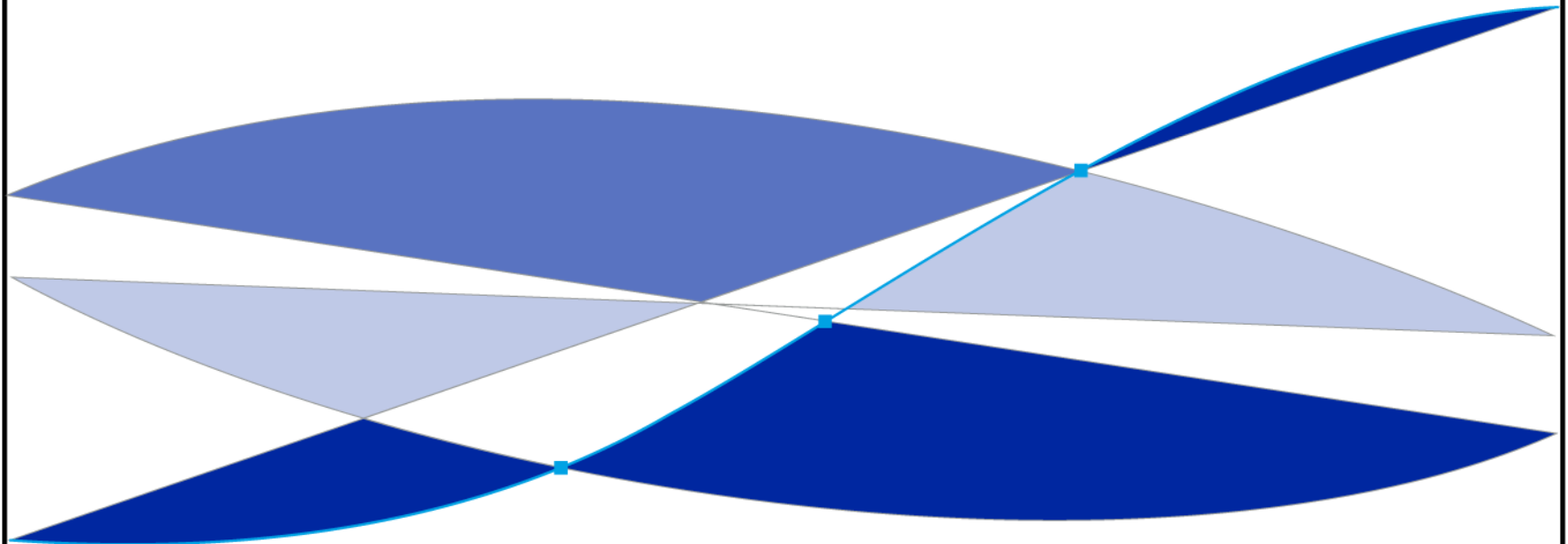




# Valuation of Corporate Credits: Lessons from the Recent Market Turmoil and Cross-Border Issues

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# Agenda

1. **Introduction**
2. **Loan Valuation Framework**
3. **Lessons Learned From Recent Market Turmoil**
4. **Cross-Border Issues**
5. **Closing Remarks**



# Introduction

## An Introduction to Fair Value Measurement Standard (FAS157)

### The YouTube version:

- [http://www.youtube.com/watch?v=hBoZTM8\\_cVw](http://www.youtube.com/watch?v=hBoZTM8_cVw)

### The text version:

- **Level 1** is assets that have observable market prices.
  - E.g, stock traded on the NYSE.
- **Level 2** assets don't have an observable price, but they have inputs that are based on them.
  - E.g., an interest-rate swap where its components are observable data points like the price of a 10-year Treasury bond.

**Level 3** is for assets where one or more of those inputs don't have observable prices.

- This is the bucket that has been described as a “guesstimate” in the press

### For Commercial Banks:

- Investments intended to be held to maturity are generally reported at amortized cost in the primary financial statements

## Demand For Loan Mark-to-Market

"...Banks are not required to recognize the fair market value of loan commitments or outstanding loans in their financial statements, even when there has been a major erosion of economic value. Consequently, the economic cost of these outstanding liabilities is unknown to investors, regulators, or the media."

Henry Paulson

**CEO, Goldman Sachs**

Quoted in *The American Banker*

June 6, 2002

# Betting against Requiring Banks Marking Their Loan Books to Market

## THE ARENA FOR ACCOUNTABLE PREDICTIONS

The purpose of Long Bets is to improve long-term thinking. Long Bets is a public arena for enjoyably competitive predictions, of interest to society, with philanthropic money at stake. **The Long Now Foundation** furnishes the continuity to see even the longest bets through to public resolution. This website provides a forum for discussion about what may be learned from the bets and their eventual outcomes.

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PREDICTION 149

DURATION 20 years (02004-02024)

“US accounting and banking regulations will not require that loan portfolios held in the "banking book" be marked to market before 2024.”

PREDICTOR  
Stuart Brannan

CHALLENGER  
TBA

### VOTE ON THIS BET

When you vote, your name, today's date and who you are siding with will be added to this prediction's permanent record. Please [sign in](#) to vote.

side with predictor

5 people (38%)

side with challenger

8 people (62%)

[DETAILS »](#)

## Brannan's Arguments in 2004

- Although marking to market provides greater transparency to all bank stakeholders (shareholders, depositors, creditors) who have a legitimate desire to more fully understand the economics of a bank's business, the result would be a significant increase in earnings volatility.
- Increased volatility would make it more difficult for banks to play a stabilizing role in the economy and may make it more difficult for them to obtain stable access to capital.
- In addition, marking to market actually involves large conceptual and technological challenges. Overcoming these would require significant investment in technology and cultural change.
- As a result, banks will resist marking their loan portfolios to market for at least another 20 years.

## If Not a Mandate, How About an Option?

### IFRS – IAS 39

- IAS 39 became effective on January 1, 2005 but was amended in June 2005 to include FVO eligibility criteria. The FVO may be applied if either:
  1. It aligns accounting practices with risk management or investment strategies
  2. It eliminates or significantly reduces accounting mismatches

### US GAAP – FAS 159

- FAS 159 was published in February 2007. It is effective for fiscal years beginning after November 15, 2007. There are no eligibility criteria.

