Madelyn Antoncic

Chief Risk Officer

Lehman Brothers Risk Management

August 17, 2007

LEHMAN BROTHERS

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Agenda

Agenda

Key Themes

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Risk Management is one of the core competencies of the Firm and is an intrinsic component of our control system. As a result of our focus on continuously enhancing our risk capabilities, in the current challenging environment, we feel confident that our risk position is solid.

- Risk Management is at the very core of Lehman's business model
  - Conservative risk philosophy – supported by approximately 30% employee ownership
  - Effective risk governance – unwavering focus of the Executive Committee
  - Significant resources dedicated to risk management function – continuous investment into human capital, analytics, and infrastructure
  - Strong discipline, rapid feedback and anticipation, business partnership culture

- In the current challenging environment, Lehman's risk position is solid
  - All risk metrics within established limits
  - Proactive monitoring and tightening (where justified)

- In today's discussion we will cover
  - Lehman Risk Management overview – governance, organization and methodology
  - The Firm's risk exposure – current situation and stress tests
  - Areas of increased focus – our position and actions

Risk Governance

Our Control Environment

- Risk Management is one of our core competencies
- It is Multi-tiered and involves many areas of the Firm
- One key feature which differentiates us from our peers is Market risk, Credit risk and Quantitative risk are integrated
  - allows us to leverage people, analytics, systems, information flows
- Risk Management is more than measuring and reporting risk
- Our approach applies analytical rigor overlaid with sound practical judgment
- Risk Management is a partnership with the business
  - we work proactively with the business before a large trade is done to collectively determine the least risky deal structure
- Risk Management
  - develops risk policies and procedures
  - develops risk measurement methodologies
  - sets limits
  - tracks actual risk usage against limits
  - evaluates valuation models

Risk Philosophy

- Our focus is balancing risk versus return
  - We want to help ensure Lehman Brothers' risk appetite is deployed in the most efficient way
- At the end of the day nothing is fool-proof. While there is no guarantee against loss, we can minimize the probability of loss
  - We minimize market and credit risk through our client-driven franchise where we facilitate customers
    - We proactively manage risk both before and after trades are done by mitigating risk via management of the terms, outright sales or syndication, or hedging the remaining risk
    - We actively manage collateral assessment and collection where applicable
    - Risk is minimized through geographic, industry, asset class and customer diversification

Committee Structures

- Lehman has established numerous committees to oversee risk taking activities and to ensure that controls are appropriately administered and reviewed
- The key operating committees at the Firm include:

Management Oversight Committees

1. Executive Committee
2. Management Committee
3. Operating Exposures Committee
4. Finance Committee
5. Capital Markets Committee
6. Risk Committee

Firmwide Transaction Approval Committees

7. Commitment Committee
8. Bridge Loan Committee
9. Investment Committee
10. Fairness Opinion Committee
11. New Products Committee
12. Complex Structured Finance Transaction Committee
13. Strategic Acquisition Review Committee

Business Level Transaction Approval Committees

14. High Grade Credit Committee
15. High Yield Credit Committee
16. Loan Participation Committee
17. Structured Finance Committee
18. Equity Commitment Committee
19. IMD Product Review Committee
20. Executive Oversight Committee

Risk Management Overview

Risk Management Function

Risk Management is Independent from Trading

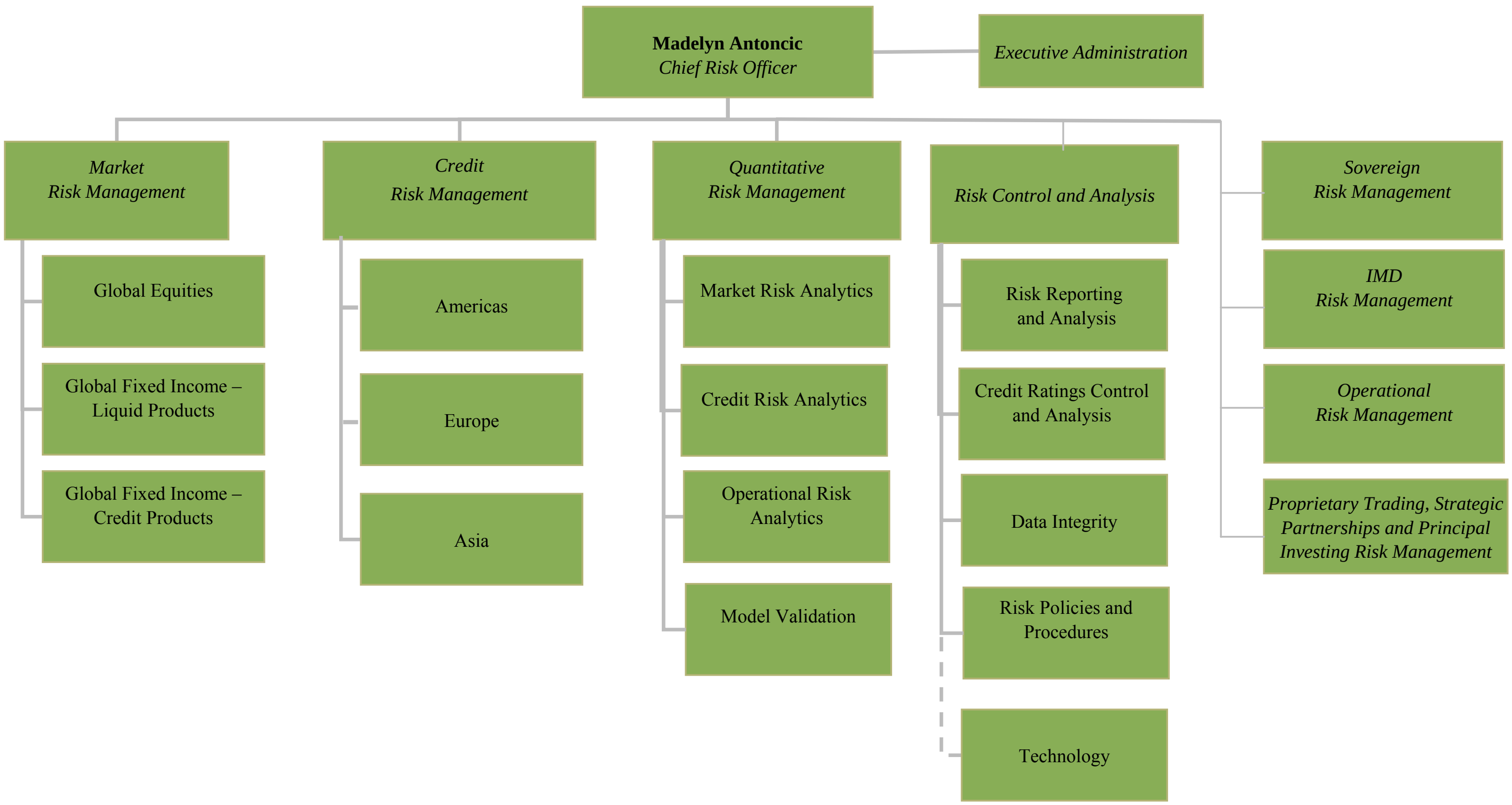
- The Global Risk Management Division is independent of the trading areas
- The Chief Risk Officer is a member of the Firm's Management Committee. She reports directly into the Executive Committee to the Head of Strategic Partnerships, Principal Investing and Risk (Dave Goldfarb) who reports to the Firm's Chairman and CEO (Dick Fuld) who reports ultimately to the Board of Directors of the Firm
- The Global Risk Management Division consists of several departments:
  - Market Risk Management
  - Credit Risk Management
  - Quantitative Risk Management
  - Operational Risk Management
  - Sovereign Risk Management
  - IMD Risk Management
  - Risk Control and Analysis
  - Proprietary Trading, Strategic Partnerships and Principal Investing Risk Management
- Outside the U.S., Risk Management is "matrixed" reporting both to global risk management managers and regional heads consistent with the trading businesses organization structure

Risk Management Function - continued

- **Market Risk Management** is responsible for ensuring all market risks are identified, understood, measured, monitored and captured by an appropriate metric. Risk managers work very closely with the trading desks in assessing risk and sit on trading floors with the desks they support
- **Credit Risk Management** is responsible for counterparty credit analysis and due diligence; assigning and maintaining internal risk ratings; credit limits for each counterparty; establishing country risk limits; preparing credit reviews; monitoring counterparty credit exposures on a current (CCE) and potential basis (MPE) including usage of credit limits
- **Quantitative Risk Management** is responsible for developing, implementing and maintaining the risk methodologies and systems used to measure market, credit and operational risks, as well as validating the pricing and valuation models used by the business units of the Firm
- **Sovereign Risk Management** is responsible for establishing a framework to assess political, economic, and social conditions and events in a foreign country that might adversely affect the Firm's interests or reputation
- **Operational Risk Management** is responsible for ensuring all operational risks are identified, understood, measured and monitored
- **IMD Risk Management** is responsible for risk management for the Investment Management Division including Private Investment Management, Asset Management and Private Equity
- **Risk Control and Analysis** is responsible for data integrity including data management and reconciliation; business level, Firmwide and regulatory reporting and analysis; overseeing implementation of all risk technology projects; maintaining consistent global risk policies and procedures; and credit ratings control and analysis
- **Proprietary Trading, Strategic Partnerships and Principal Investing Risk Management** is responsible for risk management for Global Trading Strategies, Global Principal Strategies, Strategic Investments including risk associated with our GP or LP interests in hedge funds as well as Lehman's share of investments in our private equity funds

