

Securitization: a *Post Mortem*

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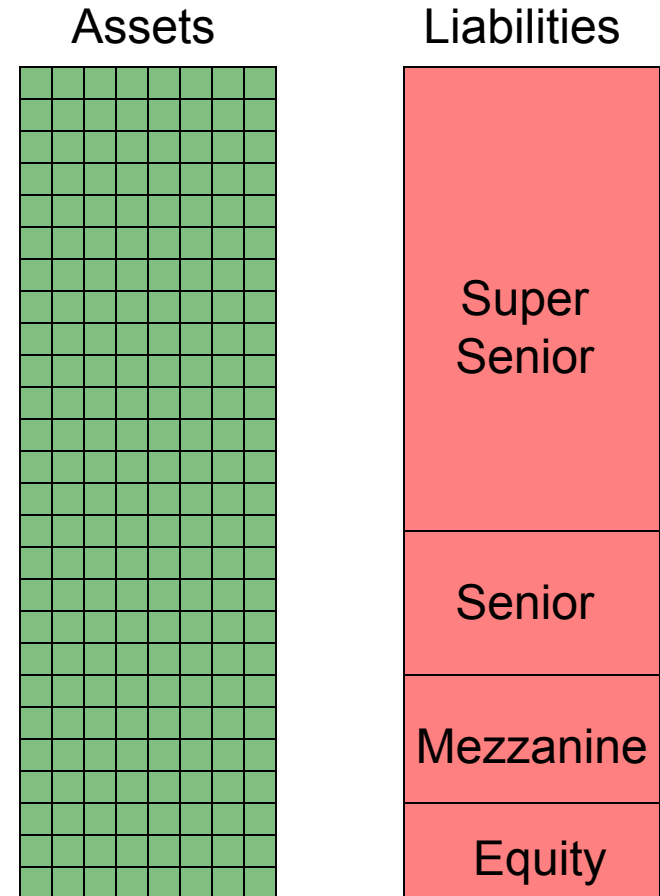
Today's Talk

- Overview of securitization
- Looking back
- What went wrong?
 - Excessive complexity
 - Leveraged exposure to systematic risk
 - Model error
- Looking forward
 - Alternatives to securitization
 - Securitization going forward

Overview

What is credit securitization?

- Securitization is the pooling and tranching of credit risk
- Assets of a securitization are a pool of fixed income securities with embedded credit risk such as
 - Corporate bonds & loans
 - Mortgages
 - Credit card receivables
 - Other structured products
- Liabilities are structured in tranches ordered in terms of payment priority
 - Senior tranches bear least risk but carry lowest interest rate
 - Mezzanine tranches bear more risk in return for higher rate
 - Lowest tranche (equity) bears most risk and is often not traded



