

## Risk Management in the New World

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*"We structured the deal so it won't make any sense to you."*

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## I. Seismic Changes in the Financial Markets

II. Lessons Learned from the Crisis

III. Risk Management in the New World

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## Massive Changes in the Financial Markets

Paradigm shift in the financial markets

As markets broke down, models broke down too

- Typical risk measures like duration and beta became less important
- Models, by definition, can't anticipate unprecedented government intervention

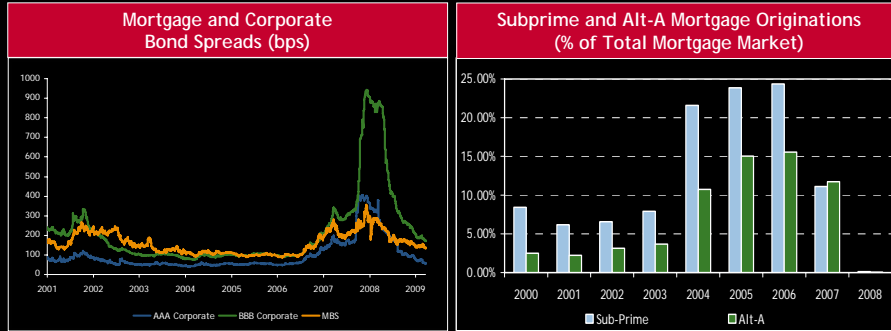
“Normal” markets in the future may behave quite differently than in the past

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## Genesis of the Market Crisis

A long period of low yields led to increased issuance of risky debt, setting the stage for the crisis

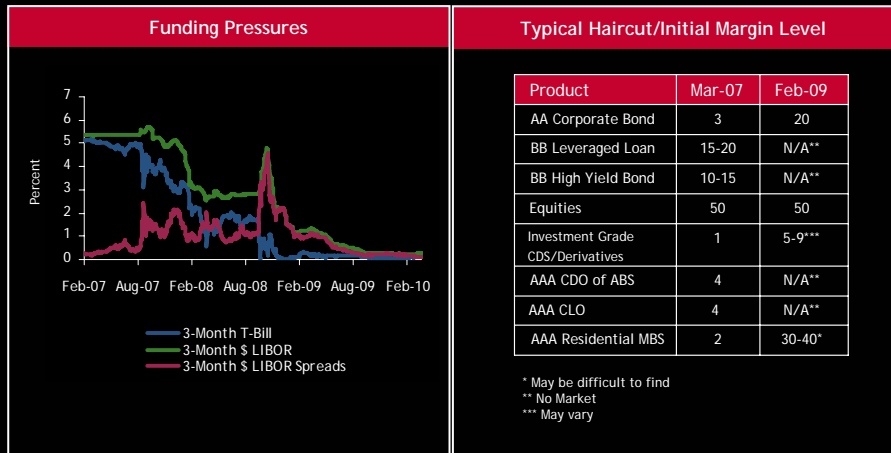


Source: JMP, Barclays (LehmanLive), Moody's/Economy.com

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## Genesis of the Market Crisis

Increased borrowing costs and margin calls forced rapid de-leveraging

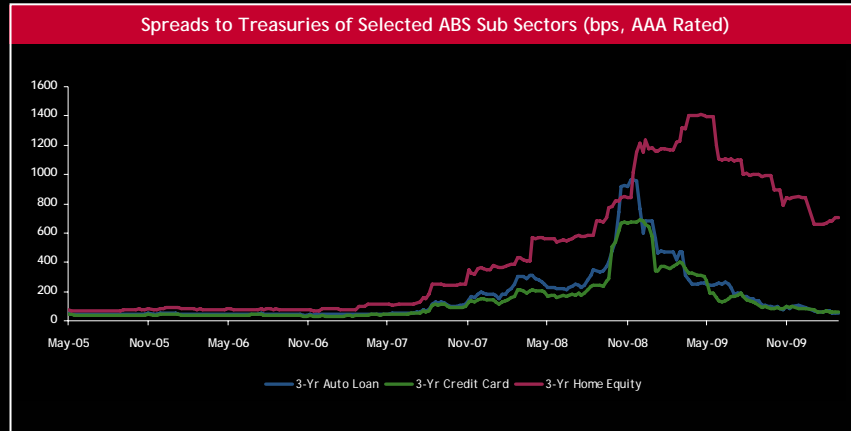


Source: Bloomberg, Citi.