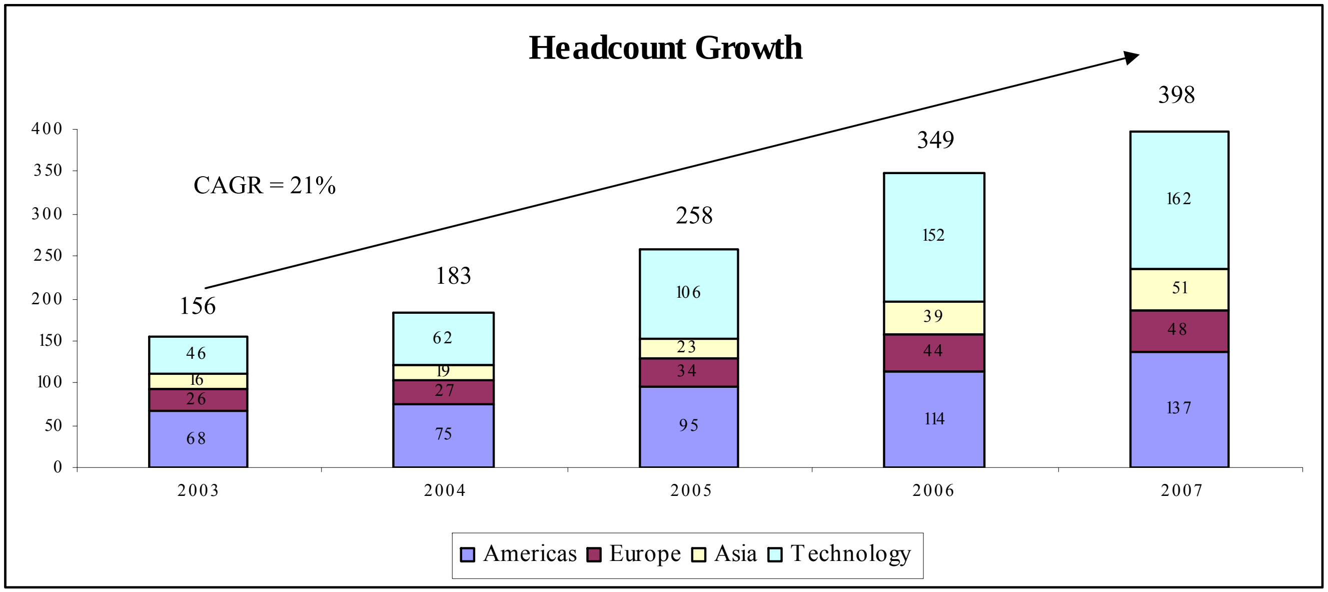
Risk Management Organization

- Risk Management is a global, integrated function under the leadership of the Chief Risk Officer, Madelyn Antoncic. The Global Risk Management Department consists of 398 professionals, with 228 risk managers and 162 technologists



Risk Management Organization - continued

- To respond to the growth of the businesses over the last several years the Risk Division, including risk technology, has grown significantly
  - Headcount has gone from 156 at the end of FY 2003, to 398 currently
- The Division has 228 risk managers (excluding admin) and 162 technologists (including off-shore consultants)



Risk Management Organization

- Excluding technologists and administrative staff, we have 228 professionals in GRMD. Our professionals are highly qualified, many having substantial relevant experience. Many are either former traders, former desk quants or have relevant business experience.

1	Chief Risk Officer
4	Executive Administation (Regional Heads/CAO)
40	Market Risk Management
3	Proprietary Trading, Strategic Partnership and Principal Investing Risk Management
87	Credit Risk Management
46	Quantitative Risk Management
9	Operational Risk Management
5	Sovereign Risk Management
5	IMD Risk Management
28	Risk Control and Analysis
8	Admin
162	Technology (including off-shore consultants)

	Global (CRO/ Exec Admin)	Market Risk	Prop Trading	Credit Risk	Quantitative Risk	Operational Risk	Sovereign Risk	IMD Risk	Risk Control and Analytics	Total
PhD	40%	23%	0%	3%	59%	11%	0%	0%	4%	19%
Masters	20%	60%	100%	34%	35%	45%	100%	80%	29%	42%
Bachelors	20%	17%	0%	62%	6%	33%	0%	0%	64%	37%
Other	20%	0%	0%	1%	0%	11%	0%	20%	3%	2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Percentage of former traders, desk quants and business	**60%**	**38%**	**33%**	**22%**	**20%**	**22%**	**40%**	**20%**	**4%**	**23%**

External Constituents

Relationship with Regulators

- The Firm enjoys an excellent relationship with its regulators
- Many senior members of the Firm's Compliance group have either worked at, or with those who work at, the regulatory agencies. Members of the GRMD and the Compliance department also participate in numerous industry associations and sub-committees together with representatives from the regulatory agencies. This has allowed the Firm to develop a good working relationship with the various regulatory bodies
- Representatives of Finance and Risk meet monthly with the SEC (division of Market Regulation) to discuss the Firm's risk metrics and financial performance. This began as a voluntary meeting agreed to in order to help the SEC develop a better understanding of the Firm and is now part of the CSE process
- The Firm was approved by the Securities and Exchange Commission as a Consolidated Supervised Entity (CSE) in November 2005. Accordingly, the Firm uses risk-based internal models for purposes of calculating market and credit risk component of the regulatory capital charge
- The Firm is in the process of seeking FSA approval to use these same internal models in the calculation of regulatory capital charges for activity booked through UK-regulated entities, most notably LBIE
- The Firm has indicated to the FSA that we will file our AMA (Advanced Measurement Approach) waiver in 2008 under Basle II. This waiver will enable the Firm to use our internal Operational Risk model to calculate the operational risk component of capital
- In addition, the NYSE, the CBOT, the OTS (for Lehman Brothers Bank) and the FSA in Europe and Asia and the BaFin in Germany conduct annual examinations

Risk Analysis and Quantification

Risk Management Integrated Framework

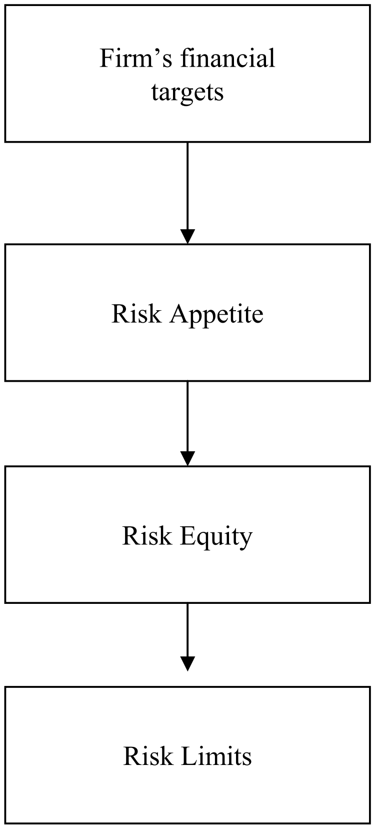
The Three Core Functions of Risk Management are

1. Understanding and identifying all risks
2. Ensuring that appropriate limits are in place for all transactions and products
3. Protecting the Firm against "catastrophic" loss

1. Have metrics to measure the risk for all products
2. Define a "Risk Appetite"
3. Have the ability to measure and monitor "tail risk"

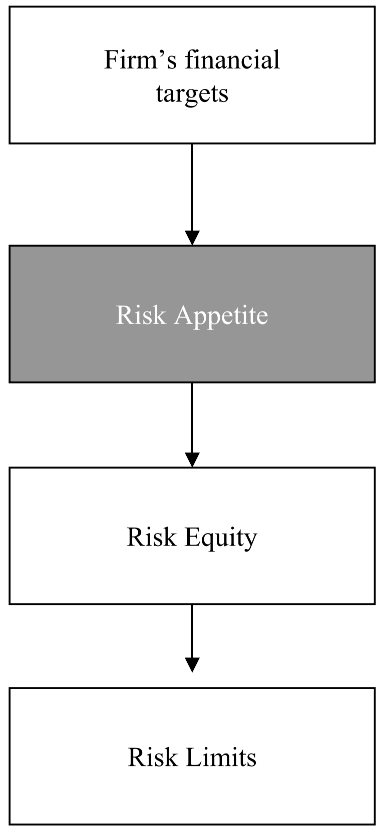
Risk Management Integrated Framework

– Multi-tiered
– Integrated Risk Framework



Risk Management Integrated Framework

– Multi-tiered
– Integrated Risk Framework



Risk Management Integrated Framework

Risk Appetite

- The risk appetite represents the quantity the Firm is "prepared to lose" in a year from market, event and counterparty credit risk
- The risk appetite framework begins with the Firm's financial targets and is designed to balance risk and return:
  - our aim is to deploy enough risk in our businesses to maximize returns
  - while limiting risk to ensure we meet our financial targets
- Significant factors driving risk appetite include:
  - base revenue assumptions
  - an estimate of the loss of revenues from non-risk taking activities
  - a minimum acceptable ROE
  - compensation adequacy

Risk Management Integrated Framework

Risk Appetite

- We start with our financial targets.
- We take into account a potential simultaneous slowdown in customer flow and banking activities (origination/advisory) which would negatively impact our financial targets since revenue shortfalls can also come from non-risk taking activities
- Then we subject ourselves to two constraints:
  - maintaining a minimally acceptable annual ROE
  - ensuring compensation adequacy including maintaining sufficient headcount to protect the franchise for the long-term

Risk Management Integrated Framework

Risk Appetite – the center of our approach to risk.

The risk appetite represents the quantity the Firm is "prepared to lose" in a year from market, event and counterparty credit risk. It is defined and measured at a 95 percent level of confidence.

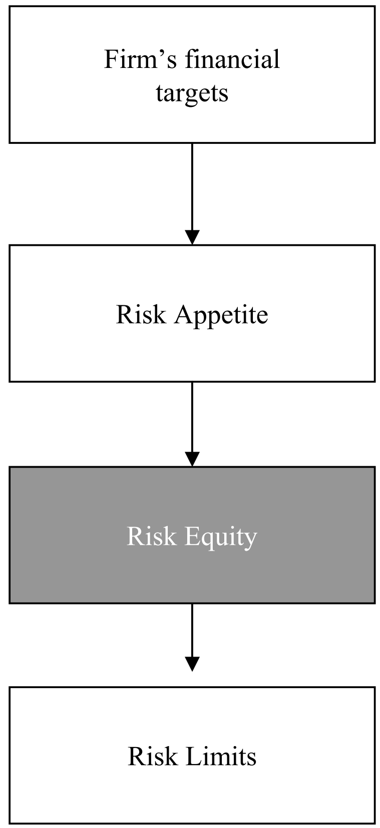
Confidence Interval and Time Horizons

Daily VaR		Risk Appetite		Equity Requirement
95% confidence One day horizon	⇦	95% confidence One year horizon	⇨	99.5% confidence 1 year or longer horizon depending on the nature of the trade

Risk Management Integrated Framework

– Multi-tiered

– Integrated Risk Framework



Risk Management Integrated Framework

Risk Equity

- The equity capital the Firm requires is the economic capital required to protect the Firm against market, event, counterparty credit and operational risks augmented by capital requirements due to external constraints
  - To the extent leverage or regulatory equity is an overriding constraint for the Firm, businesses are charged incremental equity on top of their economic (risk) equity

Equity Capital: Economic Capital and Regulatory Capital

Market Risk
+
Event Risk
+
Counterparty Credit Risk
+
Operational Risk

Economic Capital **Augmented by** **Regulatory Capital** = **Equity Capital**

Risk Management Integrated Framework

Market Risk

- Measures the potential mark-to-market loss on all positions from adverse market moves
- We use historical simulations which are "walk-backs" through time to determine what would have been the P&L impact on today's portfolio if we relived each day over the past four years. We weight the data giving more weight to recent market moves while at the same time giving less weight to market moves further back in time
- This approach allows us to avoid making assumptions about distributions, about diversification, about relative risk
  factor weightings
- In order to determine the reasonableness of the market risk measures, we do back-testing, comparing the market risk generated for the portfolio using the historical simulation approach to its actual trading P&L