A taxonomy of securitization products

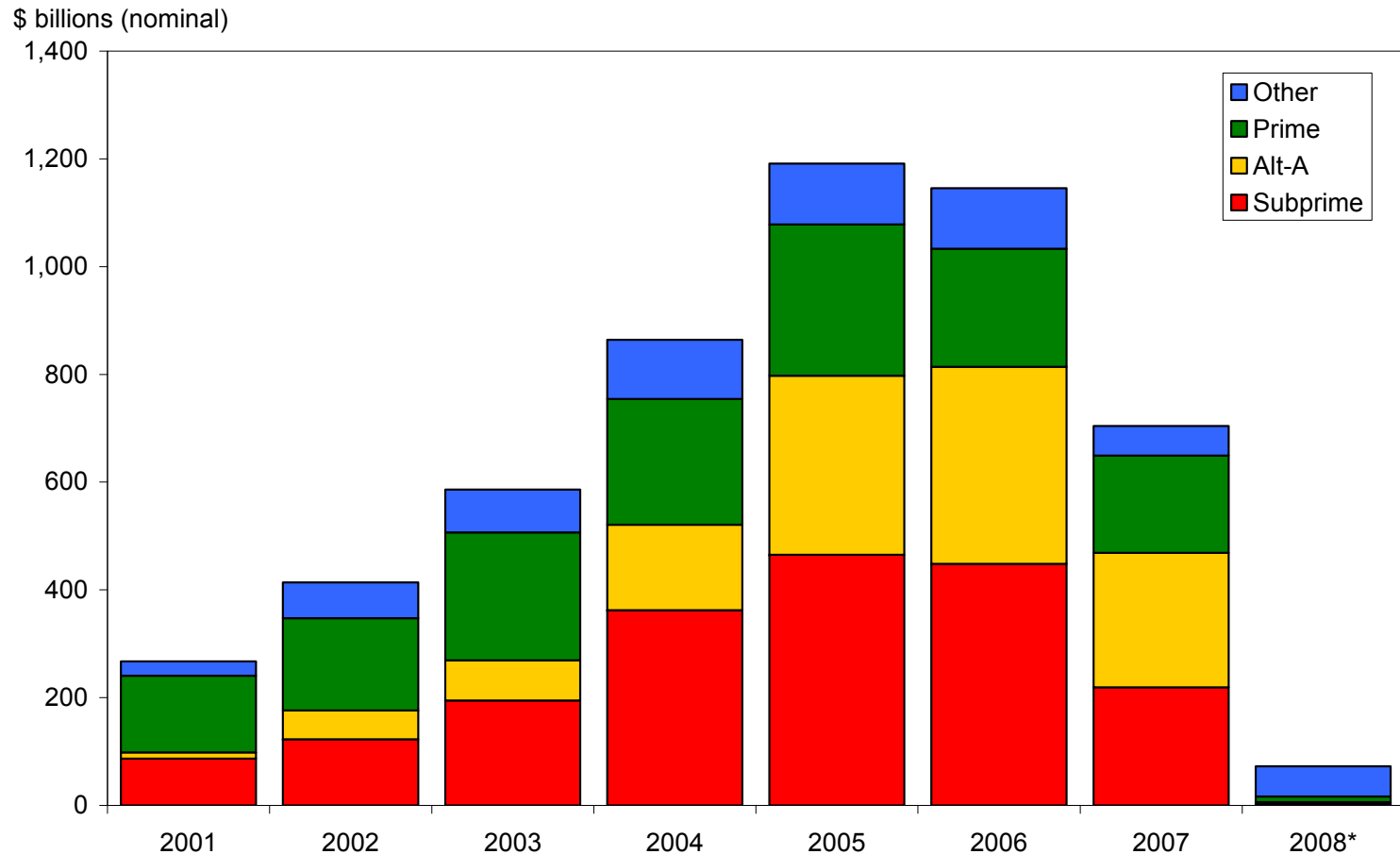
Liabilities	Assets	
	Whole Loans or Unstructured Bonds	Structured Securities
Pass-through	Agency MBS CDX Indexes	ABX.HE Indexes
Structured	Non-agency MBS Corporate Bond CDO	ABS CDO CDO-squared

Goals of securitization

- Separate debt funding from risk bearing
 - Senior tranche investors put up most of the capital to fund assets
 - Junior tranche investors bear most of the credit risk
- Risk diversification
 - A single structured credit deal may be backed by hundreds or thousands of loans
 - Cash flows for large asset pools may be easier to predict
- Tailor debt risk/return characteristics to market demand
 - Risk/return profile of structured securities is different from that of underlying collateral
- Regulatory arbitrage
 - Financial institutions can move assets off balance sheet while continuing to be exposed to much of those assets' credit risk

Rapid growth of new MBS...