### For both IAS 39 and FAS 159

- The election must be made at inception and is irrevocable
  - there can be no transfer into or out of the FVO classification following initial recognition
- Only entire loans/commitments may be assigned to the fair value book



## Applications of MTM by Banks

### Active Use:

- Risk monitoring
- Hedging decisions
- Loan pricing and origination decisions
- Measuring the true cost of relationship lending

### Passive Use:

- Communicating hedge effectiveness
- After-the-fact reporting

## New Criticism of Marking-to-Market...

From the Institute of International Finance (IIF) April 08 report:

- Significant deviation of MTM value from the true fundamental value
- Exacerbate the market stress
  - Putting additional pressure on downward spiral on asset prices
  - Forced write-downs and liquidation

Financial Times, May 30, 2008 reported:

- *(IIF) proposed to relax some of the classifications for financial instruments and to ease the rules in times of financial stress. It claimed that taking prices in illiquid markets "results in valuations that do not provide a true picture of the financial positions of firms".*

*Goldman Sachs called the proposed change: "Alice-in-wonderland accounting"*

## My Discussion Today ...

Will focus on

- Valuation of Corporate credits (esp. corporate loans) by commercial banks
  - Some principles can be applied to other asset classes
- Model based valuation
  - Modeling issues
  - Lessons learnt from recent market turmoil
  - Cross border issues

Caveats:

- Views expressed in the qualitative statements are mine only, not necessary that of Moody's
- Raising questions and stimulating further research and debate rather than providing definite answer

# 2

## Loan Valuation Framework

## Valuation of Corporate Credit: a Waterfall Approach

1. Use market price if available
  - Market price or quotes (usually)
  - source chosen according to a hierarchy (e.g., internal trading desk source first)
  
2. Use direct inputs which are market based
  - A non-traded loan with traded LCDS contract of similar maturity on the same name
  
3. Model based
  - Need to calculate default probability (PD), Loss Given Default (LGD) etc, preferably from market information
  - Need to model the instrument specific characteristics, e.g. prepayment

## Value of a Defaultable Loan Is

$$V = \sum_{t=1}^N e^{-r_t t} E^Q (C_t)$$

- The discounted value of expected value of the cash flows under the risk neutral measure
- A more sophisticated version of “discounted cash flows”
- The cash flows can be contingent upon credit states of the borrower, thus credit migration needs be accounted for
  - The borrowers prepays if the value of the loan is above the principal plus the prepayment penalties and costs
  - The borrower tends to draw down the credit line when getting into financial trouble

## Options (for Loans) that Are Not Covered by John Hull's Book...

### Prepayment

- The right to pay back a term loan or cancel a revolver before maturity, sometimes with a penalty or other costs.

### Variable Revolver Usage

- The borrower's ability to decide how much of a revolving line of credit to draw

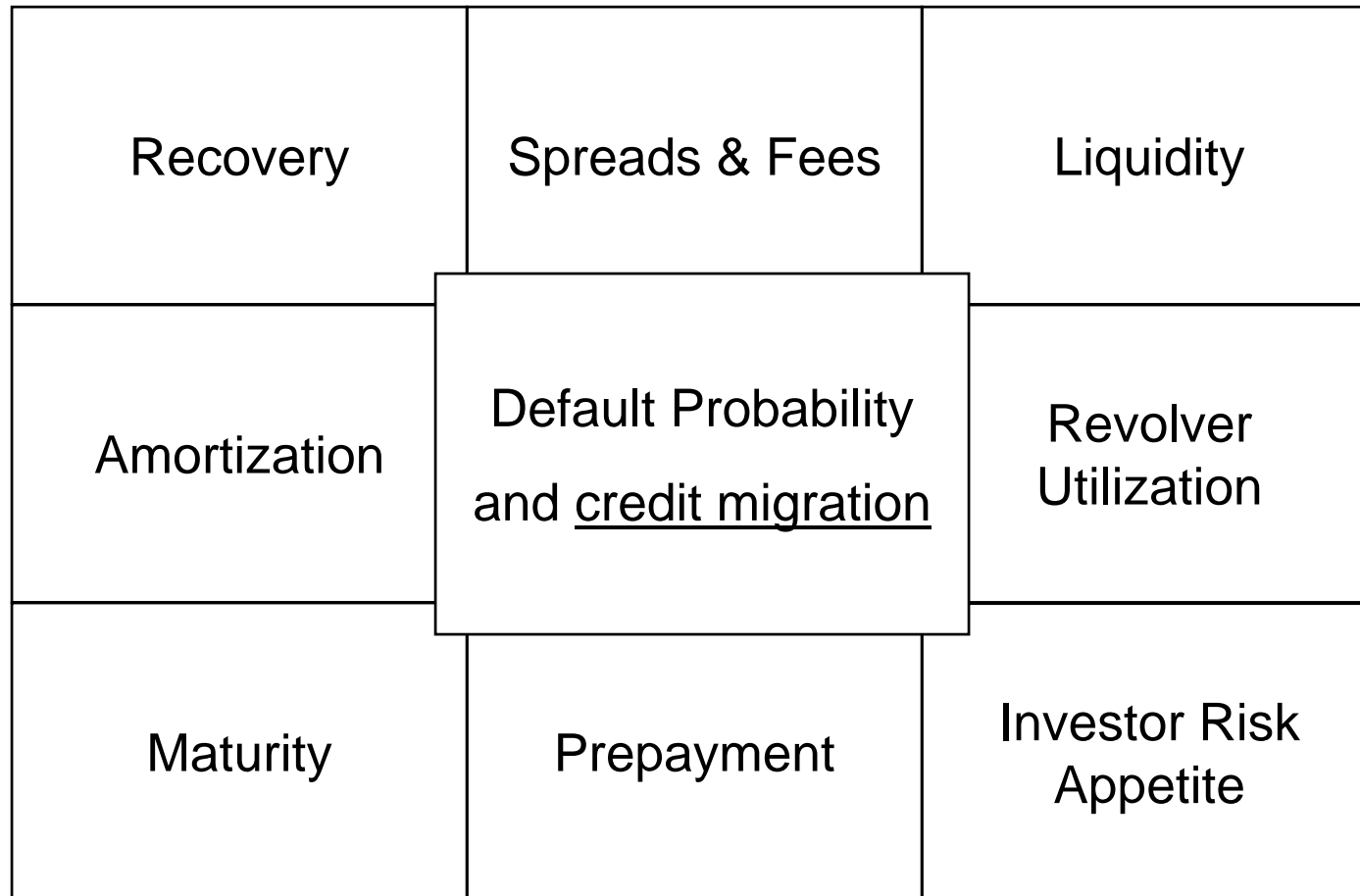
### Grid Pricing

- In many loan contracts, spreads and loan fees are dependent on some external variable, like an agency rating.

