value in the model of -4.840. The red flag benchmark is a Z-Score greater than a negative 1.49, i.e., a smaller negative number or a positive number indicates possible financial reporting problems (Beneish 1999). For example, Enron had a Z-Score of a positive 0.045 in its last year.

A.5.1 SGI – Sales Growth Index x 0.892

This measure is current year sales divided by prior year sales. It is meant to detect abnormal increases in sales which may be the result of fraudulent revenue recognition. If a company experiences a very large increase in sales from one period to the next, it may be due to shifting revenue to a later period or booking phony revenue.

A.5.2 GMI – Gross Margin Index x 0.528

This measure is last year's gross margin divided by this year's gross margin. While not necessarily a direct measure for potential manipulation, companies that are experiencing declining gross margins may have increased pressure to improve financial performance. Such pressure may cause them to turn to fraud or questionable financial reporting to maintain net income margins.

A.5.3 AQI – Asset Quality Index x 0.404

This measure is the percentage of total assets that are intangible assets this year divided by the same percentage calculation for last year. An increase in this index may represent additional expenses that are being capitalized to preserve profitability. Rather than expensing various costs, such as research and development or advertising,

these costs are being capitalized as intangible assets. Capitalization increases assets while helping to maintain the profitability of the company.

A.5.4 DSRI – Days Sales in Receivables Index x 0.920

This measure is DSRI this year divided by DSRI last year. Companies that are trying to boost revenue and profit may allow customers to have greatly extended credit terms so that they will buy earlier. This practice increases revenue in the current quarter but may hurt future performance. This metric is meant to detect companies which make significant changes in their collection policies and/or recognize phony or early revenues.

A.5.5 TATA – Total Accruals to Total Assets x 4.679

This measure represents total accruals to total assets. Accruals represent non-cash earnings. Similar to Sloan's accrual measure and the accrual measure in the Dechow fraud model, an increase in accruals represents an increased probability of earnings manipulation and possible operating and free cash flow problems.

A.6 F-Score (Dechow Fraud Model)

This F-Score fraud model (Dechow, Ge, Larson, and Sloan 2007) can be used as a test for determining the likelihood of financial reporting manipulation. Similar to the other models and ratios, a fraudulent score for this model does not necessarily imply such manipulation but it serves as a red flag for further analysis. The model contains measures to identify problems in accruals, receivables, inventory, cash sales, earnings and stock issuances as discussed below with their coefficients, based upon their research. There is also a constant value of -6.753 in the model. The red flag benchmark is an F-Score greater than 1.0 and is calculated using an exponential model. For example, the F-Score for Enron in its last year of operation was 1.85. This research is the more extensive of the two fraud models since it was based upon an examination of all Accounting and Auditing Enforcement Releases (AAERs) issued by the SEC between 1982 and 2005 while the older Beneish study was based only on AAERs issued between 1982 and 1992.

A.6.1 Accruals x 0.773

Firms that engage in earnings manipulation typically have abnormally high accruals. A significant amount of non-cash earnings results in inflated earnings and is a warning sign for earnings manipulation. This measure is a complex calculation based upon numerous accrual measures and is scaled by average total assets. Essentially any business transactions other than common stock are reflected in accrual measures (Dechow et.al. 2007).

A.6.2 Change in receivables x 3.201

The change in receivables from last year to this year is scaled by average total assets. Large changes in accounts receivables may indicate revenue and earnings manipulation. Such manipulation can occur through the early or phony recognition of revenue and large swings in accounts receivable will distort cash flows from operations.

A.6.3 Change in inventory x 2.465

The change in inventories from last year to this year is scaled by average total assets. Large changes in inventory may indicate inventory surpluses, shortages, obsolescence, or liquidation. For example, if the company uses the last-in first-out (LIFO) method of accounting for inventory in a period of rising prices, selling older inventory will result in lower cost of goods sold, i.e., LIFO liquidation of inventory units or layers. This practice leads to inflated earnings.

A.6.4 Change in cash sales x 0.108

This measure is the percentage change in cash sales from last year to this year. For a firm not engaged in earnings manipulation, the growth rate in cash sales should approximate the growth rate in revenues. Thus, the change in cash sales is a key metric to monitor when evaluating the potential for earning manipulation.

A.6.5 Change in earnings x -0.995

This measure is a percentage calculated as earnings divided by total assets this year less the same measure last year. Volatile earnings may be indicative of earnings manipulation. According to Dechow, Ge, Larson, and

Sloan (2007), a consistent theme among manipulating firms is that they have shown strong performance prior to manipulations. The cause for such manipulations may be a current decline in performance which may be covered up by manipulating financial reporting.

A.6.6 Actual issuance of stock x 0.938

This measure is a dummy variable that is ON if additional securities are issued during the manipulation year and is OFF if no such securities are issued. Such issuances may indicate operating cash flow problems that need to be offset by additional financing. Also, issuance of stock may indicate that managers are exercising their stock options. The exercise of stock options may signify that managers are attempting to sell at the top because they foresee future underperformance of the company. Such insider sales resulted in the criminal conviction of Qwest's Chief Executive Officer and have been a significant non-financial red flag. For example, Qwest and Enron insiders made \$2.1 billion and \$1.1 billion, respectively, by exercising and selling their stock options before their firms' financial reporting problems became public.