Annual Issuance of Non-agency Residential Mortgage Backed Securities

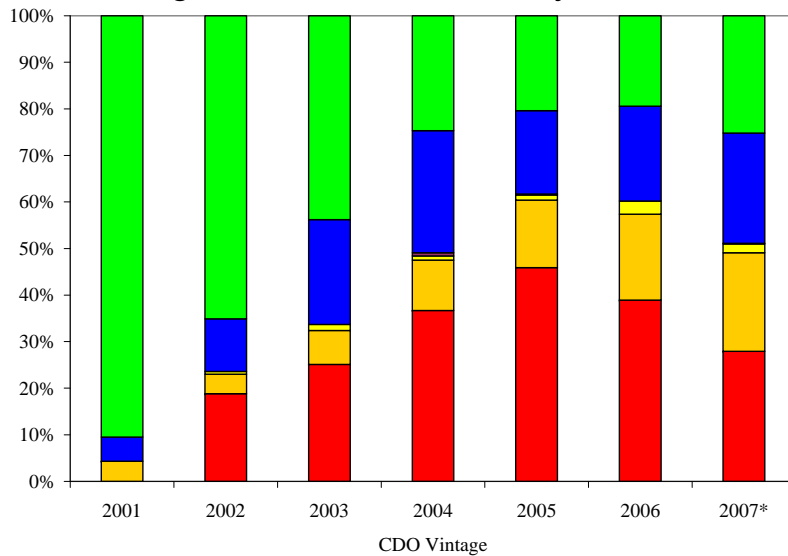


* Jan-Sep, Annualized
Source: Inside Mortgage Finance

...Increasingly held by CDOs

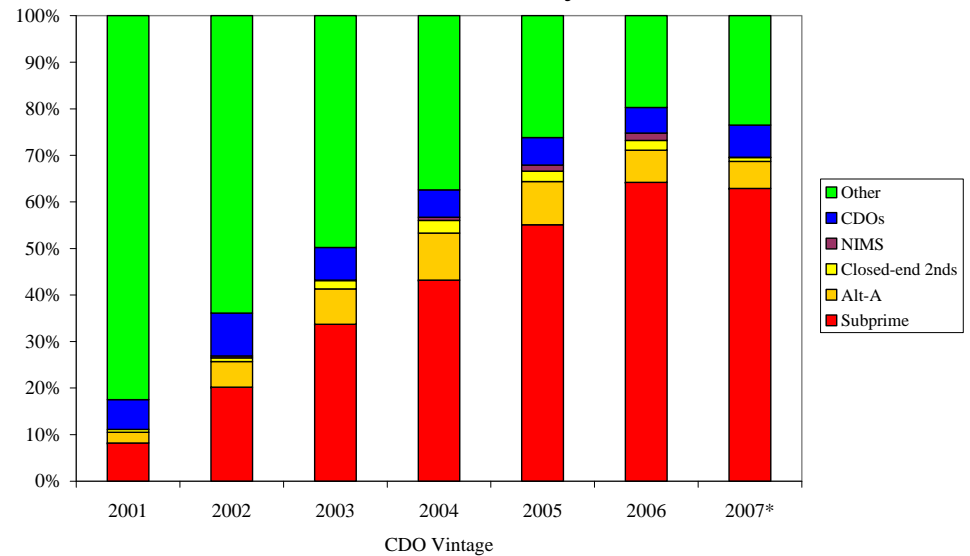
Composition of CDO Collateral

High-Grade Cash-Flow/Hybrid CDOs



* 2007 vintage includes deals completed through September
Source: Standard and Poors