### Term Out Option

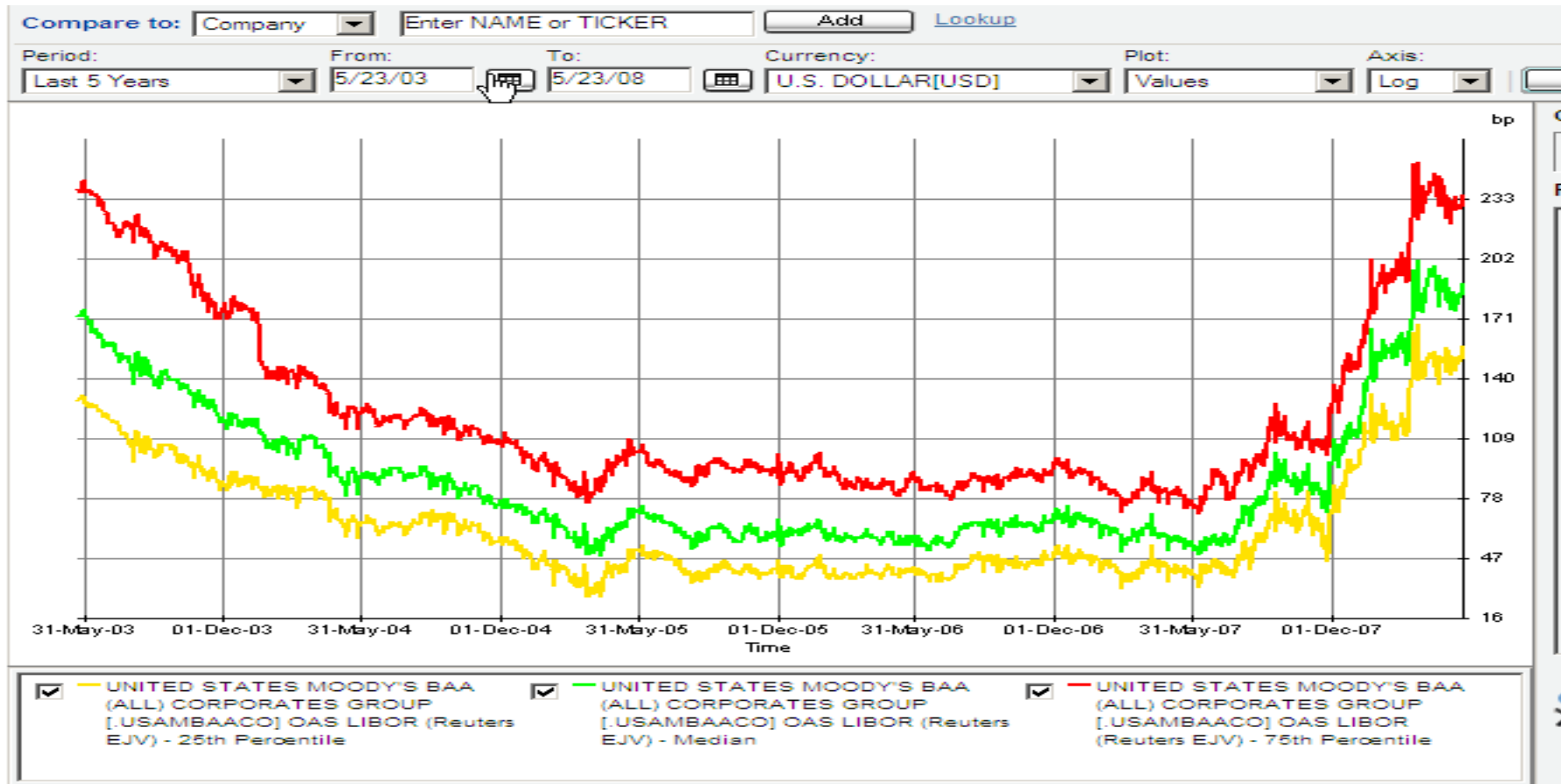
- Some revolving lines of credit give the borrower the option to convert the line into a term loan with a prearranged maturity.

## Loan Valuation Drivers





# Credit Migration: Not all Baas Are Equal in the Eyes of the Market!



Source: MKMV CreditEdge Plus

# Different Views on Credit Migrations

Moody's one-year migration matrix based on actual ratings changes

| Initial Rating | Rating at End of One Year |       |       |       |       |       |       |         |
|----------------|---------------------------|-------|-------|-------|-------|-------|-------|---------|
|                | Aaa                       | Aa    | A     | Baa   | Ba    | B     | Caa-C | Default |
| Aaa            | 91.56                     | 7.73  | 0.69  | 0.00  | 0.02  | 0.00  | 0.00  | 0.00    |
| Aa             | 0.86                      | 91.43 | 7.33  | 0.29  | 0.06  | 0.02  | 0.00  | 0.01    |
| A              | 0.06                      | 2.64  | 91.48 | 5.14  | 0.53  | 0.10  | 0.02  | 0.02    |
| Baa            | 0.05                      | 0.22  | 5.16  | 88.70 | 4.60  | 0.84  | 0.26  | 0.19    |
| Ba             | 0.01                      | 0.07  | 0.52  | 6.17  | 83.10 | 8.25  | 0.63  | 1.26    |
| B              | 0.01                      | 0.05  | 0.19  | 0.41  | 6.27  | 81.65 | 5.92  | 5.50    |
| Caa            | 0.00                      | 0.04  | 0.04  | 0.25  | 0.79  | 10.49 | 69.91 | 18.47   |

The difference is almost as large as 100%!

