

Lehman Brothers – 1998
Liquidity Risk Case Study

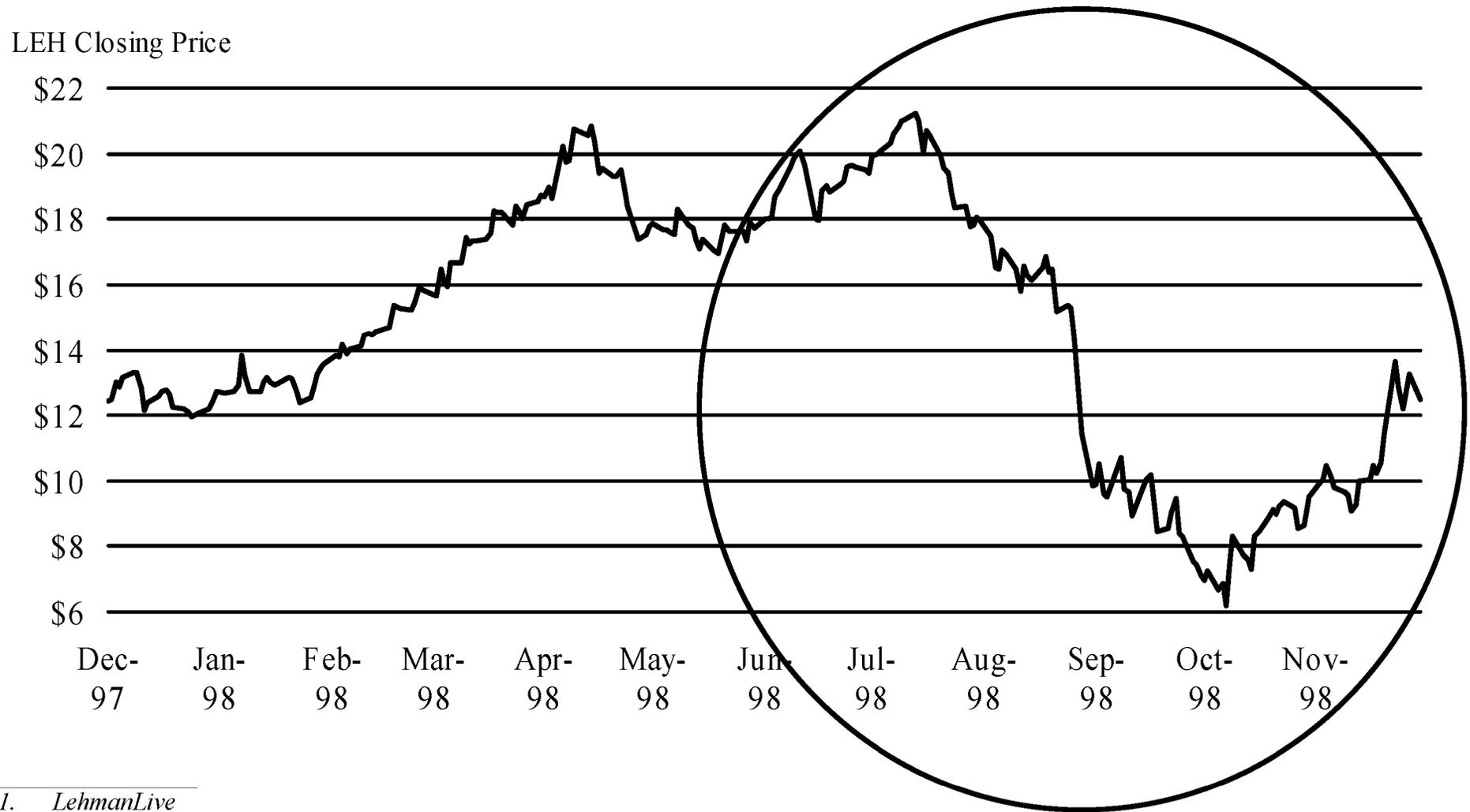
Ken Umezaki

LEHMAN BROTHERS

Lehman Stock Price 1998

What happened?