Risk Management Integrated Framework

Event Risk

- Measures stress and "gap risks" which go beyond potential market risk losses. We measure these risks using statistically measurable stress analyses which capture losses associated with
  - Downgrades for high grade and defaults for High Yield loans, bonds and convertibles
  - Defaults for sub-prime mortgage loans
  - Property value losses on real estate
  - Dividend risk for equity derivatives
  - Deal break risk for merger arbitrage positions
  - Gap risk for fund derivatives

Risk Management Integrated Framework

Counterparty Credit Risk

- Measures the potential loss the Firm can suffer due to forward settlements, financing and derivative transactions with its customers. The measurement is a three-step process
  - Measure the potential exposure of all transactions over the appropriate time horizon
  - Assign each counterparty a probability of default based on its internal credit rating and a recovery rate based its internal facility rating
  - Run these inputs through the model to create a cumulative joint probability distribution from which we cut a tail

Risk Management Integrated Framework

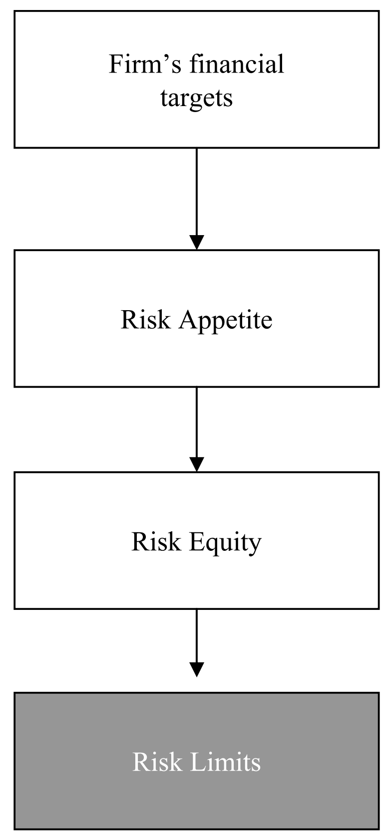
Operational Risk

- Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events
- Four different types of data are used (internal loss, key risk indicators, external loss and risk control self assessments). The aggregation of this data is defined as a “Hybrid VaR”
  - Collection of internal loss data:
    - Automated for cash equities - receiving daily feeds directly form trading systems
    - “Sub-system” loss databases for Operations and Treasury Departments feed directly
    - Regular (manual and uploaded) submissions from Finance, Legal, Front Office, Risk Managers
  - Key risk indicators:
    - Automatically on a daily basis – includes volume, fails, trade amendments
    - Periodical indicators – includes HR stats, IT outages, etc.
  - External loss:
    - Vendor purchased data
    - Risk manager research
  - Risk Control Self-Assessment (RCSA) program – scenario analysis and risk profile estimation
- In addition "Incidents" and “near misses” that are reviewed by Risk Managers and may form part of input into the scenario analysis is undertaken by experienced Business and Support and Control Managers
- In general terms, the data is converted into statistical distributions and aggregated through a Monte Carlo simulation using Bayesian credibility to determine the weight of each data component
- A multifactor model that regresses the key risk indicators against the operational losses is run daily. This model identifies the relationship between the control environment of the Firm and the losses. The outcomes of this model is also incorporated into the Hybrid VaR
- Through the inclusion of the multifactor model, the Hybrid VaR is similar to a Market Risk VaR
- This enables risk managers to identify control environment factors, for example, the impact of an increase in transaction volume or the number of fails to settle transactions, in the final VaR figure

Risk Management Integrated Framework

– Multi-tiered

– Integrated Risk Framework



Risk Management Integrated Framework

Risk Limits

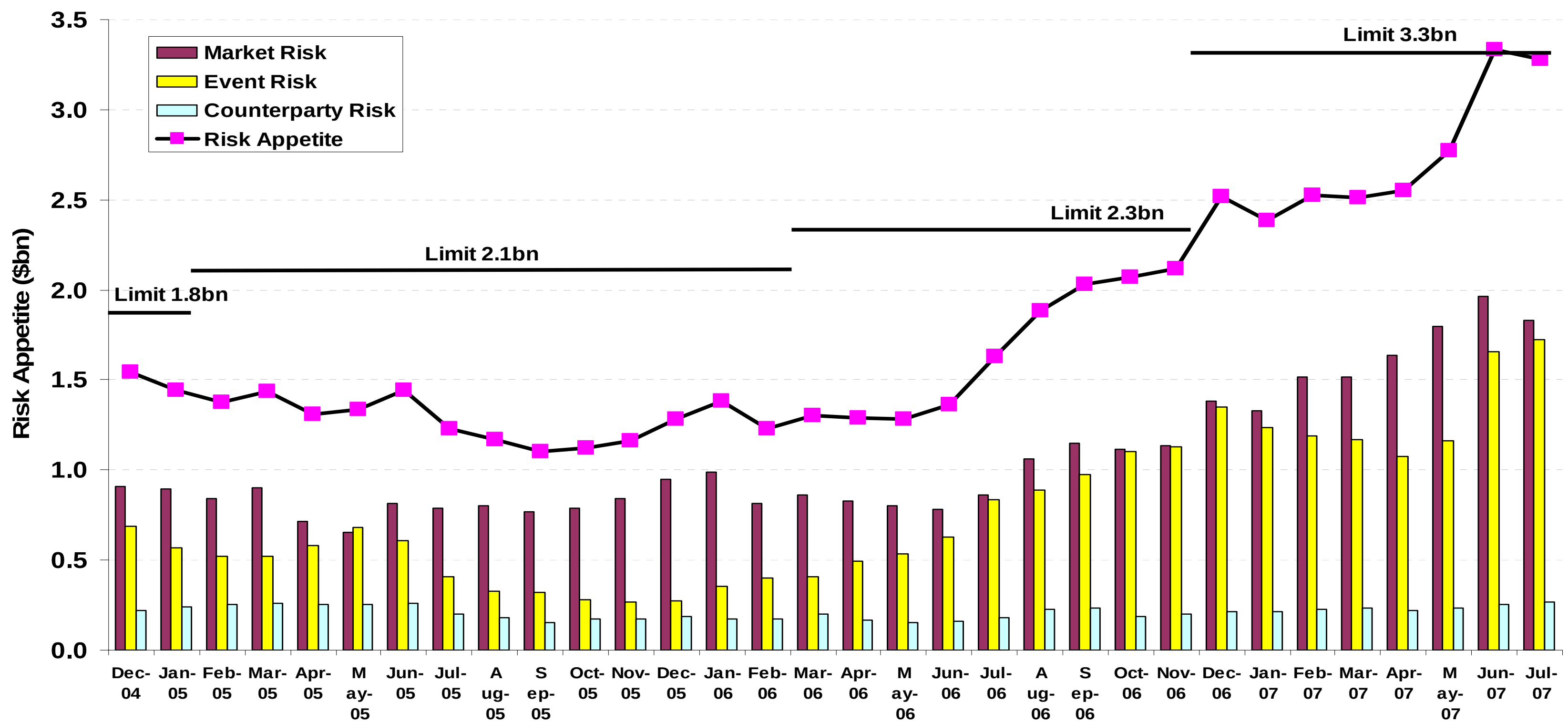
- The overall philosophy of our Firm is that we have a zero tolerance level for ignoring limits and internal processes
- Disciplinary actions for limit breaches include compensation adjustment or terminations
- The Chief Risk Officer has the authority to approve exceptions. The Global Heads of Market Risk and Credit Risk will make recommendations
- Risk Appetite Limits
  - The overall risk appetite limit is recommended by the Chief Risk officer and approved by the Executive Committee and the Board on an annual basis and is reviewed quarterly for requisite changes
  - Limits are cascaded down to divisions, businesses and regions. Trading desk heads further allocate limits to individual desks
  - Limits are monitored daily
- Credit Limits
  - All counterparties with credit exposure are given internal ratings
  - Every Hedge Fund counterparty requires a limit
  - The largest counterparties by industry, region and product are reviewed on a quarterly basis
  - All counterparties rated below “A” are formally reviewed on an annual basis

Risk Exposure

Risk Appetite Usage

- Risk appetite usage is composed of market risk, event risk and counterparty credit risk and is calculated daily both on a global, consolidated basis, and at regional, divisional, and line-of-business levels
- Risk Appetite usage is monitored on a daily basis against the limits
- Our franchise is highly diversified due to our product and business mix, as well as our international presence

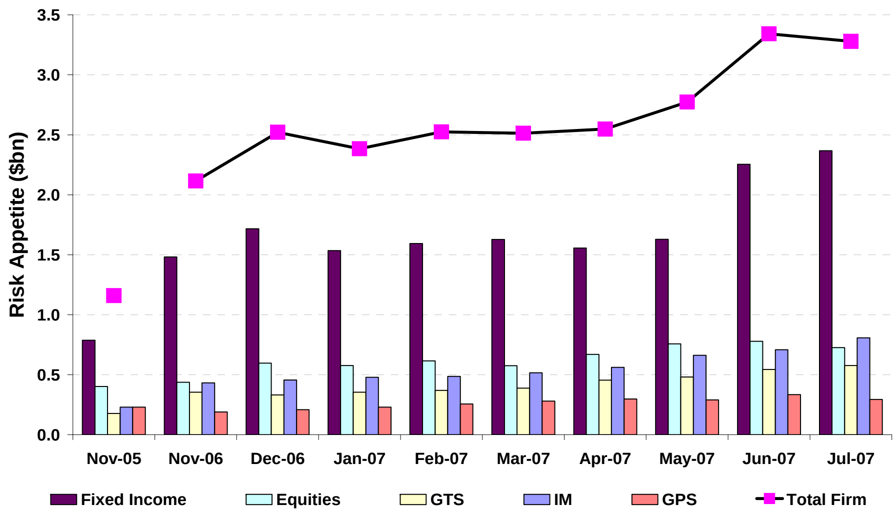
Average Monthly Risk Usage – Total Firm ($ million)