Source: Moody's Investor Services, 2006\*

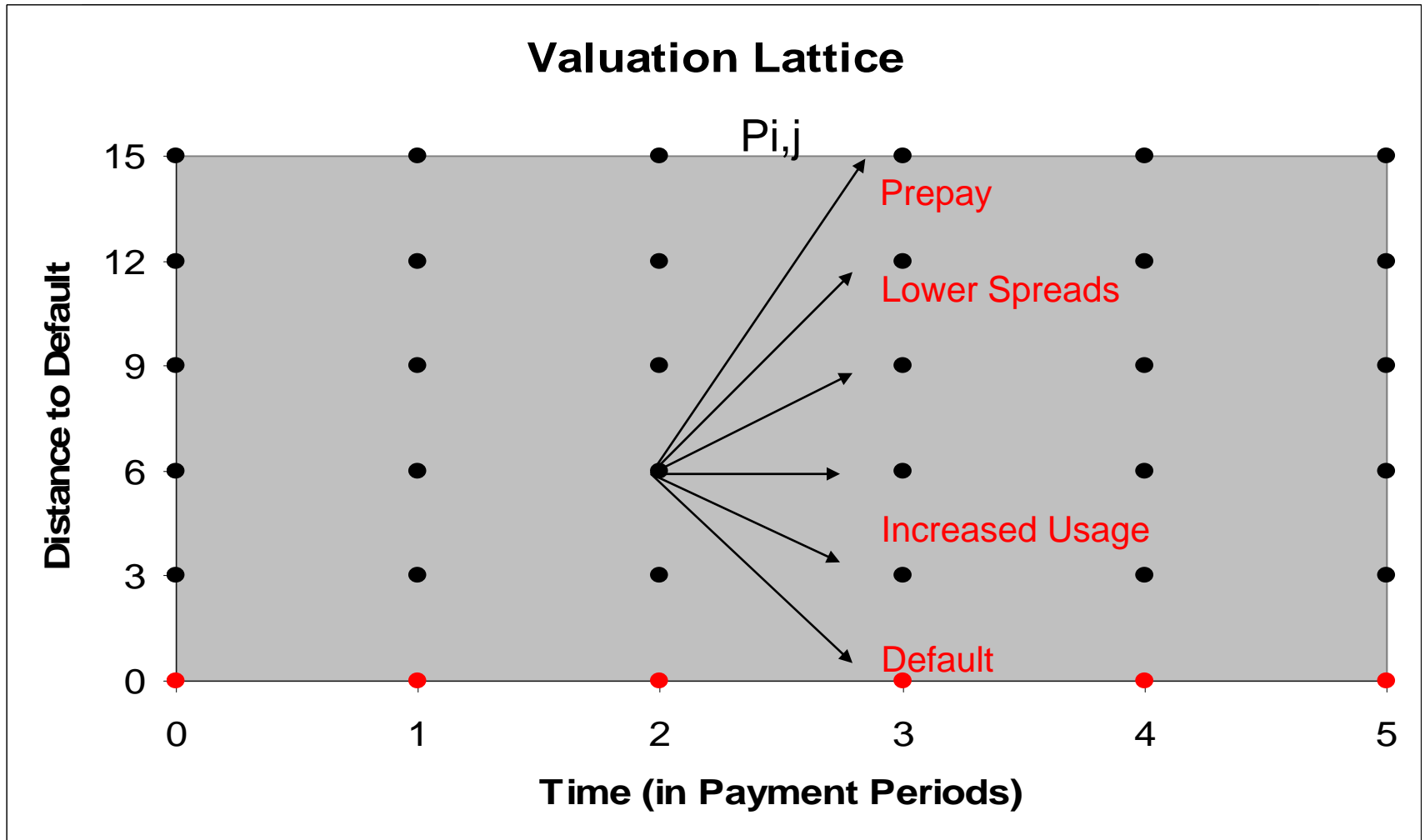
MKMV one-year migration matrix based on non-overlapping EDF ranges

| Equivalent Rating | Equivalent Rating at End of One Year |       |       |       |       |       |       |         |
|-------------------|--------------------------------------|-------|-------|-------|-------|-------|-------|---------|
|                   | Aaa                                  | Aa    | A     | Baa   | Ba    | B     | Caa   | Default |
| Aaa               | 65.50                                | 20.10 | 8.50  | 3.90  | 1.20  | 0.80  | 0.10  | 0.00    |
| Aa                | 25.53                                | 36.57 | 25.80 | 9.20  | 2.17  | 0.50  | 0.10  | 0.07    |
| A                 | 4.10                                 | 18.03 | 41.03 | 27.17 | 7.77  | 1.63  | 0.17  | 0.07    |
| Baa               | 0.43                                 | 2.87  | 19.17 | 46.27 | 24.87 | 5.47  | 0.67  | 0.30    |
| Ba                | 0.10                                 | 0.17  | 2.33  | 21.27 | 49.77 | 22.97 | 2.70  | 0.60    |
| B                 | 0.00                                 | 0.00  | 0.20  | 2.00  | 18.50 | 55.70 | 21.40 | 2.17    |
| Caa               | 0.00                                 | 0.00  | 0.00  | 0.30  | 1.80  | 20.60 | 63.60 | 13.60   |