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## Genesis of the Market Crisis

De-leveraging leads to significant spread widening



Source: Barclays (LehmanLive).

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## Lessons Learned From the Crisis

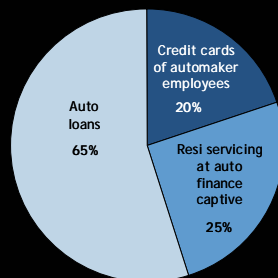
- Lesson 1: The Importance of Good, Clean Data
- Lesson 2: The Paramount Importance of Liquidity
- Lesson 3: The Importance of Counterparty Risk Management
- Lesson 4: Simpler is Often Better
- Lesson 5: Risk Management is an Evolving Art Form

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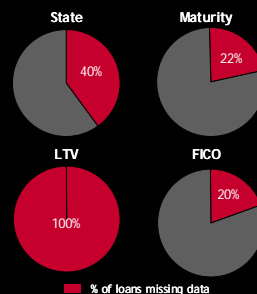
## Lesson 1: The Importance of Good, Clean Data

In a crisis, clean data has the greatest value  
But bad data is often the norm

Bank with significant "auto" exposure



Resi loan pool missing key details



*In one example, 14% of a bank's loans had balance issues*

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## Lesson 2: The Paramount Importance of Liquidity

Only robust liquidity sources are cash and cashflow

- Price = Fair Value only in functioning markets

Free riding can hurt the novice investor

- When market participants anticipate liquidity, investors can trade products they do not fully understand

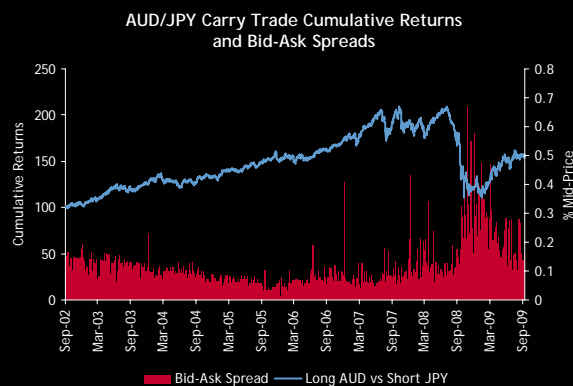
Severe market disruption can hurt the expert investor

- The more complex the product, the fewer genuine experts exist
- As a result, the only bids come from vulture investors buying at prices "too cheap to be wrong"

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## Lesson 2: The Paramount Importance of Liquidity

During a liquidity crisis, even seemingly liquid assets can experience large negative returns



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Source: Bloomberg and Golub (2009)

## Lesson 3: Importance of Counterparty Risk Mgmt

Absent government guarantees, regular surveillance of counterparties is critical

- Determine appropriate terms of trade
  - Delivery versus Payment (DVP)
  - Maximum exposure limits, etc.

Measure concentrations of exposure by account - clients cannot be netted against each other

### Direct Exposure

- TBA Mortgages
- Derivatives
- Trade Settlement
- Commercial Paper Holdings
- Bonds
- Prime Brokerage Cash

### Indirect Exposure

- Guarantees - now mostly worthless
- Enhancers - now mostly worthless
- Liquidity Providers

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## Lesson 3: Importance of Counterparty Risk Mgmt

Counterparty risk needs to be managed as much by Operations as by Portfolio Managers

- Unconfirmed CDS trades
- Derivatives collateral management
- Payments processing and reconciliation

### Credit Markets Innovations and Their Implications

These markets grew much more quickly than did the supporting infrastructure [...] the market was using 19<sup>th</sup> century methods of dealing with 21<sup>st</sup> century financial instruments

- Timothy Geithner, March 2007

### Credit-Derivative Backlog Balloons During Market Rout

The average number of unconfirmed trades more than 30 days old rose to the highest since the beginning of 2006 [...] "The stats show that most of the gains have been given back"