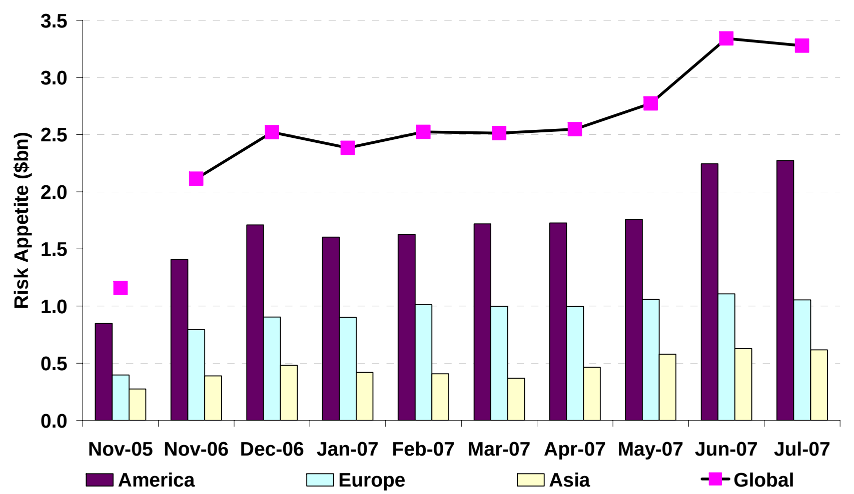
Risk Appetite Usage – Firm

- Given the growth in the Firm's revenue generating ability and capital base, in the Spring of 2006 at our strategic offsite the Firm made the decision to increase our risk profile and utilize more of our risk appetite capacity.
  - Average Risk Appetite rose from $2.12 billion in November 2006 to $3.28 billion in July 2007. This increase in risk is consistent with the growth of our businesses in Fixed Income, Equities, Global Trading Strategies, Investment Management, and Global Principal Strategies. Market Risk accounted for most of the increase while event risk and counterparty risk remained relatively constant
    - The increase in Market Risk was driven by larger position sizes in FID, Equities and GTS as well as increased market volatility in equities and credit spreads
  - Risk Appetite increased in all regions as we have expanded our geographic presence

Average Monthly Risk Usage by Business



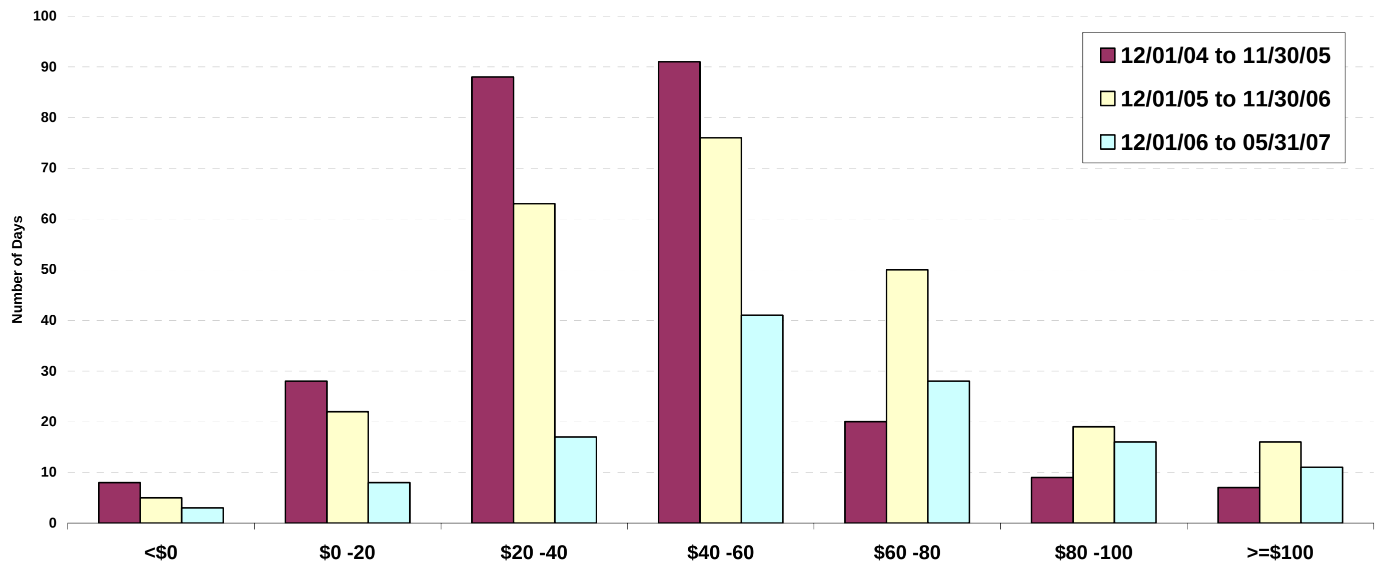
Average Monthly Risk Usage by Region



Trading Revenues

- From December 2004 through May 2007, we had sixteen (16) days of trading losses at the Firm level. The largest losses in financial years 2005, 2006, and 2007 were $16m, $59m, and $57m respectively. The number of negative P&L days has significantly decreased over this three year period from 8 to 3
- Over the same period, the average daily trading revenue has increased from $42m in 2005 to $60m in 2007. The number of days with greater than $75mm in revenue has increased from 19 to 34
- The bulk of the large gains were from sales of real estate positions which, under current accounting rules, have to be valued at the lower-of-cost-or-market. Because we are not on mark-to-market for these positions, appreciation is not recognized until we sell the property. However, impairments are recognized as they occur over time
- The significant mean and gains in our trading revenue distribution reflects the growth in our strong franchise

Daily Trading Revenue Distribution (December 2004 through May 2007 - $millions)



Counterparty Credit Risk

- We continue to be prudent in our approach to counterparty credit risk
  - We have a very low tolerance for delays on receiving collateral, where applicable
  - We give very close scrutiny to the value of customer collateral posted against margin loans
- We have a very high quality credit portfolio
- 97.8% of our counterparty exposure is in investment grade names

Credit Exposure Trend by Rating

(US$ million)	Ratings					Percentages				
	2Q '06	**3Q '06**	**4Q '06**	**1Q '07**	**2Q '07**	**2Q '06**	**3Q '06**	**4Q '06**	**1Q '07**	**2Q '07**
AAA	5,506	5,097	5,312	6,771	6,967	20.5%	21.3%	20.6%	23.8%	21.7%
AA	11,930	10,469	10,487	10,506	14,464	44.5%	43.7%	40.8%	36.9%	45.1%
A	6,987	6,140	6,873	8,063	7,443	26.1%	25.7%	26.7%	28.3%	23.2%
BBB	2,010	1,658	2,348	2,231	2,520	7.5%	6.9%	9.1%	7.8%	7.8%
BB	308	421	559	690	461	1.1%	1.8%	2.2%	2.4%	1.4%
B or Lower	81	138	161	243	241	0.3%	0.6%	0.6%	0.8%	0.8%
Total	***26,822***	***23,923***	***25,740***	***28,504***	***32,096***	***100.0%***	***100.0%***	***100.0%***	***100.0%***	***100.0%***

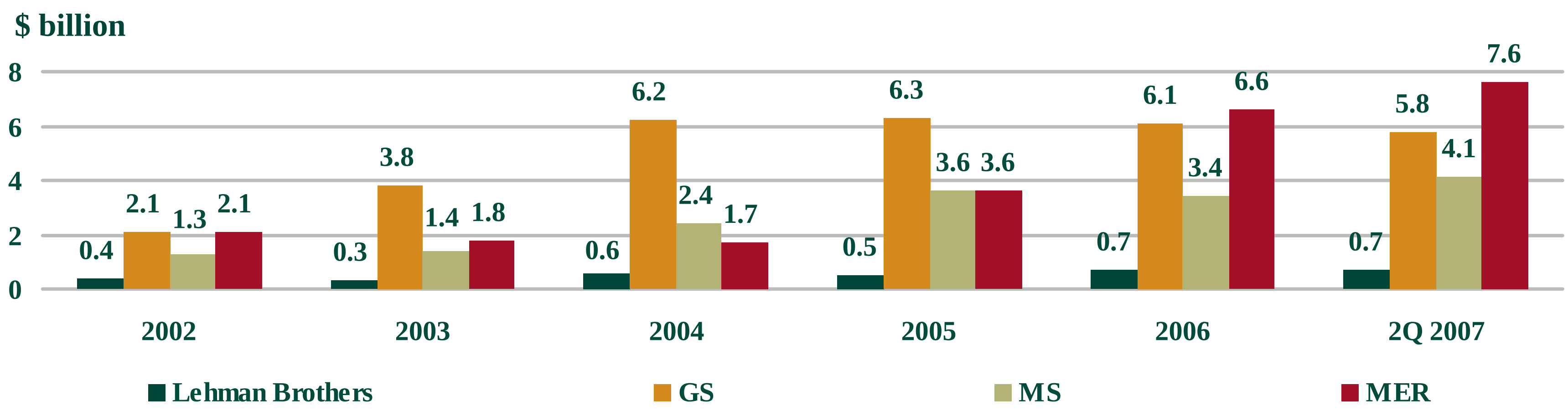
	2Q '06	**3Q '06**	**4Q '06**	**1Q '07**	**2Q '07**
Investment Grade	98.6%	97.6%	97.2%	96.8%	97.8%
Below Investment Grade	1.4%	2.4%	2.8%	3.2%	2.2%
	100.0%	***100.0%***	***100.0%***	***100.0%***	***100.0%***

Note: Does not include money market deposits.

Non-Investment Grade Derivatives Exposure

- Lehman Brothers has continually had the lowest non-investment grade derivative exposure in absolute terms and as a percentage of tangible equity as it relates to peers

Non-Investment Grade Derivative Exposures



Non-Investment Grade Derivative Exp as % Total Tangible Equity

	2002	2003	2004	2005	2006	2Q 2007
Lehman Brothers	4%	3%	5%	3%	4%	3%
GS	15%	23%	28%	25%	19%	15%
MS	6%	5%	8%	12%	9%	10%
MER	10%	7%	6%	11%	17%	19%

Stress Testing

- Stress tests and scenario analyses are performed regularly to evaluate the potential P&L impact on the Firm's portfolio of abnormal yet plausible market conditions
  - Analyses of movements in interest rates, stock prices, FX, volatility, etc., are run over a wide range of possible scenarios to determine the impact on the current portfolio of these extreme instantaneous shocks
  - These analyses are conservative because they do not allow for re-hedging or selling down a position either actively or through the automatic execution of existing stop-losses
- Our stress tests are run regularly on a suite of scenarios, including:
  - Re-runs of historical episodes of extreme market moves, for example:
    - 9/11 terrorist attacks
    - Russia default contagion and LTCM
    - November 2001 volatile bond market
    - October 1987 stock market crash
  - Hypothetical scenarios due to shocks that have some probability of occurrence and are driven by macro fundamental shifts, for example:
    - Liquidity Crunch due to central banks globally raising rates to reduce excess liquidity and investors reducing their riskier bets in high yielding assets
    - Oil price jump due to a disruption accompanied with fears of deflation in economies resulting in significant rate reductions by the central banks
    - Yield curve steepening due to potential inflationary expectations
  - Other ad-hoc hypothetical scenarios
- We subject both our trading and counterparty portfolio to stress tests

Stress Tests

- Stress tests indicate the worst revenue impact on trading portfolio of about $2.3 billion, a slight decrease from $2.6 billion in April 2007

Revenue Impact on Trading Portfolio ($ Millions)