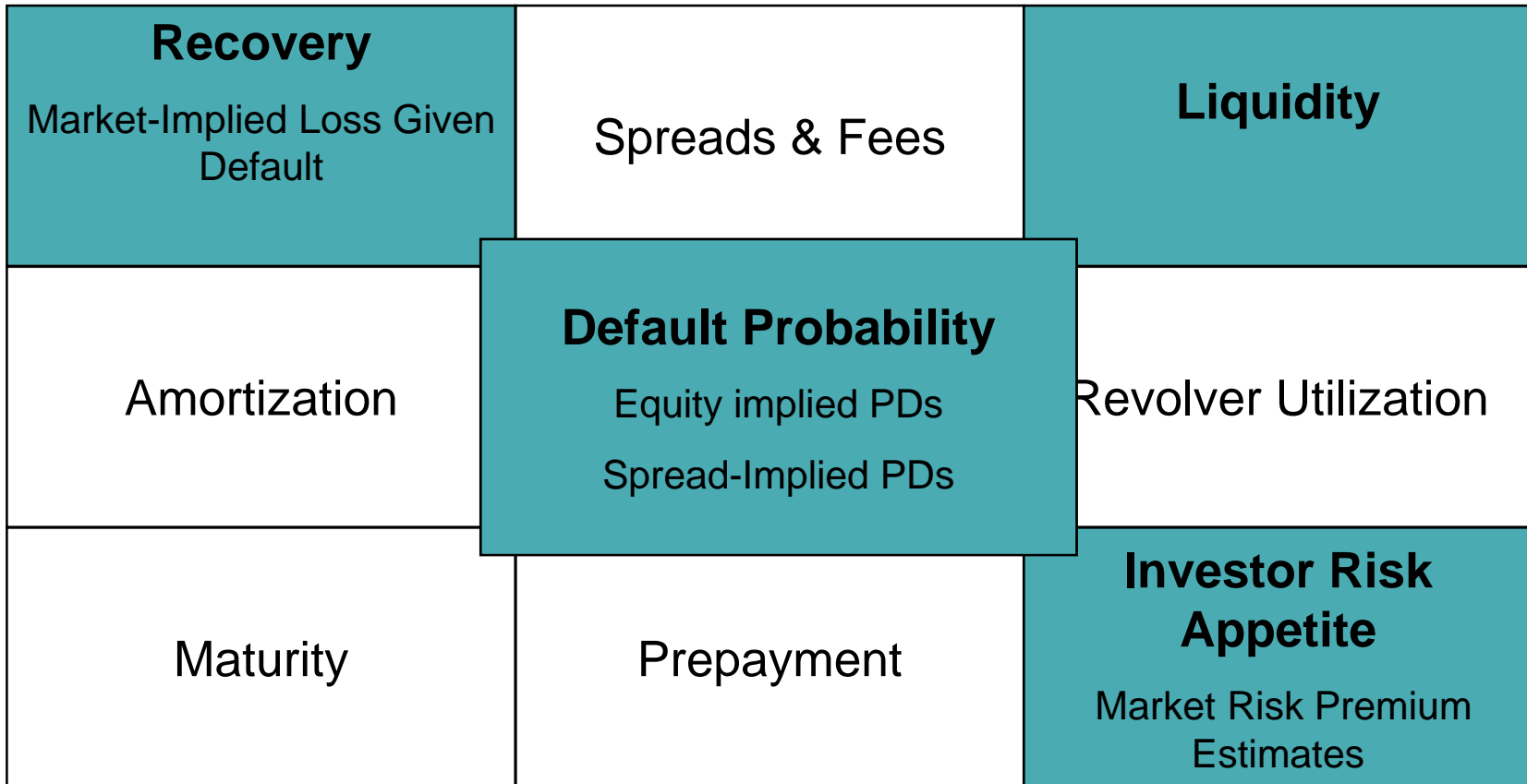
\*Withdrawn Ratings are redistributed proportionally.

Source: Moody's KMV

# Moody's KMV Lattice Valuation Model for Loans



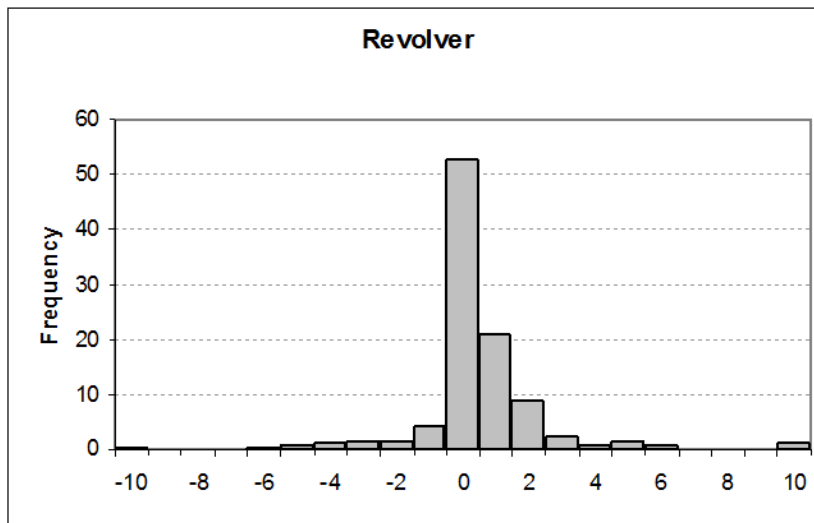
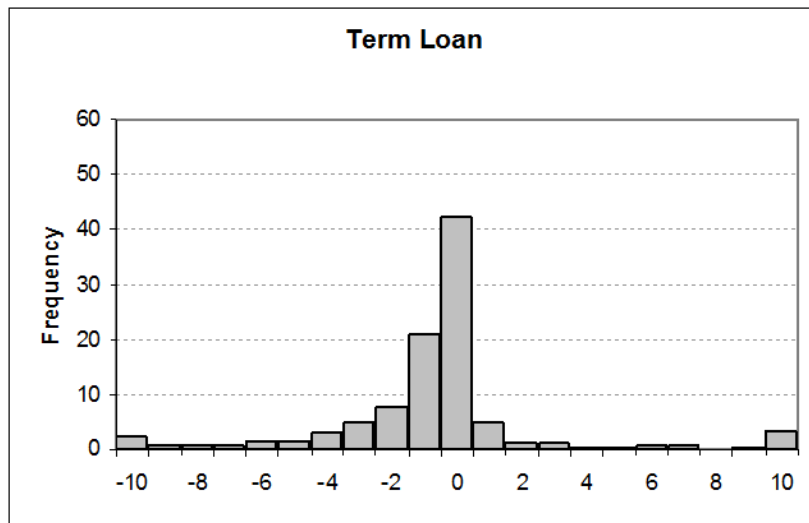
## Inputs That Can Be Inferred from Market Information



- These inputs can be inferred from equity market, bond market and CDS market.
- MKMV calculates them on daily basis.