- Bloomberg, October 2007

### Lehman Collapse Spurs Call for Credit Clearinghouse

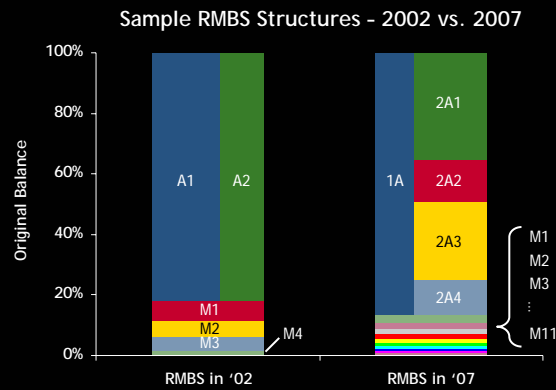
"The fact that I can't tell you the notional value of derivatives contracts Lehman has written the day after a bankruptcy is a scary thing"

- Bloomberg, Sept 16, 2008

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## Lesson 4: Simpler is Often Better

Structures became more complex and harder to analyze



Triggers redirected bond cash flows

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## Lesson 4: Simpler is Often Better

Investors need to be more hands-on and develop a visceral understanding of the underlying collateral and deal structure

Securitization relied on the law of large numbers

- Generic collateral (not deal-specific) vectors for RMBS
- "0/0" assumption for CMBS

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## Lesson 4: Simpler is Often Better

But bonds were idiosyncratic and the quality and performance of underlying assets were materially worse than expected...

| Subprime RMBS       |          |          |
|---------------------|----------|----------|
|                     | Bond A   | Bond B   |
| Coupon              | L+26 bps | L+26 bps |
| 60+ Delinquency     | 34%      | 64%      |
| Projected Bond Loss | 17 pts   | 57 pts   |
| Current price       | \$45     | \$32     |

| Conduit CMBS        |          |          |
|---------------------|----------|----------|
|                     | Bond A   | Bond B   |
| Coupon              | S+44 bps | S+37 bps |
| 60+ Delinquency     | 3%       | 13%      |
| Projected Bond Loss | none     | 74 pts   |
| Current price       | \$65     | \$35     |

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## Lesson 4: Simpler is Often Better

Relying on ratings alone was a failed strategy

- Investor demand for risk-free AAA > natural supply
- Structured AAA - Risky collateral + subordination + rating agency (+ monoline wrap)

*In hindsight,  
these were  
not "true"  
AAA*

| Pre-Crisis AAA Ratings by Security Type |                       |                                 |
|---|-----------------------|---------------------------------|
| Entity                                  | Number of AAA Ratings | AAA Ratings as Percent of Total |
| Structured Finance                      | 37,000                | 60%                             |
| Insured Municipal Bonds                 | 22,324                | 47%                             |
| Non-insured Municipal Bonds             | 2,292                 | 5%                              |
| Sovereign Nations                       | 19                    | 17%                             |
| U.S. Corporations                       | 9                     | < 1%                            |

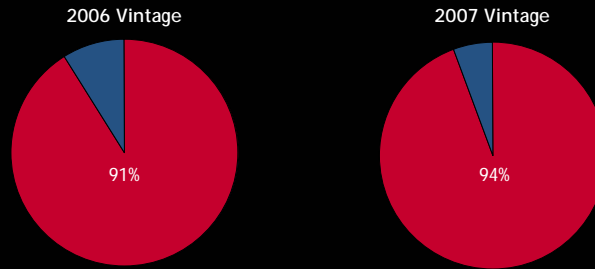
Source: Data from Bloomberg. Data on structured finance are from Coval, Jurek, and Stafford (2008) and corresponds to ratings as of mid-2007. Data on corporations are from Salas (2006) and date to August 7, 2006.

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## Lesson 4: Simpler is Often Better

Rating agencies were wrong

Non-Agency Bonds  
AAA's → Junk



Source: Bank of America

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## Lesson 4: Simpler is Often Better

The case for monoline insurance was rational...