Portfolio Date		Bull Steepening	Bull Flattening	Bear Flattening	Bear Steepening	EMG Crisis	Rating / Default & HF Risk	HY / LBO / Default Risk	Equity Crash (1987)	Parallel Move Down	Parallel Move Up	Black Monday	Oil Supply Crisis	Liquidity Crunch
06/29/07	Fixed Income	(513)	(67)	270	(374)	(1,016)	(978)	(1,259)	(601)	(824)	369	(564)	(263)	(610)
	Equities	24	148	306	(163)	69	(123)	(11)	(1)	15	233	169	88	(120)
	Global Trading Strategies	(410)	106	323	(141)	(405)	(69)	(449)	(1,061)	(422)	324	(701)	(464)	(290)
	Investment Management	(295)	68	190	(208)	(281)	(94)	(310)	(606)	(296)	192	(409)	(320)	(239)
	Global Principal Strategies	(47)	(2)	(40)	(112)	(58)	(55)	(81)	(5)	(38)	(39)	(8)	28	(67)
	Prime Services	17	19	(44)	(23)	9	7	7	14	17	(32)	14	32	(45)
	Investment Banking	(8)	2	6	(4)	(8)	(1)	(9)	(22)	(8)	6	(15)	(10)	(6)
	Non-Core	(1)		1	(1)	(2)	()	(2)	(4)	(1)	1	(3)	(2)	(1)
	Firm Total	**(1,235)**	**274**	**1,012**	**(1,026)**	**(1,691)**	**(1,313)**	**(2,115)**	**(2,288)**	**(1,559)**	**1,053**	**(1,516)**	**(910)**	**(1,379)**
05/31/07	Firm Total	(748)	358	1,476	(543)	(1,284)	(737)	(1,680)	(2,315)	(1,360)	1,541	(1,649)	(398)	(1,187)
04/30/07	Firm Total	(1,011)	343	1,435	(646)	(1,500)	(871)	(1,684)	(2,604)	(1,327)	1,394	(1,935)	(895)	(1,084)

Note: These represent revenue losses associated with instantaneous market moves that in actuality occurred over two-week periods. These analyses are conservative because they do not allow for re-hedging or selling down a position either actively or through the automatic execution of existing stop-losses.

Areas of Increased Focus

Subprime

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Subprime Exposure

Tight Oversight

- Dedicated risk manager for residential Americas origination platform
- Monthly risk review process
- Extensive risk reporting, scorecards, and tools
- Stress testing on a weekly, and monthly basis
- All warehouse lines are collateralized and margined on a daily basis, with collateral having to satisfy specific requirements as to quality and aging. Pricing of the collateral is done by Lehman
- The Firm has a process for monitoring exposure to Representations and Warranties fraud along with Early Payment Defaults

Risk Exposure

- Daily Risk Appetite calculation includes event risk number that stresses sub-prime residuals (actual cash positions and whole loans implied positions) by approximately a 25% increase in loss assumptions from current projections
  - Current Event Risk calculated at 95% confidence level is $81 mm
- Weekly non-agency mortgage scenario analysis reflects impact on sub-prime of widening spreads by 50% and increasing losses on securities rated single B and below (including residuals) residuals by 25%
  - The potential loss net of hedges is $379mm and represents a spread widening from current levels of 400-900 bps on the BBB and BB exposures
- Monthly global Firmwide stress tests consist of 13 different scenarios, several of which include significant spread widening in the mortgage sector
  - The three worst case scenario indicates potential losses ranging from $186mm to $292mm

High Yield and Leveraged Loans

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High Yield and Leveraged Loans

Tight Oversight

- Risk Management has always included risk associated with pipeline on a probability weighted basis to ensure we are picking up risk in the event a sponsor we are backing wins the asset and Lehman wins the franchise
- Risk management performs comprehensive scenario and stress analysis on HY commitments. Risk management works with finance and treasury to ensure the Firm has adequate capital and liquidity to support the business
- The Firm has an effective hedging strategy
  - Approximately 50% of the high-grade and 20% of the high-yield exposure in the inventory loans portfolio is spread risk hedged
- Risk Management's integrated Risk Appetite Framework incorporates all trading and loan/commitment exposures including commitments in the pipeline. We capture Mark to Market risk or spread risk in Risk Appetite for all loans and forward pipeline. In addition, default risk is considered as an "add-on" to ensure prudent risk management practice

Risk Exposure

- We have hedging beta based on historical price relationship and theoretical relationship based on recovery assumptions. These betas are used in risk measurement and are used to demonstrate hedging effectiveness
- The Firm has a comprehensive risk framework for commitments including mandated, signed letters, contingent commitments and conditional/potential deals. The internal proprietary model calculates potential losses in a variety of market conditions including closed, normal and friendly markets based on historical spread and default statistics in a probability framework, consistent with Firm's Risk Appetite framework. The analysis provides the Firm the tool to estimate the marginal Risk Appetite usage and detect early warning signs based on deal and portfolio size, leverage, quality, capital structure, deal probability and syndication strategy
- Risk management works closely with the trading desks establish structured transactions to mitigate risk

Hedge Funds

LEHMAN BROTHERS

Hedge Funds

Areas of Increased Focus

The Firm is engaged in a number of activities involving hedge funds

- Institutional flow trading in both Fixed Income and Equities
  - Cash and derivative products
  - Derivatives
  - Foreign exchange
  - Financing and securities lending
  - Futures
- Prime Brokerage
  - Lehman has a robust prime brokerage offering and receives consistent industry recognition for the quality of our product and the excellence of our service levels
- Principal Investments in hedge fund managers
  - Strategic majority stakes include:
    - Libertyview: 100% (multi-strategy hedge fund manager)
    - Lehman Brothers Alternative Investment Management ("LBAIM"): 100% (fund-of-funds)
  - Strategic minority stakes include:
    - GLG: 18% stake (European multi-strategy hedge fund complex with $17bn of AUM)
    - Ospraie: 20% stake (US-based multi strategy manager with $6.0bn of AUM)
    - Marble Bar: 20% stake (European manager with $3.5bn of AUM)
    - Spinnaker: 20% stake (European manager with $6.0bn of AUM)
    - DE Shaw: 20% stake (US-based multi-strategy manager with $34bn of AUM)

Comprehensive Credit Risk Framework

Lehman has a comprehensive framework for ensuring tight controls around hedge fund risk. The main components of this framework are:

- Client Selection and Screening: Background checks are performed on all new accounts. Salespersons have broad "Know Your Customer" responsibility and are accountable for ensuring suitability of the client's trading activity
- Credit Due Diligence: Within Credit Risk Management ("CRM"), we have dedicated teams of specialists organized by region and industry who perform due diligence and assess the credit quality of proposed counterparties
- Ratings: CRM employs a rigorous credit rating framework to assess the relative riskiness of our counterparties
- Limits: CRM sets credit limits to constrain aggregate exposure concentrations to any individual counterparty or group of related counterparties
- Documentation and Margin: We require master documentation with all clients providing for, among other protections, the ability to net exposure across transactions. We also require collateral and structure margin requirements to substantially mitigate our risk. Collateral is our first line of defense. Virtually all of our activity with hedge funds is margined, with liquid collateral covering marked-to-market exposure and, to varying degrees, potential future exposure
- Exposure Monitoring: We calculate exposure against limits daily and aggregate exposure across all activity with each individual counterparty and across related counterparties using sophisticated modeling of portfolio volatility, stress-test methodologies as well as concentration and liquidity analysis
- Credit Monitoring: We perform ongoing credit monitoring on active counterparties, including monthly performance tracking, meetings with the client and formal annual reviews

Hedge Funds Exposure

Despite recent volatility and widely reported problems incurred by a number of funds, we have not experienced any recent credit losses from hedge funds. This is not to say that we don't take risk, but rather our controls are designed to ensure that the risk is substantially reduced through our tight controls, especially those relating to the taking and monitoring of collateral

- As at May 31, 2007, total Current Credit Exposure ("CCE") to hedge funds was $172 million, or 0.5% of $32 billion in total CCE across the Firm. This small exposure is a function of the fact that we are well collateralized

- Examples of recent hedge fund failures where Lehman had exposure but did not incur losses:
  - Amaranth (Sep 2006): the fund avoided default selling its troubled energy portfolio to Citadel and rapidly unwinding other positions. The fund did not default to Lehman and our derivatives positions were unwound successfully
  - Bear Stearns Asset Management (June 2007): two funds with leveraged exposure to the sub-prime market suspended redemptions and subsequently defaulted on margin calls. Lehman had financing and derivatives exposures to the fund and had sufficient collateral across the positions to avoid a credit loss
  - Basis Capital Management (July 2007): Australian hedge fund manager with two funds that had leveraged exposure to the sub-prime market. Funds suspended redemptions and failed on margin calls after liquidity drain from asset write-downs. Lehman had financing exposure to the funds but had sufficient collateral protection to avoid a credit loss
  - Sowood Capital Management (July 2007): Multi-strategy hedge fund founded by ex-Harvard managers with $3.5bn of capital across two funds. Funds incurred losses and narrowly avoided default by selling most of its portfolio to Citadel. The fund met all margin calls and did not default to Lehman. We had financing and derivatives positions with Sowood that were either unwound or assigned to Citadel

Conclusion

Conclusion

- We have a strong culture of Risk Management throughout the Firm
- Our franchise is to facilitate clients
- We have developed a very robust and comprehensive framework for thinking about and managing all forms of risk
  - Our powerful risk and equity allocation tools help guide the Firm in its overall management and decision making
- We are prudent toward our approach to credit risk which has resulted in a very high quality and well diversified
  credit portfolio
  - We have very low tolerance for delays on receiving collateral, where applicable
  - We give close scrutiny to the value of customer collateral posted against margin loans
- Our approach is to mitigate risk through various hedging strategies, and follow a model of credit facilitation where we act as a conduit between our clients and the capital markets, rather than as the ultimate holder of the risk
- Our overall Risk Management philosophy of conservatism and prudence has been an important factor in our improving credit spreads, ratings and credit worthiness

Appendix

Stress Scenarios

Bull Steepening

Modeled after post 9/11, Flight to Quality (Sep 11, 2001 - Sep 25, 2001)

Rates

- **USD:** Treasury rates: 2Y -90bps, 10Y -30bps (60bps steepening),
  - Swap Spr: 2Y +20bps, 10Y +5bps
  - Cap vol +5%, Swaption vol +3%
- **EUR**: Govt rates: 2Y -57bps, 10Y -17bps (40bps steepening),
  - Swap Spr: 10Y +11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bp, 10y rates -32bp (40bps steepening) ,
  - Swap Sprd :+20 bps,
  - Cap vol +7%, Swaption vol +3.5%,
- **JPY**: Govt rates: 2Y +1bp, 10Y unch; cap vol +5%, Swaption vol 1%
- **Inflation:** +35 bps

(vol shocks are absolute)

FX

- JPY up 8%, CHF up 8%, EM ccys down 5%-35%
- Vols: JPY 40%, EMG 15%-30%

(vol shocks are relative)

Mortgage

- FNCL (Fannie Mae 30yr) LOAS widened by 5 bp, FNCI LOAS by 4 bp. Trust IO by + 36 bp and PO by -8 bp.
- HEL AAA widens by 3 bp, and BBB- widens by 95 bp. OAS Drop widens by 5bp, subprime loan by 19 bp, MTA loan and hybrid loan widen by 12 bp and 10 bp respectively. CMBS AAA by 3 bp, BB by 85 bp. CMBS whole loan by + 8 bp.