Lehman Brothers Stock Price – 1998

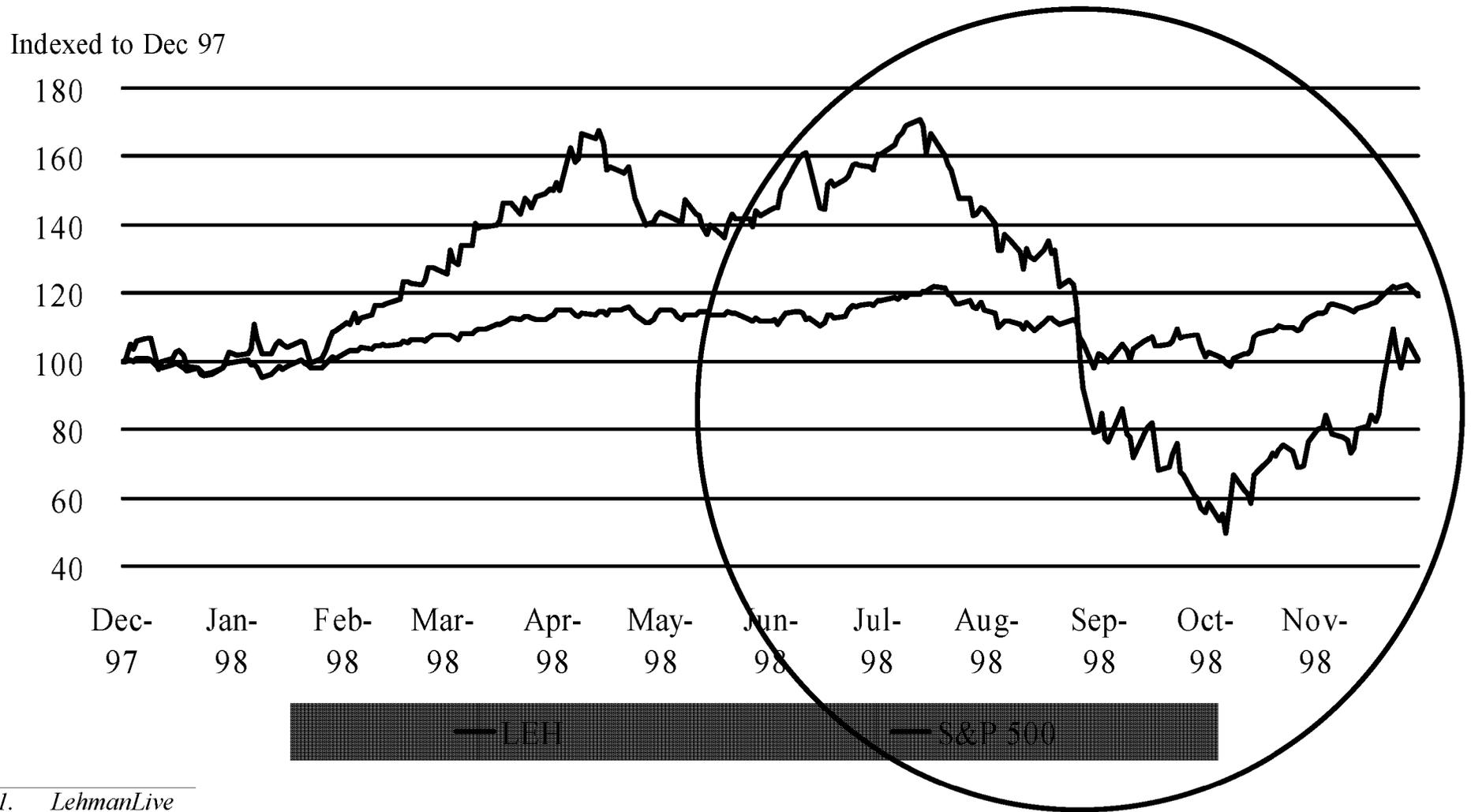


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Lehman Stock Price 1998

What happened?

Lehman Brothers Stock Price – 1998



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Key Lehman Facts

As of May 1998

◆ 1H98 Revenues (annualized) = \$5.04Bn (1997 = \$3.87Bn)

◆ Employees = 8,387

◆ Gross Balance Sheet = \$178Bn

◆ Leverage Ratio (Gross/Net) = 39.6X / 26.9X

◆ Liability Structure

	<u>Q2 1998 (\$Bn)</u>	<u>Change from Q2 1997 (\$Bn)</u>
– Secured Financing	\$79	+\$15
– Short Term Unsecured	\$11	+\$0
– Long-Term Debt	\$27	+\$9
<u>Total</u>	<u>\$117</u>	<u>+\$24</u>