# Modeled Based Loan values Can Match Market prices from LPC

1/2002 – 12/2006



|            | <b>TL</b> | <b>R</b> | <b>R%</b>  | <b>TL%</b> |
|------------|-----------|----------|------------|------------|
| within \$1 | 1885      | 3900     | <b>70%</b> | <b>60%</b> |
| within \$2 | 2308      | 4683     | <b>84%</b> | <b>73%</b> |
| All        | 3161      | 5593     |            |            |

Difference = Model value – Nearest LPC quote. Set to zero if model value is within Bid and Ask quotes

Source: MKMV Research

# 3

## Lessons Learned from the Recent Market Turmoil

## Lesson #1: In the Fog of War...

- Events are still unfolding...
- Be careful to draw definite conclusion.

## Some Questions Are So Obvious That They Are Rarely Asked...

Why is corporate credit market illiquid?

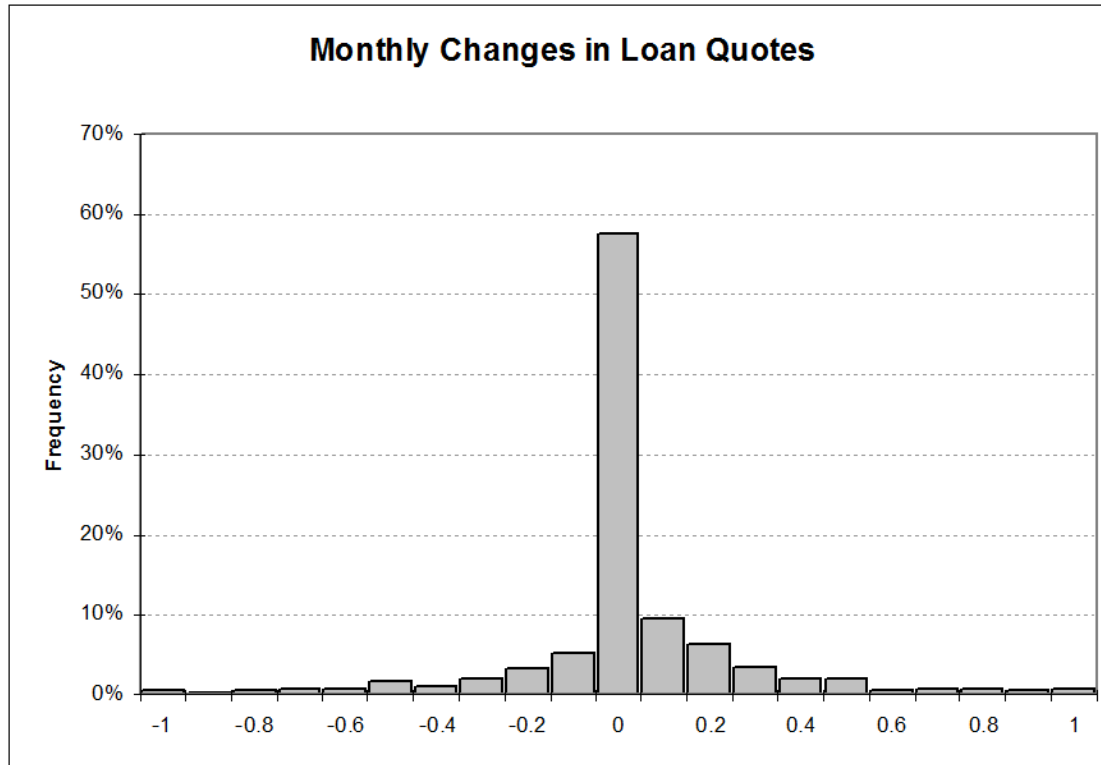
- Some answers:
  - Information asymmetry: banks and borrowers know more about loans
  - Pay-off asymmetry of investing in credit: upside is capped, huge downside
  - Institutional set-up: institutionally intermediated, not market intermediated exchange
- Why is stock market much more liquid?

What needs to be done to make corporate credit market a liquid one?



# Loan Quotes Tend to Be Stale, Even in Normal Market Condition

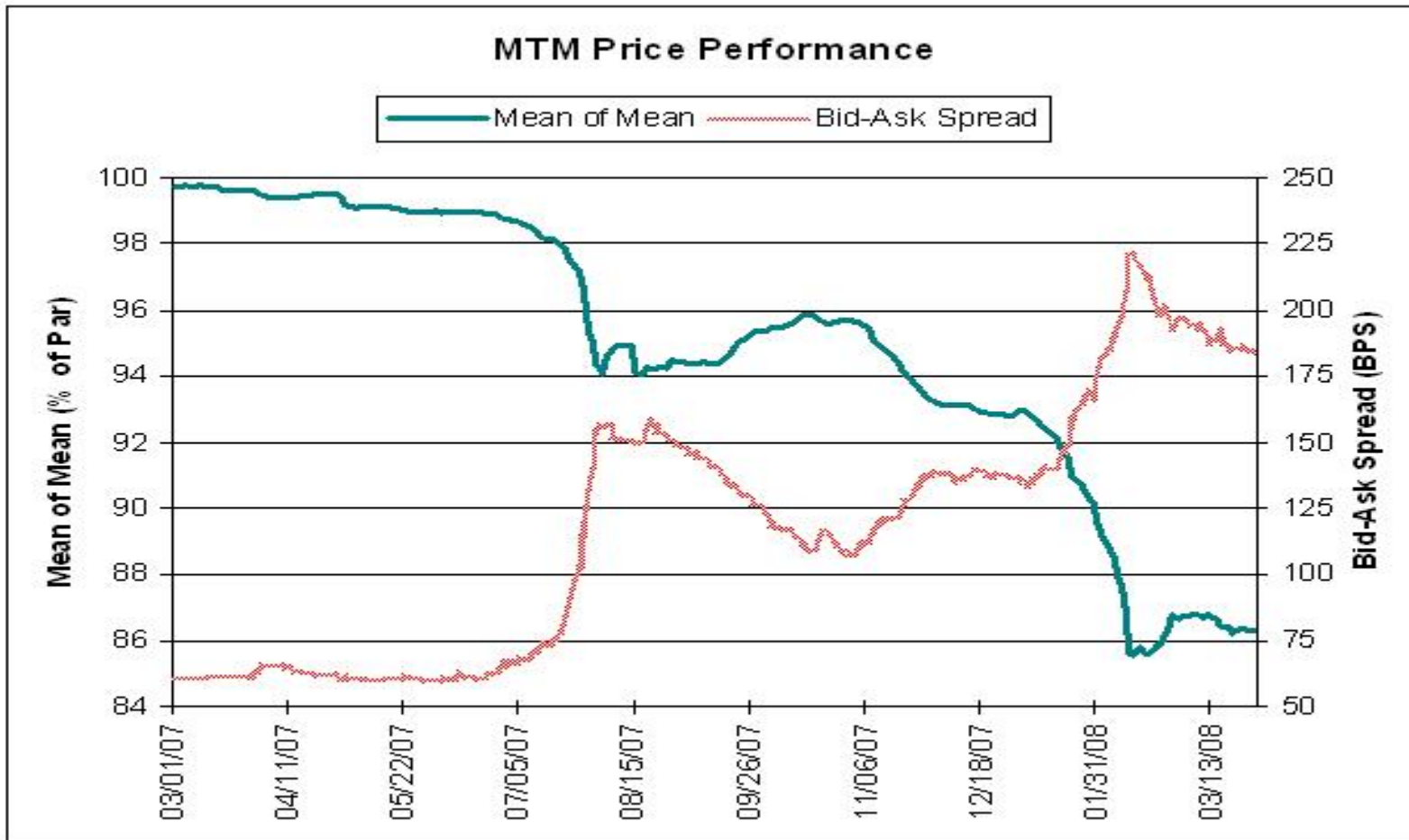
Distribution of Monthly changes in loan quotes, 2002 ---2006