Credit

- HG spreads out 25%
- HY market down 4.3% (Ba), 5.7% (B), 8.5% (Caa and below), HY Loans down 1.0% (Ba), 2.4% (B), 4.8% (Caa and below). CDS down 5.7% (Ba), 6.3% (B), 8.5% (Caa and below)
  Latin/East Europe EMG spreads widen 30%, Asia credit spreads widen 25%
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -12%, Asia -7%, EMEA -14; Emerging Markets I Countries (E1) - Americas -13%, Asia -14%, EMEA -14%; Emerging Markets II Countries (E2) - Americas -16%, Asia -14%, EMEA -17%
- 1M Vol +69.3%, 3M Vol +40%, 6M Vol +28.3%, 9M Vol +23.1%, 1Y Vol +20%,2Y Vol +14.1%, 3Y Vol +11.5%, 5Y Vol +8.9% *(vol shocks are relative)*

Bull Flattening

Modeled after the period before the major rates backup in the summer of 2003. Generally strong market tone across all asset classes due to signs of economic recovery and low inflation expectations, but reduced demand for energy (May 1, 2003 - May 15, 2003)

Rates	◆ **USD:** – Treasury rates: 2Y -25bps, 10Y -50bps (25bps flattening) – Swap Spr: -5bps – Cap vol +4%, Swaption vol +2% ◆ **EUR:** – Govt rates: 2Y -46bps, 10Y -56bps (10bps flattening) – Swap Spr: -11bps – Cap vol +5%, Swaption vol +3% ◆ **GBP:** – Govt rates: 2Y -45bps, 10Y -65bps (20bps flattening) – Swap Spr: -20bps – Cap vol +7%, Swaption vol +3.5% ◆ **JPY:** 10Y rate -2bp, sprd +30 bps ◆ **Inflation:** -35 bps *(vol shocks are absolute)*
FX	◆ All ccys up 3%, except Latam down 4% and minor Asian ccys up 1% ◆ Vols: Latam 20%, RUB 400%, TRY 60%, Eastern Europe 15% ◆ JPY 20%, Other majors 10%, Minor Asian 30% *(vol shocks are relative)*
Mortgage	◆ FNCL LOAS tightens by -5 bp, FNCI LOAS by -3 bp. Trust IO by -54 bp and PO by +8 bp. ◆ HEL AAA tightens by -2 bp, and BBB- tightens by -15 bp. OAS Drop tightens by 3 bp, subprime loan by -6 bp, MTA loan and hybrid loan widen by -5 bp and -4 bp respectively. CMBS AAA by -2 bp, BB by -9 bp. CMBS whole loan by -3 bp.
Credit	◆ HY market up 1.0% (Ba), 0.5% (B), 0.2% (Caa and below). HY Loans up 0.0% (Ba), 0.1% (B), 0.1% (Caa and below). CDS up 0.3% (Ba), 0.2% (B), 0.2% (Caa and below) ◆ HG spreads tighten 10% ◆ Latin/East Europe EMG, Asia credit spreads tighten 10%
Equity	◆ Developed Markets Countries (D) - Americas +4%, Asia +3%, EMEA +1%; Emerging Markets I Countries (E1) - Americas +2%, Asia +4%, EMEA +2%; Emerging Markets II Countries (E2) - Americas +2%, Asia +4%, EMEA +3% ◆ Vols: 1M Vol -11%, 3M Vol -6.4%, 6M Vol -4.5%, 9M Vol-3.7%, 1Y Vol -3.2%,2Y Vol -2.2%, 3Y Vol -1.8%, 5Y Vol -1.4% *(vol shocks are relative)*
Energy	◆ Crude oil front end prices fall 35%, back end prices fall 23% ◆ Oil products front end prices fall 40%, back end prices fall 26% ◆ Oil vols down 50% ◆ US natural gas front end falls 40%, back end 26%, vols fall by 50% ◆ US power front end prices fall 35%, back end falls 23% *(front end 0-6mo; back end 4Y and up; vol shocks are multiplicative/relative)*

Bear Flattening

Treasury down trade caused by asset reallocation and yield searching. Spreads generally moderately tightened, and Equity and high yield asset classes outperformed others (modeled after the period Oct 30, 2001 - Nov 14, 2001)

Rates

- **USD:** Treasury rates: 2Y +95bps, 10Y +70bps (25bps flattening)
  - Swap Spr: 2Y +12bps, 10Y +8bps
  - Cap vol +4%, Swaption vol +2%
- **EUR**: Govt rates: 2Y +61bps, 10Y +41bps
  - Swap sprd + 11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP**: Govt rates: 2Y +70, 10Y +50bps
  - Swap sprd +20 bps
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate +1bps, sprd -10 bps
- **Inflation:** -35 bps

(vol shocks are absolute)

FX

- Major ccys down 3%, BRL and TRY up 4%, RUB and Eastern Europe down 1%, minor Asian up 1%
- Vols: Latam 20%, RUB 140%, TRY 40%, Eastern Europe 30%
- JPY 15%, Other majors -10%
- Minor Asia 50%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 5 bp, FNCI LOAS by 3 bp. Trust IO by + 54 bp and PO by -10 bp.
- HEL AAA widens by 5 bp, and BBB- widens by 15 bp. OAS Drop widens by 3 bp, subprime loan by 9 bp, MTA loan and hybrid loan widen by 8 bp and 7 bp respectively. CMBS AAA by 3 bp, BB by 9 bp. CMBS whole loan by + 3 bp.

Credit

- HY market up 1.4% (Ba), 0.2% (B), 2.9% (Caa and below). HY Loans up 0.5% (Ba), 0.3% (B), 1.5% (Caa and below). CDS up 3.2% (Ba), 0.9% (B), 2.9% (Caa and below)
- HG spreads tighten 15%
- Latin/East Europe EMG, Asia credit spreads tighten 15%

Equity

- Developed Markets Countries (D) - Americas +8%, Asia +3%, EMEA +7%; Emerging Markets I Countries (E1) - Americas +10%, Asia +11%, EMEA +7%; Emerging Markets II Countries (E2) - Americas +12%, Asia +10%, EMEA +10%
- 1M Vol -21%, 3M Vol -12.1%, 6M Vol -8.6%, 9M Vol -7%, 1Y Vol -6.1%,2Y Vol -4.3%, 3Y Vol -3.5%, 5Y Vol -2.7%

(vol shocks are relative)

Bear Steepening

Modeled after post LTCM (Sep 28, 1998 – Oct 13, 1998)

Rates

- **USD:** Treasury rates: 2Y +45bps, 10Y +75bps (30bps steepening)
  - Swap Spr: 2Y +10bps, 10Y +15bps
  - Cap vol +4%, Swaption vol +2%
- **EUR**: Govt rates: 2Y +49bps, 10Y +51bps
  - Swap sprd + 11 bp
  - Cap vol +3%, Swaption vol +3%
- **GBP**: Govt rates: 2Y +46, 10Y +50bps
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate -11bps, sprd -45 bps
- **Inflation:** +35 bps

(vol shocks are absolute)

-

FX

- JPY up 5%, Major Europe up 5%, TRY unch, Latam down 10%, RUB down 10%, Minor Asia down 5-10%
- Vols: Latam 65%, RUR 65%, Eastern Europe 65%, TRY 65%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 10 bp, FNCI LOAS by 6 bp. Trust IO by + 109 bp and PO by -18 bp.
- HEL AAA widens by 5 bp, and BBB- widens by 30 bp. OAS Drop widens by 6 bp, subprime loan by 9 bp, MTA loan and hybrid loan widen by 8 bp and 7 bp respectively. CMBS AAA by 2 bp, BB by 18 bp. CMBS whole loan by + 3 bp.

Credit

- HY market down 9.5% (Ba), 10.0% (B), 11.2% (Caa and below). HY Loans down 1.4% (Ba), 3.1% (B), 5.7% (Caa and below). CDS down 8.3% (Ba), 9.5% (B), 11.2% (Caa and below)
- HG spreads widen 25%, Latin/East Europe EMG spreads widen 30%, Asia credit spreads widen 25%
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -5%, Asia -5%, EMEA -5%; Emerging Markets I Countries (E1) - Americas -5%, Asia -2%, EMEA -8%; Emerging Markets II Countries (E2) - Americas -6%, Asia -4%, EMEA -13%
- 1M Vol +15%, 3M Vol +8.7%, 6M Vol +6.1%, 9M Vol +5%, 1Y Vol +4.3%,2Y Vol +3.1%, 3Y Vol +2.5%, 5Y Vol +1.9%

(vol shocks are relative)

EMG Crisis

Market meltdown driven by EMG (Russian default) with spiked idiosyncratic risk, higher defaults, higher correlations, falling energy demand (modeled after the period Aug 17, 1998 - Aug 30, 1998)

Rates

- **USD:** Treasury rates: 2Y -65bps, 10Y -50bps (15bps steepening)
  - Swap Spr: +20bps
  - Cap vol +5%, Swaption vol +3%
- **EUR:** Govt rates: 2Y -57bp, 10Y -17bp (40bps steepening)
  - Swap spr: 10Y -11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bps, 10Y -32bp (40bps steepening)
  - Swap sprd: +20 bps,
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate +5bp, Swap sprd +10 bps
- **Inflation:** +35 bps

(vol shocks are absolute)

FX

- TRY down 50%, RUR down 50%, Latam down 20%-40%, minor Asia down 20%-40%, JPY up 10%, GBP up 4%, EUR up 5%, CHF up 6%
- Vols: TRY 300%, RUR 100%, Latam 300%, CNY 300%
- Minor Asia 100-300%, Majors 30%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 15 bp, FNCI LOAS by 9 bp. Trust IO by + 163 bp and PO by -27 bp.
- HEL AAA widens by 5 bp, and BBB- widens by 67 bp. OAS Drop widens by 8 bp, subprime loan by 18 bp, MTA loan and hybrid loan widen by 16 and 14 bp respectively. CMBS AAA by 5 bp, BB by 54 bp. CMBS whole loan by + 8 bp.