◆ Ratings = Baa1 / A

◆ 10-Year Holding Company debt spreads = LIBOR+55

◆ Stock Price ≈ \$17.5 (\$70 pre-split basis)

The Headlines

<u>Date</u>	<u>Stock \$</u>	<u>Event</u>
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“11 firms contributed \$300mm each. Lehman debated whether to contribute anything at all, Fuld said, because it had a relatively small exposure to losses from the fund. If it contributed \$300mm,

“In the case of Lehman Brothers, a couple of days of spinning transatlantic rumors that the firm was on the brink of insolvency

“Once in peril, Lehman grabs the spotlight: Turnaround lifts profits, stock” – *Crain’s New York Business*

floors, it went so far as to allege Lehman’s 20 lenders had cut off the firm’s lines of credit.” – *New York Post*

continuing successful shift in the firm’s business mix to higher

“On Sept. 11, 1998 Reuters announced that a major Wall Street firm was on the verge of collapse and caused a major panic among Lehman investors, clients and employees” – *Sydney Morning Herald*

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The Headlines

<u>Date</u>	<u>Stock \$</u>	<u>Event</u>
9/98	\$7.3	Moody's affirms / S&P warns downgrade
10/98	\$6.9	SEC investigates LEH share manipulation
10/98	\$6.0	LEH stock = \$6.0

“Lehman has denied all the rumors. Richard Fuld over the weekend responded to a question about whether the bank was solvent:

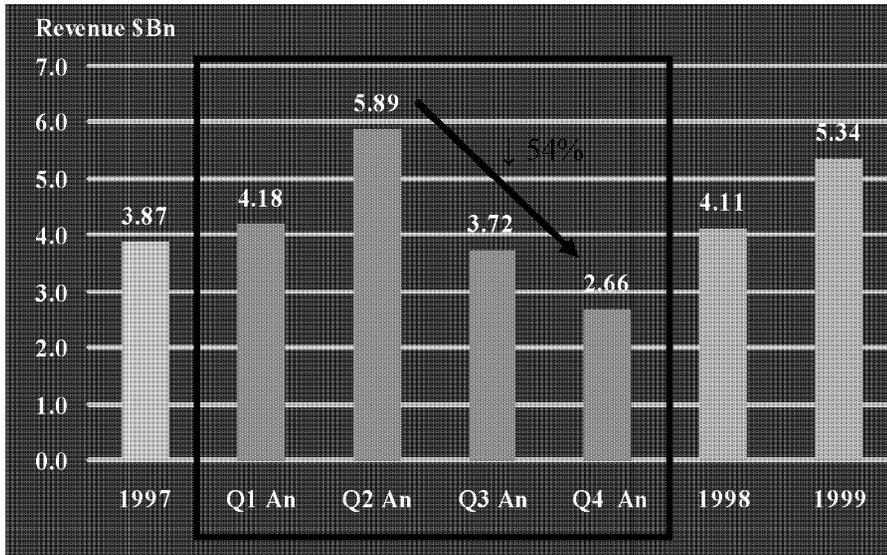
“Solvent, yes, of course, we are solvent. We have around \$34Bn of

“It (Lehman) said its exposure to hedge funds totaled \$447mm, which was more than 100% collateralized, and its net positions in the emerging markets totaled \$305mm...Its largest single hedge fund exposure is \$10mm. The firm's gross mark-to-market exposure to Long-Term Capital Management is \$32mm, against which it holds \$41mm in the form of US Treasuries.” – *Financial Times*

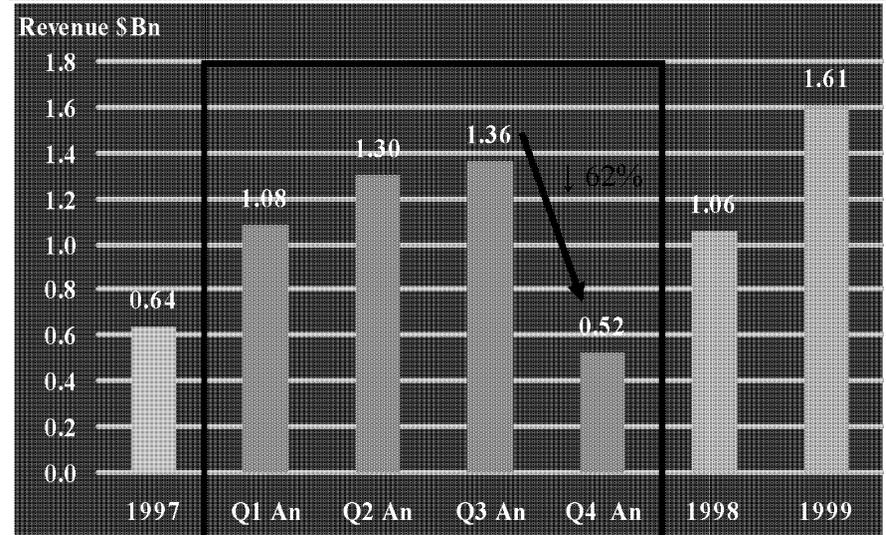
vulnerable to declines in the markets.” – *Financial Post Investing*