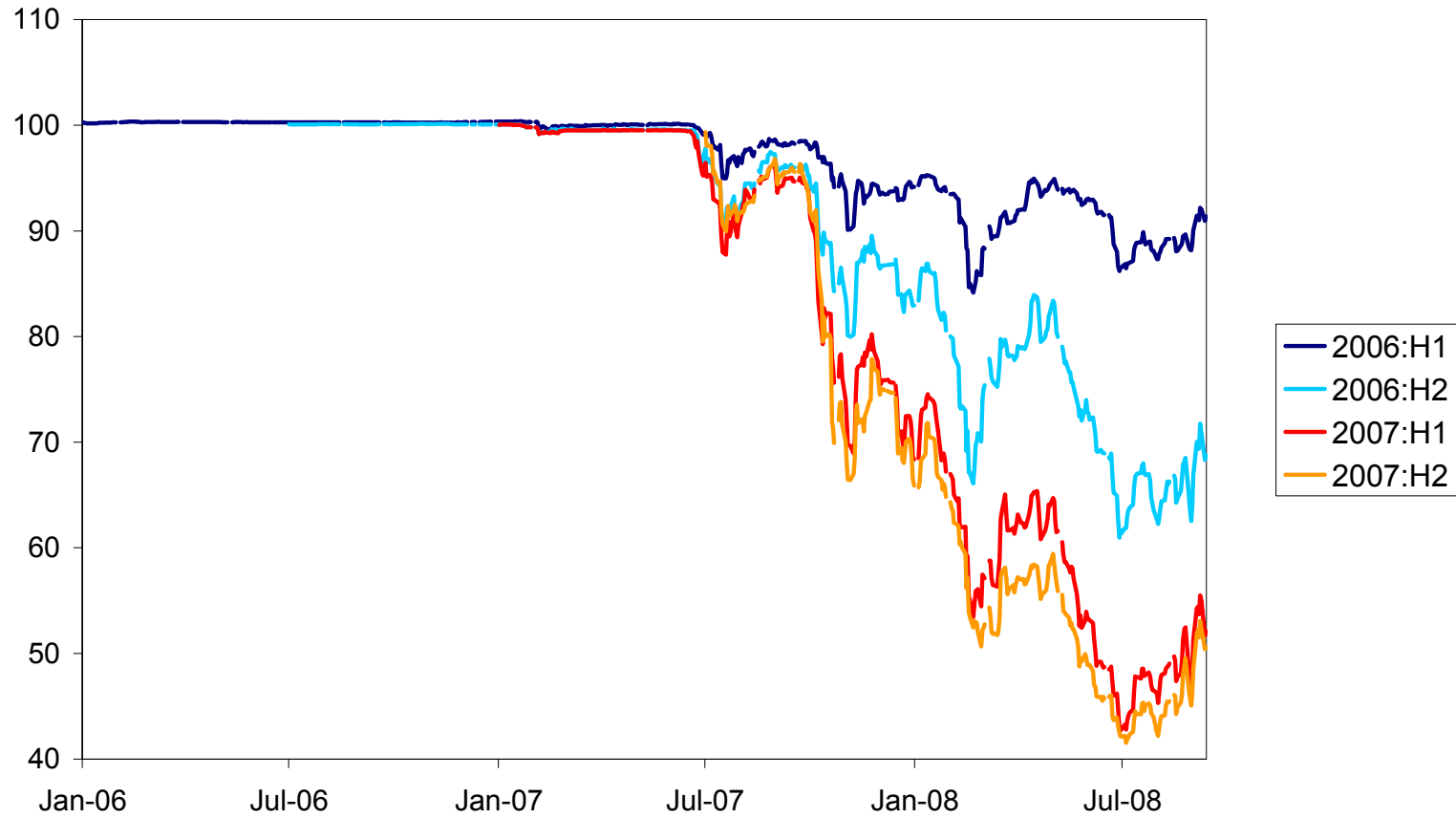
Mezzanine Cash-Flow/Hybrid CDOs



* 2007 vintage includes deals completed through September
Source: Standard and Poors