Credit

- HG spreads widen 50-65%, EMG spreads widen 200%
- HY market down 6.3% (Ba), 7.0% (B), 7.5% (Caa and below). HY Loans down 1.3% (Ba), 2.5% (B), 3.8% (Caa and below). CDS down 7.6% (Ba), 7.5% (B), 7.5% (Caa and below)
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%) EMG default rate spike up to 10% for one country default out of high beta countries

Equity

- Developed Markets Countries (D) - Americas -12%, Asia -5%, EMEA -8%; Emerging Markets I Countries (E1) - Americas -32%, Asia -34%, EMEA -22%; Emerging Markets II Countries (E2) - Americas -32%, Asia -41%, EMEA -45%
- 1M Vol +86.6%, 3M Vol +50%, 6M Vol +35.4%, 9M Vol+28.9%, 1Y Vol +25%,2Y Vol +17.7%, 3Y Vol +14.4%, 5Y Vol +11.2%

(vol shocks are relative)

Energy

- Crude front end prices fall 40%, back end prices fall 26%
- Oil products front end prices fall 45%, back end prices fall 29%
- Oil front end vols down 50%
- US natural gas front end falls 40%, back end falls 26%, vols fall by 50%
- US power front end falls 35%, back end falls 23%.

(Front end 0-6mo; back end 4yr and up; vols are relative)

Rating/Default and Hedge Fund Risk

Significant rating risk (e.g. GM), one name default in CDX or HVOL coupled with hedge fund blow-out on structured credit products causing panic selling, significant market widening with CDS basis gapping out (modeled after the period Jul 18, 2002 - Aug 2, 2002)

Rates

- **USD:** Treasury rates: 2Y -46bps, 10Y -35bps (11bps steepening)
  - Swap Spr: +14bps
  - Cap vol +5%, Swaption vol +3%
- **EUR:** Govt rates: 2Y -57bps, 10Y -17bp (40bps steepening)
  - Swap spr: 10Y +11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bps, 10Y -32bp (40bps steepening)
  - Swap Sprd: +20 bps,
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y +4bp, Swap sprd +10 bps
- **Inflation:** +35 bps

(vol shocks are absolute)

FX

- Major ccy in the range of +/- 4%, minor Asian +/-2%, Latam down 2%-5%, and TRY and Eastern Europe down 6%
- Vols: Latam 10%, TRY 40%, RUR and Eastern Europe 40%, Major ccy 15%, minor Asia 50%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 20 bp, FNCI LOAS by 12 bp. Trust IO by + 218 bp and PO by -36 bp.
- HEL AAA widens by 15 bp, and BBB- widens by 105 bp. OAS Drop widens by 10 bp, subprime loan by 38 bp, MTA loan and hybrid loan widen by 30 and 28 bp respectively. CMBS AAA by 12 bp, BB by 130 bp. CMBS whole loan by + 21 bp.

Credit

- HY market down 3.0% (Ba), 6.5% (B), 5.5% (Caa and below). HY Loans down 0.7% (Ba), 2.3% (B), 2.8% (Caa and below). CDS down 3.9% (Ba), 6.9% (B), 5.5% (Caa and below). Default rate loss shocks of 0.2% (Baa), 0.75% (Ba), 1% (B), 5% (Caa and below), Asian distressed NPL unchanged
- HG spreads widen 50%-65%. Latin/Eastern Europe EMG spreads widen 30%. Asia credit spreads widen 25%.
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -5%, Asia -4%, EMEA -7%; Emerging Markets I Countries (E1) - Americas -11%, Asia -6%, EMEA -8%; Emerging Markets II Countries (E2) - Americas -13%, Asia -7%, EMEA -10%
- 1M Vol +18%, 3M Vol +10.4%, 6M Vol +7.3%, 9M Vol +6%, 1Y Vol +5.2%,2Y Vol +3.7%, 3Y Vol +3%, 5Y Vol +2.3%

(vol shocks are relative)

HY/LBO/Default Risk

Global default rate increase coupled with lower recovery. Investor demand dries up after "hot" market, leading to a longer syndication time line or no syndication in large LBO or M&A loan deals (modeled after the period Sep 16, 2002 - Oct 17, 2002)

Rates

- **USD:** Treasury rates: 2Y -46bps, 10Y -35bps (11bps steepening)
  - Swap Spr: +14bps (widened)
  - Cap vol +5%, Swaption vol +3%
- **EUR:** Govt rates: 2Y -57bp, 10Y -17bp (40bps steepening)
  - Swap spr: 10Y +11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bps, 10Y -32bp (40bps steepening)
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate +2 bp, swap sprd +10 bps
- **Inflation:** +35 bps

(vol shocks are absolute)

FX

- Major ccy in the range of +/- 4%, minor Asian +/-2%, Latam down 2%-5%, and TRY and Eastern Europe down 6%.
- Vols: Latam 10%, TRY 40%, RUR and Eastern Europe 40%, Major ccy 15%, minor Asia 50%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 8 bp, FNCI LOAS by 7 bp. Trust IO by - 51 bp and PO by +30 bp.
- HEL AAA widens by 5 bp, and BBB- widens by 350 bp. OAS Drop widens by 20 bp, subprime loan by 65 bp, MTA loan and hybrid loan widen by 25 and 20 bp respectively. CMBS AAA by 8 bp, BB by 117 bp. CMBS whole loan by + 16 bp.

Credit

- HG spreads widen 80% for 0-2yr, 70% for 2-5yr, 55% for 5-10yr, 50% for >10yr
- HY market down 4.6% (Ba), 9.8% (B), 7.8% (Caa and below). HY Loans down 0.9% (Ba), 3.9% (B), 4.4% (Caa and below). CDS down 5.7% (Ba), 10.3% (B), 10.5% (Caa and below). Default rate loss shocks of 0.2% (Baa), 0.75% (Ba), 1% (B), 5% (Caa and below)
- Latin/East Europe EMG spreads widen 30%, Asia Credit spreads widen 25%

Equity

- Developed Markets Countries (D) - Americas -13%, Asia -8%, EMEA -12%; Emerging Markets I Countries (E1) - Americas -13%, Asia -10%, EMEA -12%; Emerging Markets II Countries (E2) - Americas -16%, Asia -11%, EMEA -12%
- 1M Vol +15%, 3M Vol +8.7%, 6M Vol +6.1%, 9M Vol +5%, 1Y Vol +4.3%,2Y Vol +3.1%, 3Y Vol +2.5%, 5Y Vol +1.9%

(vol shocks are relative)

Equity Crash (1987)

Weakening US dollar, deteriorating US current account deficit, escalating US government debt, High P/E's low dividend yields (modeled after the period Oct 5, 1987 - Oct 19, 1987)

Rates

- **USD:**
  - Treasury rates: 2Y -80bps, 10Y -30bps (50bps steepening)
  - Swap Spr: 2yr +20bps, 10yr +5bps
  - Cap vol +5%, Swaption vol +3%
- **EUR:** Govt rates: 2Y -57bps, 10Y -17bps (40bps steepening),
  - Swap spr: 10Y -11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bps, 10Y -32bp (40bps steepening)
  - Swap spr: +20 bps
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate -25 bp, Swap sprd +10 bps
- **Inflation:** +35 bps
- **Fund Derivatives NAV:** down 31.5%

(vol shocks are absolute)

FX

- Major ccys up 5% except CHF up 8%, Emerging Europe down 5%
- Latam down 10%, Asia down 5%, Minor Asia down 10%
- Vols: 20% across

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 10 bp, FNCI LOAS by 6 bp. Trust IO by +109 bp and PO by -18 bp. HEL AAA widens by 4 bp, and BBB- widens by 75 bp. OAS Drop widens by 6 bp, subprime loan by 18 bp, MTA loan and hybrid loan widen by 16 and 14 bp respectively. CMBS AAA by 5 bp, BB by 72 bp. CMBS whole loan by + 9 bp.

Credit

- HG spreads widen 10%
- HY market down 4.9% (Ba), 4.0% (B), 4.0% (Caa and below), HY Loans dow 1.1% (Ba), 1.5% (B), 2.0% (Caa and below). CDS down 6.2% (Ba), 4.5% (B), 4.0% (Caa and below).
- Latin/East Europe EMG spreads widen 10% Asia credit spreads 10% widening
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -32%, Asia -19%, EMEA -17%; Emerging Markets I Countries (E1) - Americas -32%, Asia -34%, EMEA -30%; Emerging Markets II Countries (E2) - Americas -32%, Asia -41%, EMEA -40%
- 1M Vol +173.2%, 3M Vol +100%, 6M Vol +70.7%, 9M Vol +57.7%, 1Y Vol +50%,2Y Vol +35.4%, 3Y Vol +28.9%, 5Y Vol +22.4%

(vol shocks are relative)

Black Monday (modeled after 10/16 – 10/19 1987)

Rates

- **USD:**
  - Treasury rates: 2Y -80bps, 10Y -30bps (50bps steepening)
  - Swap Spr: 2yr +20bps, 10yr +5bps
  - Cap vol +5%, Swaption vol +3%
- **EUR:** Govt rates: 2Y -57bps, 10Y -17bps (40bps steepening),
  - Swap spr: 10Y -11 bp
  - Cap vol +5%, Swaption vol +3%
- **GBP:** Govt rates: 2Y -72bps, 10Y -32bp (40bps steepening)
  - Swap spr: +20 bps
  - Cap vol +7%, Swaption vol +3.5%
- **JPY:** 10Y rate -25 bp, Swap sprd +10 bps
- **Inflation:** +35 bps
- **Fund Derivatives NAV:** down 20.5%

  (vol shocks are absolute)

FX

- Major ccys up 5% except CHF up 8%, Emerging Europe down 5%
- Latam down 10%, Asia down 5%, Minor Asia down 10%
- Vols: 20% across

  (vol shocks are relative)

Mortgage

- FNCL LOAS widened by 10 bp, FNCI LOAS by 6 bp. Trust IO by +109 bp and PO by -18 bp. HEL AAA widens by 4 bp, and BBB- widens by 75 bp. OAS Drop widens by 6 bp, subprime loan by 18 bp, MTA loan and hybrid loan widen by 16 and 14 bp respectively. CMBS AAA by 5 bp, BB by 72 bp. CMBS whole loan by + 9 bp.