Source: MKMV Research

- **47% of monthly quote changes are *exactly* zero, suggesting high incidence of stale quotes** (caveat: loan values are expected to be somewhat more stable than, say, bond values – no Interest rate risk, lower LGD, prepayment option).
- **These quotes, by themselves, may be inadequate for mark-to-market purposes.**
- **Potential for better price discovery and MTM in loan market by bringing in information from more active markets.**

# Recent Market Turmoil Has Drastically Decreased Loan Market Liquidity...



Source: LSTA

## Level 1 Assets Turned into Level 2 & Level 3 Asset Quickly...

Dealer quotes either totally disappeared or became extremely distressed in the turmoil

Some institutions got caught off guard without robust model based valuation framework

In hindsight, stress testing, if there were any done, was insufficient

## Embed Options and Counter-party Risk Matter...

MKMV finds empirical evidence that companies increase the credit line usage

- When their default risk increases
- During economic downturn

Revolver usage given default (UGD) tends to be very high

- Median UGD for US middle market revolvers is close to 90%!

The value of a CDS contract can vary with the counter-party:

- Imagine you brought a CDS protection on Sharper Image Inc from Bear Stern in March 2008

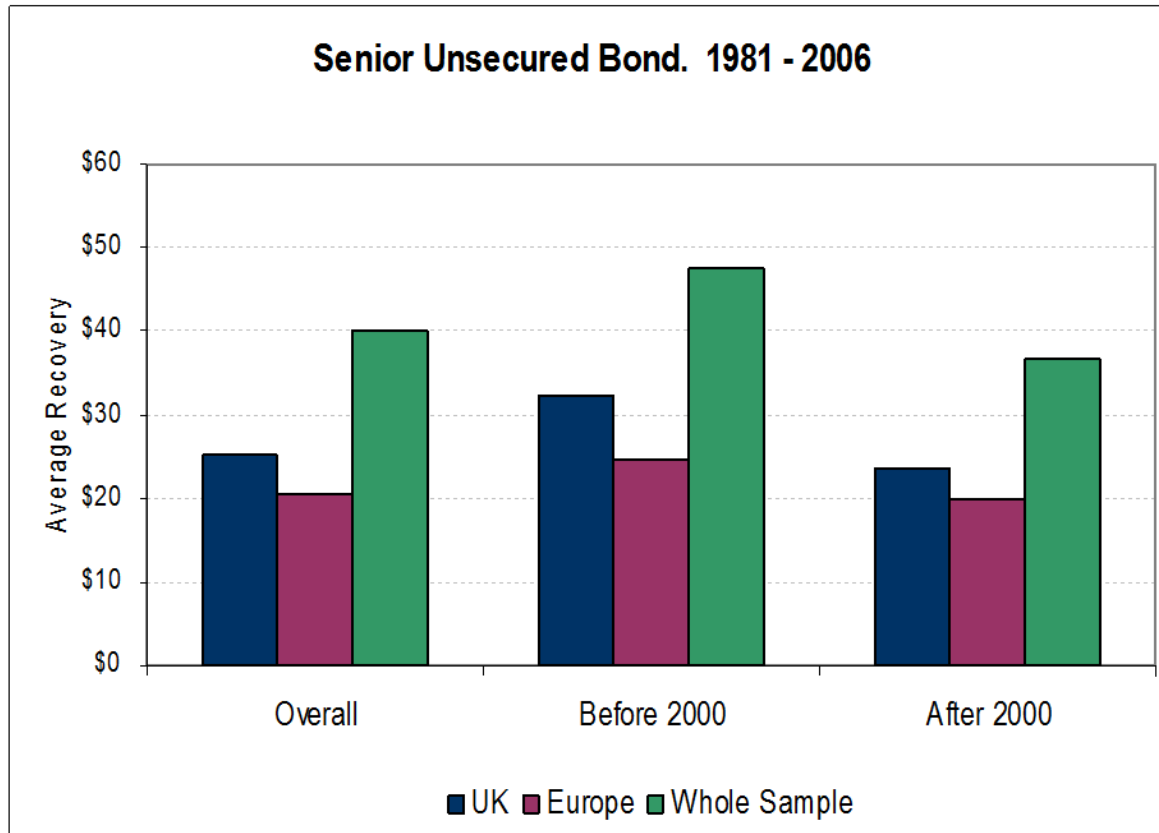
# 4

## Cross-Border Issues

## Cross-Border Issues in Model Based Valuation

- Consistent valuation framework
- Consistency in inputs:
  - Is default defined consistently?
    - Is PD measured differently?
  - Is LGD measured consistently?
  - Is market risk premium consistent cross borders?
- Let's take a look at some empirical evidence