MBS valuations plunge

AAA ABX.HE Indexes

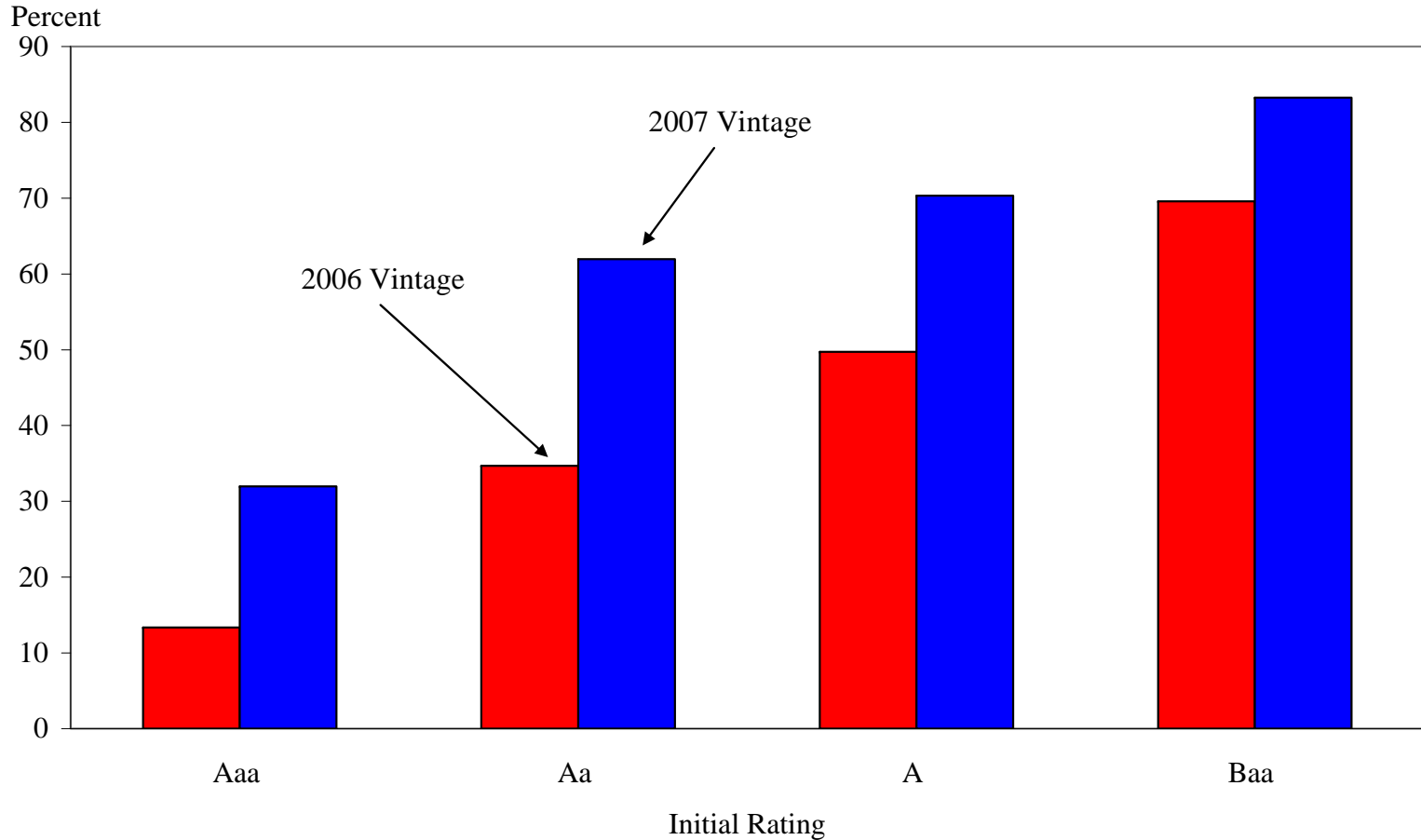


Source: MarKit

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ABS CDO credit ratings collapse...

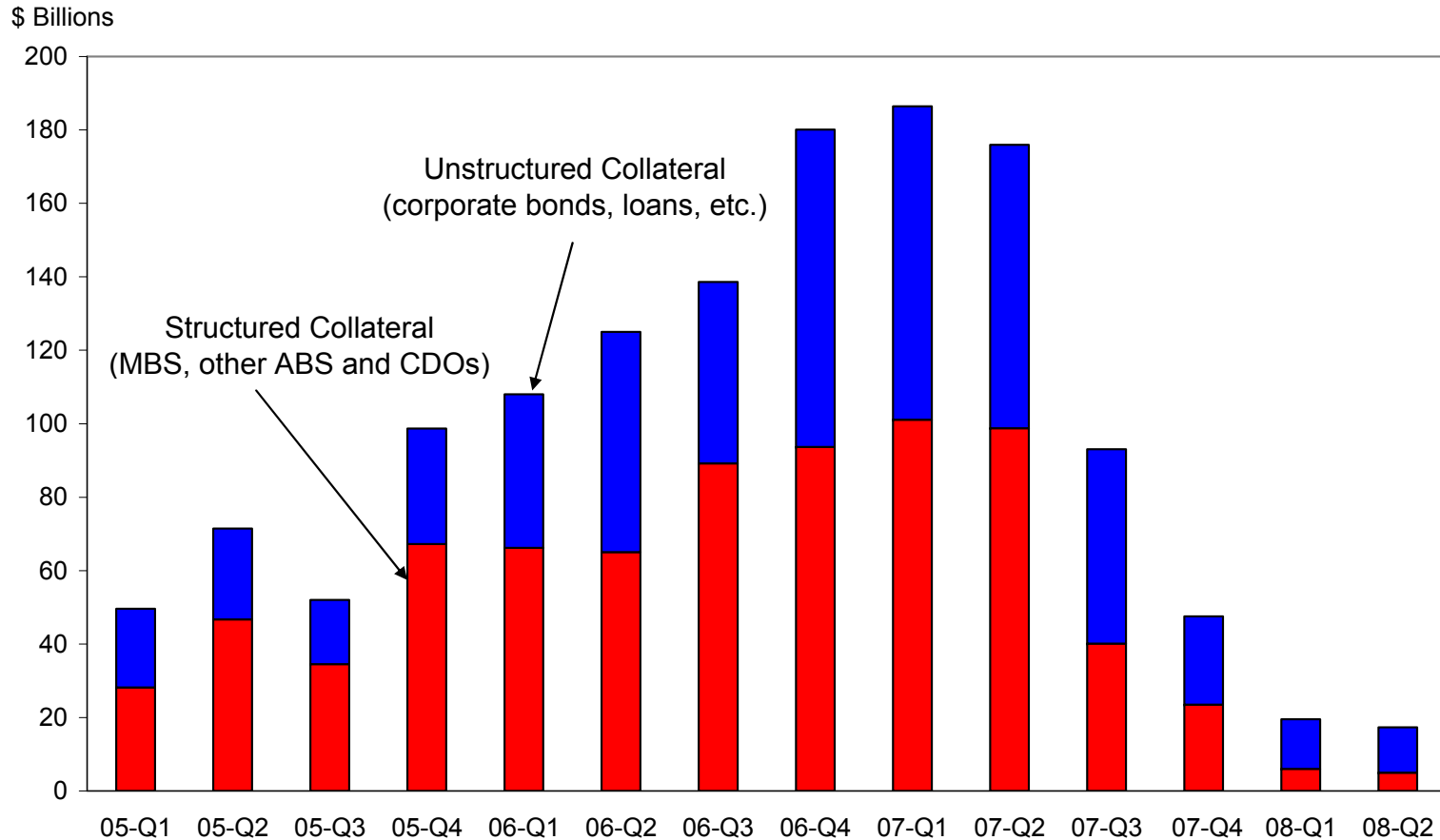
Share of CDO notes downgraded to Caa or lower, by initial grade and vintage