Lehman Revenues

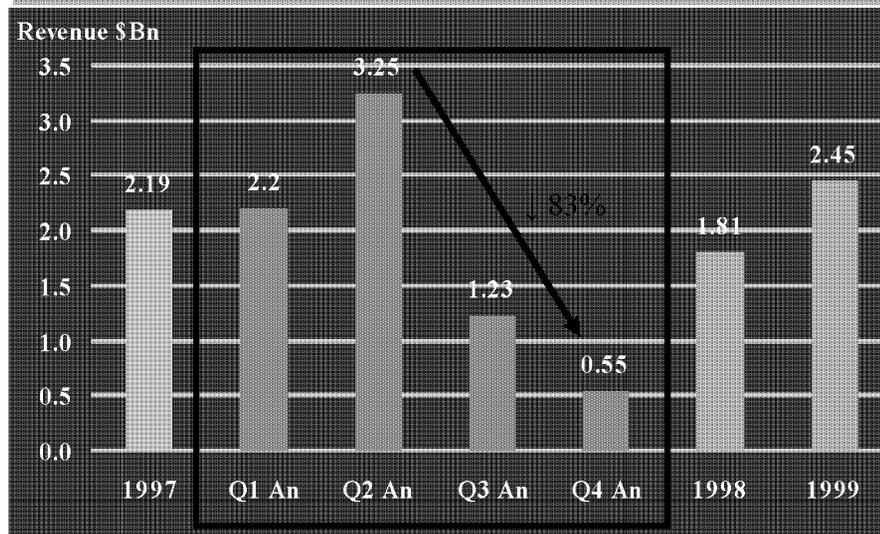
Firm Revenues 1997 - 1999



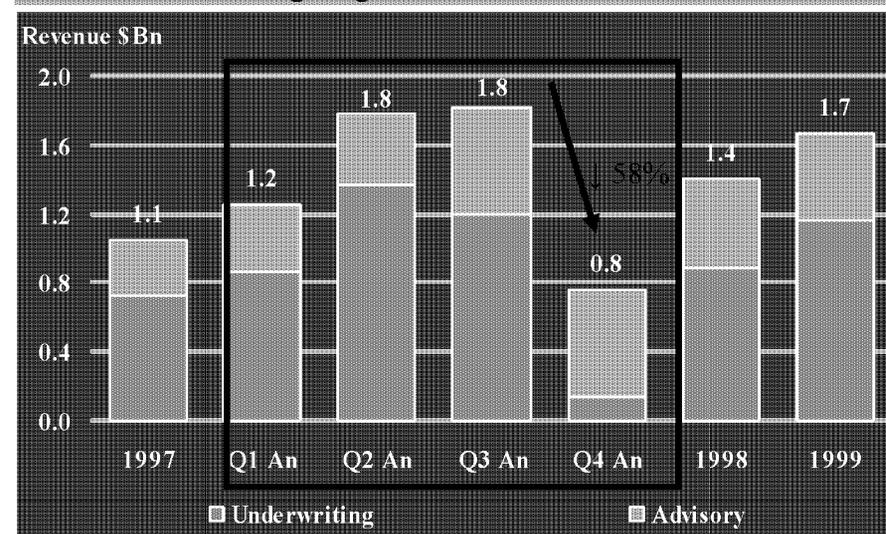
Equities Revenues 1997-99



FID Revenues 1997 - 1999



Banking Segment Revenues 1997-99



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Issues Lehman Faced

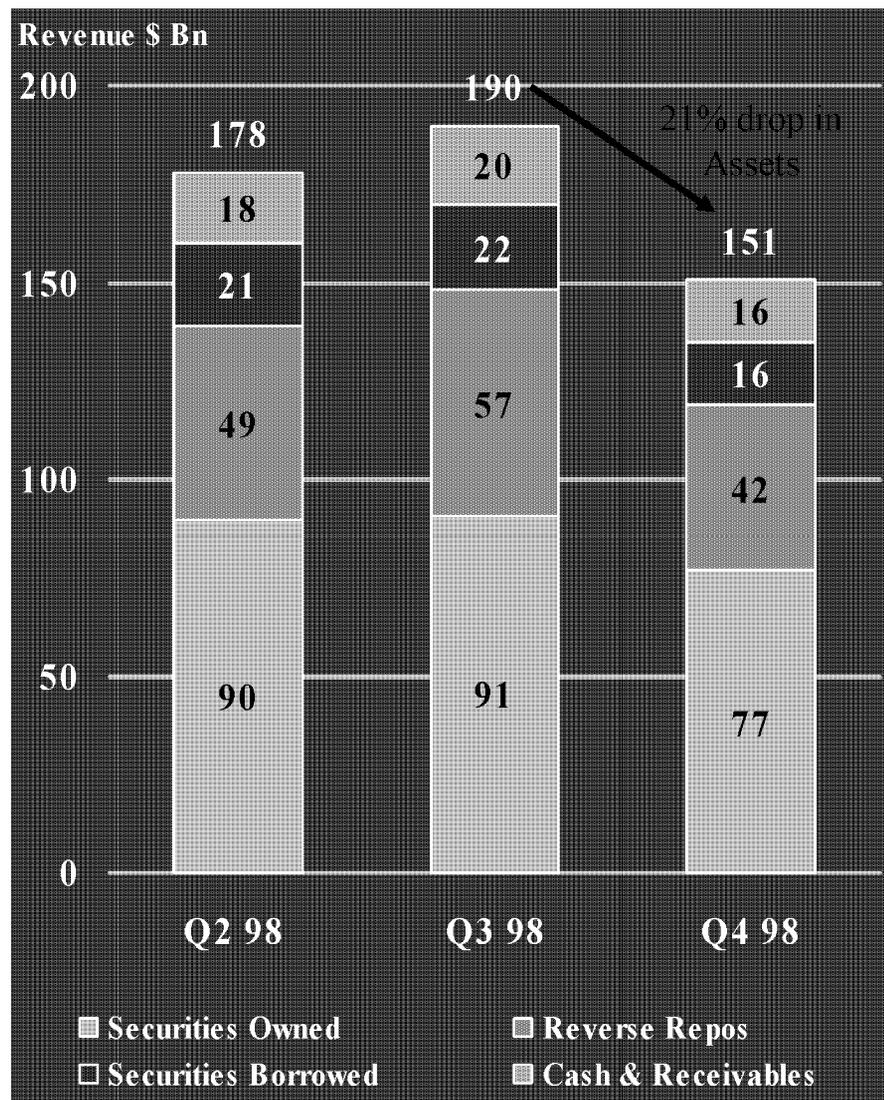
- ◆ Large FID MTM losses in Q3 + Q4 (EM, Derivatives, Mortgages)
- ◆ Significant reduction in market liquidity and origination volumes
- ◆ Speculative rumors of LEH collapse
- ◆ Client Issues
 - Collapse of LTCM
 - Default / Liquidation of other Hedge Funds
 - Margin calls
 - Losses by money market investors
 - EM structured note losses / lawsuits

Issues Lehman Faced (Continued)

- ◆ LEH ability to finance inventory
 - CP buyers demand liquidity. LEH exchanged with term collateralized borrowing
 - Repo counterparties required more liquid collateral
 - Maturity shortening of financing
 - Clients demanding bids on LB debt
- ◆ LEH needed to sell inventory in less liquid assets precisely when the market had “no bid”
- ◆ Potential “vicious” cycle

Lehman Balance Sheet

\$40 billion reduction in balance sheet in Q4



- ◆ Reduced match book in Financing
- ◆ Reduced “illiquid” inventory through sales in an illiquid market
- ◆ Initiated securitization programs in Mortgages, Real Estate and Loans
- ◆ **Firmwide effort** to counter rumors and attract funding clients

Resulting Changes to LEH Funding Framework

Based on “lessons learned” from the fall of 1998, the Firm adopted strict guiding principles to direct the target liquidity structure.