*"While rating agencies face reputational risk when assigning a rating to a security, monoline insurers are placing their own capital and credit rating at risk. Hence investors can correctly expect that the transaction structure is inherently safe and will remain so over the life of the securities guaranteed."*

- The Handbook of Mortgage-Backed Securities, 6<sup>th</sup> Ed, 2006

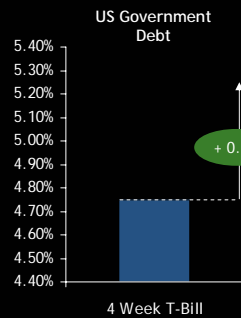
...but it proved wrong

Chances are if it's too complicated for you, it's too complicated for others too

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## Lesson 4: Simpler is Often Better

How do you figure out the right “complexity premium”?



Getting par back  
as promised:  
*Priceless!*

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## Lesson 5: Risk Management is an Evolving Art Form

Massive paradigm shift from “self managed” capital markets to “politically managed” capital markets

- Developed markets may become more like emerging markets

Risk management teams may rely less on economists and statisticians and more on politically-oriented analysts

- Quants may find themselves getting traded in for politicos

The longer term impact on productivity from an increase in political control over the economy is not known

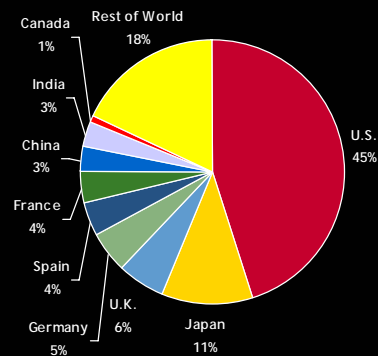
- If history is to be believed, the prognosis is not positive

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## Government Funding - To the Rescue, but Is this the New Bubble?

Governments around the world will issue \$4.5 trillion in debt in 2010  
Issuance is TRIPLE the five year average for industrial countries

2010 Projected Sovereign Debt Issuance



Sources: IMF World Economic Outlook

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## Traditional Approaches to Risk Management

### Slicing and dicing of exposures

- Sector and industry
- Market cap
- Country and currency
- Rating buckets

### Sensitivities to market movements

- Duration and convexity
- Key rate durations
- Spread durations
- Mortgage rate basis and prepayment durations

### Returns based factor models

- Traditional variance/covariance based VaR

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## Traditional Analytics Failed in the Market Crisis

As the financial markets collapsed, fixed income risk measures in particular became less relevant:

| Product             | Then                    | Now                                  |
|---------------------|-------------------------|--------------------------------------|
| Corporate Credit    | Spread Duration         | Spread Duration + Credit Analysis    |
| Agency RMBS         | Interest Rate Scenarios | Scenarios + Cash Flow Analysis       |
| Non-Agency RMBS     | OAS                     | OAS + Principal Loss and Pull to Par |
| Interest Rate Swaps | Duration                | Duration + Spread Rate Basis         |

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## Risk Management Means More than Models

Investors must respond to market changes and develop risk management techniques to help manage risk in the new world

- Lesson 1: The Importance of Good, Clean Data
  - Put processes and systems in place to ensure you know what you own
- Lesson 2: The Paramount Importance of Liquidity
  - Develop liquidity measures to better understand liquidity across sectors
- Lesson 3: The Importance of Counterparty Risk Management
  - Show counterparty risk from two perspectives:
    - What happens if my counterparties are downgraded?
    - What happens if I am downgraded, how much additional collateral needs to be posted?

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## Risk Management Means More than Models (Cont'd)

- Lesson 4: Simpler is Often Better
  - Reverse engineering each instrument in the portfolio
  - Granular analysis of mortgage collateral
- Lesson 5: Risk Management is an Evolving Art Form
  - Move back towards fundamental analysis

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## Risk Management Best Practices

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BlackRock believes that today's best practice market risk management is characterized by:

*Well-trained people...*

*...using uniform models...*

*...fed by consistent and supportable market assumptions...*

*...to produce timely, comprehensive analytics...*

*...to drive good decisions against clear goals...*

*...and that such a process be subjected to comprehensive documentation, continuous improvement and appropriate oversight*