## Differences in Recovery Rates Across Countries

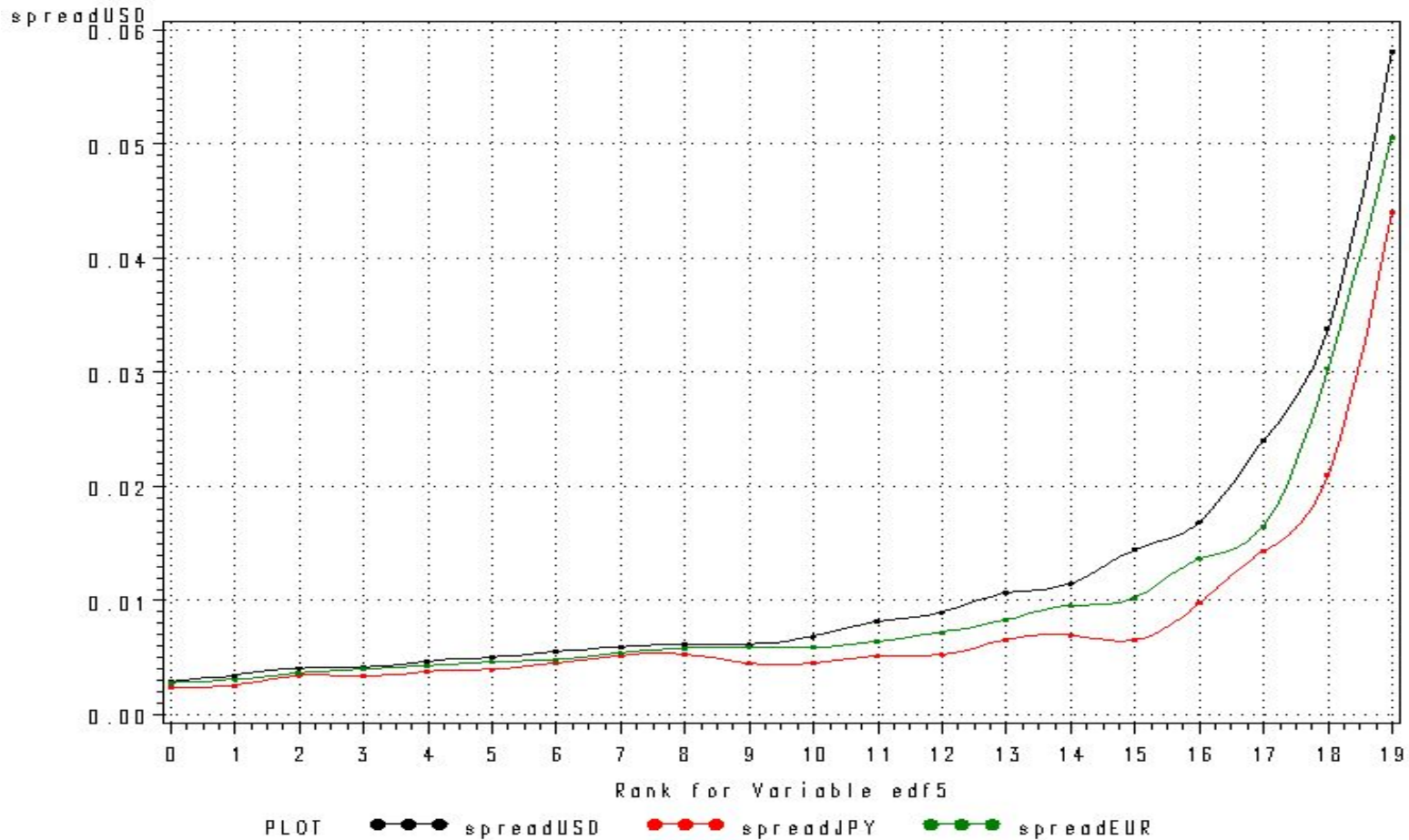


- Most of the overall sample consists of US issuers
- UK and Europe have the lowest average recovery

Source: MKMV Research

# Differences in Risk Premium

Median spreads by EDF bucket and currency



Source: MKMV Research



# 5

## Closing Remarks

## Benefits of Marking to Market of Loans

Provides transparency around credit risk management

- Timely measurement of credit deterioration
- Par can be a much poorer “guess” than extrapolating from related markets for deterioration
  - Accrual accounting is another form of mark to model

Eliminates a significant obstacle to sophisticated risk management  
(the accounting mismatch)

Provides a relevant benchmark performance measurement

- Measure the true economics of loan origination
- Objective benchmark of credit risk management and portfolio management

MKMV has been providing MTM model & data & technology to clients since 2003!

## Potential Academic Research Topics

The relationship between a commercial bank's earning quality & stock valuation with

- its risk management practices
- its accounting practices (e.g., FAS 107 disclosures)

MTM practices in the context of regulatory capital requirement

- Maybe the debate has been too narrowly focused on MTM practice instead of regulatory capital requirement

## Appendix: Suggested Readings

John Tschirhart, James O'Brien, Michael Moise, and Emily Yang, 2007, "Bank Commercial Loan Fair Value Practices", Federal Reserve Working Paper,

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1017604](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1017604)

Institute of International Finance , 2008, "Interim Report of the IIF Committee on Market Best Practices",

<http://www.iasplus.com/crunch/0804iifbestpractices.pdf>

Stephen Kealhofer, 2002, " The Economics of the Bank and of the Loan Book", MKMV white paper,

[http://www.moodyskmv.com/research/files/wp/econ\\_of\\_banks.pdf](http://www.moodyskmv.com/research/files/wp/econ_of_banks.pdf)

Deepak Agrawal, Irina Korablev, and Douglas W. Dwyer, 2008 , "Valuation of Corporate Loans: A Credit Migration Approach", KMV white paper

[http://www.moodyskmv.com/research/files/wp/Valuation\\_of\\_Corporate\\_Loans.pdf](http://www.moodyskmv.com/research/files/wp/Valuation_of_Corporate_Loans.pdf)