Four Pillars of the Firm’s Funding Framework

PILLAR I

Cash Capital Model

Determines the amount of long term debt (> 1 year) and equity needed to fund the Firm

PILLAR II

Reliable Secured Funding Model

Represents the completely reliable sources of secured funding by product

PILLAR III

Maximum Cumulative Outflow Model

Determines the size of liquidity cushion needed during a stress environment

PILLAR IV

Contingency Funding Plan

Represents a detailed management action plan during a stress event

Cash Capital Model

- ◆ Objective: Ensure that LB has sufficient long-term unsecured financing in place to support our balance sheet requirements. Owned by Treasury Department.
- ◆ Methodology:
 - Assign secured financing “haircuts” by asset type for term repo, **during a 1-year period where LB cannot raise unsecured financing.**
 - Apply the haircuts to all inventory and other balance sheet uses
 - Adjust requirements for other factors (e.g. legal entity, intercompany lending, regulatory requirements, etc.)
 - Raise long-term debt to cover this amount. Measure Cash Capital usage by business
 - Charge cost of debt (1-week Libor + 40) to business / traders
- ◆ Sample Haircuts:

– G7 Governments = 1.5%	– MBS = 2%
– Corporates Bonds = 5%	– Commercial Real Estate “Whole Loans” = 100%
– Corporates Loans = 100%	– Derivative MTM = 100%
– Lehman Debt = 100%	

Lessons for Traders

- ◆ Your risk positions are significantly leveraged!
- ◆ Understand how your positions are financed:
 - Secured vs. Unsecured
 - Cash Capital Requirements
 - Term vs. Overnight
 - Legal Entity
- ◆ Understand the “depth” of liquidity for your positions in the market:
 - Know it will change due to market conditions
 - Beware of outsized positions relative to liquidity
 - Client activity can influence liquidity
 - Limit aged inventory

Lessons for Traders (Continued)

- ◆ Hedges may not work
 - ◆ Losses today reduces headaches tomorrow
 - ◆ Communicate all potential “leading indicators” to appropriate managers
 - Large illiquid positions
 - Large market moves
 - Clients in trouble
 - Rumors
 - ◆ In times of financial crisis, liquidity can dominate value
 - ◆ Credibility takes years to earn, and one day to lose
-



Survey Results

Ken Umezaki

LEHMAN BROTHERS

Trader Training Survey Results

<i>Question</i>	<i>Avg</i>
Managers comfortable with risk during P&L vol.	4.0
Business provides enough Risk Appetite.	4.0
FID should take more risk with its capital.	3.9
I take enough risk to maximize revenues.	3.4
I have a Risk Appetite Limit.	3.4
Client business model does not conflict with taking risk.	3.4
Business provides enough balance sheet to grow revenues.	3.1
I understand my risk limits and risk policies.	3.1
I am incented to take risk commensurate with the opportunities.	3.1
Financial Control generates accurate P&L estimates.	3.1
I have a VaR Limit for my business.	3.1

Survey results for 21 individuals.

Trader Training Survey Results

What are the three most important changes that would enable you to take more risk and/or increase revenues?

Prevalent Responses

Frequency of Responses

◆ Clarity from LB + FID Management on Risk Approach & Limits	13
◆ Improve Systems / Modeling	12
◆ Change Trading Approach	8
◆ Increase Risk Taking	5
◆ More Communication	5
◆ Increase Balance Sheet	4
◆ Improve Incentives to take Risk	4
◆ Add Research Resources	4
◆ Add Sales Resources	3

Trader Training Survey Results

How do you define the Firm's trading/risk management style and does it need to be redefined? How?

Refinements

- ◆ Risk is not only taking the credit default risk, but also taking the counterparty risk (i.e. liquidity risk, legal risk, accounting risk, etc.). I currently make decisions regarding these risks based on zero probability of loss. I think we should view all risk in terms of expected dollar value approximated and perform the same style because it takes time to develop this.
- ◆ I think the Lehman trading/risk management style is very aggressive with an emphasis on trading processes, it makes it difficult to see the risk side of the business.
- ◆ Risk is taken in size relative to everybody's comfort level.
- ◆ More visible risk taking by senior level traders is the most appealing.
- ◆ I feel that Lehman is a culture built upon experienced traders/risk takers.
- ◆ "Managers of client focused businesses." We need to increase transparency of risk allocation across Lehman would give much greater context to risk taking and should encourage increased risk.
- ◆ Growth in cross-product risk taking

Survey results for 21 individuals.