Credit

- HG spreads widen 25%. Latin/Eastern Europe EMG spreads widen 30%, Asia credit spreads widen 25%.
- HY market down 4.9% (Ba), 4.0% (B), 4.0% (Caa and below). HY Loans down 1.1% (Ba), 1.5% (B), 2.0% (Caa and below). CDS down 6.2% (Ba), 4.5% (B), 4.0% (Caa and below)
- %; Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -20%, Asia -17%, EMEA -13%; Emerging Markets I Countries (E1) - Americas -25%, Asia -27%, EMEA -25%; Emerging Markets II Countries (E2) - Americas -30%, Asia -30%, EMEA -30%
- 1M Vol +173.2%, 3M Vol +100%, 6M Vol +70.7%, 9M Vol +57.7%, 1Y Vol +50%,2Y Vol +35.4%, 3Y Vol +28.9%, 5Y Vol +22.4% *(vol shocks are relative)*

Parallel Move Down

Modeled after Post 9/11 Flight to Quality (Sep 11, 2001 - Sep 25, 2001)

Rates

- **USD:**
  - Treasury: -65bps
  - Swap spr: +10bps
  - Cap vol +4%, Swaption vol +3%
- **EUR:** -50 bps
- **GBP:** -55 bps
- **JPY:** -5 bps

(vol shocks are absolute)

FX

- Major ccys up 4%, except CHF up 7% and GBP up 1%, EM ccys down 5%
- Vols: Latam 20%, TRY and Eastern Europe 15% RUR 45%
- Major ccys 30%, Minor Asia 35%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 5 bp, FNCI LOAS by 3 bp. Trust IO by +54 bp and PO by -10 bp.
- HEL AAA widens by 5 bp, and BBB- widens by 30 bp. OAS Drop widens by 3 bp, subprime loan by 12 bp, MTA loan and hybrid loan widen by 11 and 10 bp respectively. CMBS AAA by 2 bp, BB by 27 bp. CMBS whole loan by + 3 bp.

Credit

- HG spreads out 25%; Latin/Eastern Europe EMG spreads widen 30%, Asia credit spreads widen 25%.
- HY market down 4.3% (Ba), 5.7% (B), 8.5% (Caa and below). HY Loans down 1.0% (Ba), 2.1% (B), 4.3% (Caa and below). CDS down 5.7% (Ba), 6.3% (B), 8.5% (Caa and below)
- %, Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -12%, Asia -7%, EMEA -14%; Emerging Markets I Countries (E1) - Americas -13%, Asia -14%, EMEA -14%; Emerging Markets II Countries (E2) - Americas -16%, Asia -14%, EMEA -17%
- 1M Vol +34%, 3M Vol +19.6%, 6M Vol +13.9%, 9M Vol +11.3%, 1Y Vol +9.8%,2Y Vol +6.9%, 3Y Vol +5.7%, 5Y Vol +4.4%

(vol shocks are relative)

Parallel Move Up

Similar to Oct 30, 2001 - Nov 14, 2001 period

Rates

- **USD:**
  - Treasury: +75bps
  - Swap spr: +10bps
  - Cap vol +3%, Swaption vol +2%
- **EUR:** +50 bps
- **GBP**: +45 bps
- **JPY:** +5 bps

(vol shocks are absolute)

FX

- Major ccys down 3%, BRL and TRY up 4%, RUB and Eastern Europe down 1%, minor Asian up 1%
- Vols: Latam 20%, RUB 140%, TRY 40%, Eastern Eur 30%, JPY 15%
- Other majors -10%, Minor Asia 50%

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 5 bp, FNCI LOAS by 3 bp. Trust IO by 54 bp and PO by -10 bp.
- HEL AAA widens by 3 bp, and BBB- widens by 15 bp. OAS Drop widens by 3 bp, subprime loan by 9 bp, MTA loan and hybrid loan widen by 8 and 7 bp respectively. CMBS AAA by 2 bp, BB by 9 bp. CMBS whole loan by + 2 bp.

Credit

- HG spreads tighten 15%
- HY market up 1.4% (Ba), 0.2% (B), 2.9% (Caa and below). HY Loans up 0.5% (Ba), 0.3% (B), 1.5% (Caa and below). CDS up 3.2% (Ba), 0.9% (B), 2.9% (Caa and below)
- Latin/Eastern Europe EMG spreads tighten 15%, Asia credit spreads tighten 15%.

Equity

- Developed Markets Countries (D) - Americas +8%, Asia +3%, EMEA +7%; Emerging Markets I Countries (E1) - Americas +10%, Asia +11%, EMEA +7%; Emerging Markets II Countries (E2) - Americas +12%, Asia +10%, EMEA +10%
- 1M Vol -21%, 3M Vol -12.1%, 6M Vol -8.6%, 9M Vol -7%, 1Y Vol -6.1%,2Y Vol -4.3%, 3Y Vol -3.5%, 5Y Vol -2.7%

(vol shocks are relative)

Oil Supply Crisis

Major oil supply disruption at the source, likely due to political events in oil producing countries and/or terrorism, with great uncertainty around supplies returning to normal levels in the near future

Rates

- **USD:**
  - Treasury rates: 2Y -125bps, 10Y -50bps (75bps steepening)
  - Swap Spr: 2yr +20bp, 10yr: +10bp. Cap vol +5%, Swaption vol +3%
- **EUR:**
  - Govt rates: 2Y -50bps, 10Y -25bps (25bps steepening)
  - Swap Spr: -3bps. Cap vol +5%, Swaption vol +3%
- **GBP:**
  - Govt rates: 2Y -75bps, 10Y -25bps (50bps steepening)
  - Swap Spr: -5bps. Cap vol +7%, Swaption vol +3.5%
- **JPY:**
  - Govt rates: 10Y -30bp. Cap vol +15%, Swaption vol +10%
- **Inflation:** -20 bps

(vol shocks are absolute)

FX

- EUR +6%, JPY +8%, GBP +4%, CHF +9%, Latam -10% to -15%, Emerging Europe -12%, Asia -12%, Other : pegged currencies: -1%/+1%
- Vols: +50% on major currencies, +100%-200% on emerging currencies

(vol shocks are relative)

Mortgage

- FNCL LOAS widened by 5 bp, FNCI LOAS by 3 bp. Trust IO by 54 bp and PO by -10 bp.
- HEL AAA widens by 3 bp, and BBB- widens by 67 bp. OAS Drop widens by 3 bp, subprime loan by 17 bp, MTA loan and hybrid loan widen by 15 and 12 bp respectively. CMBS AAA by 2 bp, BB by 45 bp. CMBS whole loan by + 4 bp.

Credit

- HY market down 3.7% (Ba), 6.1% (B), 7.0% (Caa and below) HY Loans down 0.8% (Ba), 2.2% (B), 3.6% (Caa and below). CDS down 4.8% (Ba), 6.7% (B), 7.0% (Caa and below)
- HG spreads widen 50%-65%. Latin/East Europe EMG spreads widen 30% (non-oil exporters). Asia credit spreads widen 40% (non-oil exporters)

Equity

- North America -13.5% UK -11.5% Germany -19.5% France -21% Remaining Euro -18.5% Japan -23% Hong Kong -17% Korea -12.5% Mexico -19% Brazil -19%, India -16.9%, Turkey -21.5%, Australia -11.5%
- All Energy Sector Stocks: -3.9%
- Vols: 1M +69%, 3M +40%, 6M +28%, 9M +23%, 1Y 20%, 2Y 14%, 3Y 12%, 5Y 9%

(vol shocks are relative)

Energy

- Crude oil: front 6 mo ave. price: $106/ bbl, Year 1: $105 bbl, Year 2: $104/ bbl, Year 3: $104/ bbl
- Oil products: Heating oil - $4.55/ gallon, Unleaded gas: $4.65/ gallon
- Oil vols up 100%
- US natural gas: front 6mo ave. price: $10.05/ mmbtu, following oil curve pattern
- US power peak prices: front end: $95/ MWh, following natural gas curve pattern

(Front end 0-6mo; back end 4yr and up; vol shocks are relative)

Liquidity Crunch

Hawkish Federal Reserve and major Central Banks continuing on a path of raising rates, draining the extra liquidity enjoyed previously, resulting in a decline in the risky assets and spread products

Rates

- **USD:**
  - Treasury rates: 2Y +95bp, 10Y +70bp (25bps flattening)
  - Swap Spr: 2yr +12bp, 10yr: +8bp. Cap vol +4%, Swaption vol +2%
- **EUR:**
  - Govt rates: 2Y +61bps, 10Y +41bp (20bp flattening)
  - Swap Spr: +11bp. Cap vol +5%, Swaption vol +3%
- **GBP:**
  - Govt rates: 2Y +70bp, 10Y +50bp (20bp flattening)
  - Swap Spr: +20bp. Cap vol +7%, Swaption vol +3.5%
- **JPY:** Govt rates: short end +50bps, 2Y +35bps, 10Y +20bps; cap vol +8%, Swaption vol +2%
  Inflation: -35 bps
  (vol shocks are absolute)

FX

- JPY and CHF up 8%, other majors down 2% to 3%, Latam down 15% to 32%, Emerging Europe down 15%-25%, Asia down 7%-15%,
- Vols: JPY +40%, other major currencies +15%, Latam currencies +50%, Emerging Europe and Asian currencies +30% to +200%
  (vol shocks are relative)

Mortgage

- FNCL LOAS widened by 5 bp, FNCI LOAS by 3 bp. Trust IO by -36 bp and PO by +8 bp.
- HEL AAA widens by 3 bp, and BBB- widens by 150 bp. OAS Drop widens by 7 bp, subprime loan by 20 bp, MTA loan and hybrid loan widen by 15 and 12 bp respectively. CMBS AAA by 3 bp, BB by 85 bp. CMBS whole loan by + 8 bp.

Credit

- HY market down 6.3% (Ba), 7.0% (B), 7.5% (Caa and below). HY Loans down 1.3% (Ba), 2.5% (B), 3.8% (Caa and below). CDS down 7.6% (Ba), 7.5% (B), 7.5% (Caa and below)
- HG spreads widen 50%-65%. EMG spreads widen 50%-75%.
- Correlation: Equity tranches up-front prices down (5Y Maturity ITRAXX 0-3 tranche -5.54%, CDX 0-3 tranche -6.26%, CDX HY 0-10 tranche -5%)

Equity

- Developed Markets Countries (D) - Americas -8%, Asia -14%, EMEA -14%; Emerging Markets I Countries (E1) - Americas -21%, Asia -14%, EMEA -20%; Emerging Markets II Countries (E2) - Americas -25%, Asia -25%, EMEA -30%
- 1M Vol +86.6%, 3M Vol +50%, 6M Vol +35.4%, 9M Vol+28.9%, 1Y Vol +25%,2Y Vol +17.7%, 3Y Vol +14.4%, 5Y Vol +11.2%
  (vol shocks are relative)

Energy

- Crude front end prices fall 40%, back end prices fall 26% ; Oil products front end prices fall 45%, back end prices fall 29% ; Oil front end vols down 50%
- US natural gas front end falls 40%, back end falls 26%, vols fall by 50%
- US power front end falls 35%, back end falls 23%.
  (Front end 0-6mo; back end 4yr and up; vols are relative)

Note: The factors are meant to reflect the nature of the stress events covering the historical periods specified for each scenario. The actual factors might be adjusted depending on the conditions of the current markets (such as if a ccy peg has already been broken, default correlations are already up, new risk factors appear in the market, one country started to resemble another country due to structural and/or political changes, etc.).