Source: Moody's

...and so does CDO issuance

Global CDO issuance



Source: Securities Industry and Financial Markets Association

What went wrong?

- Excessive complexity
- Leveraged exposure to systematic risk
- Sensitivity to modeling error

Complexity

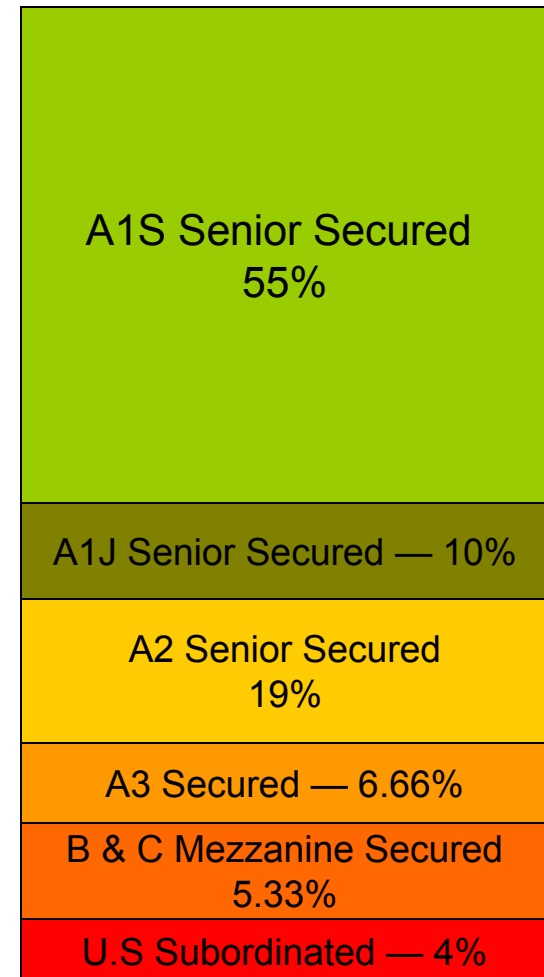
Tasman CDO

- \$300 million mezzanine-hybrid CDO²
- Deal date: January 11, 2007
- Lead Underwriter: UBS
- Capital Structure: 7 debt classes maturing in March 2047
- Assets: 64 CDO notes of various types

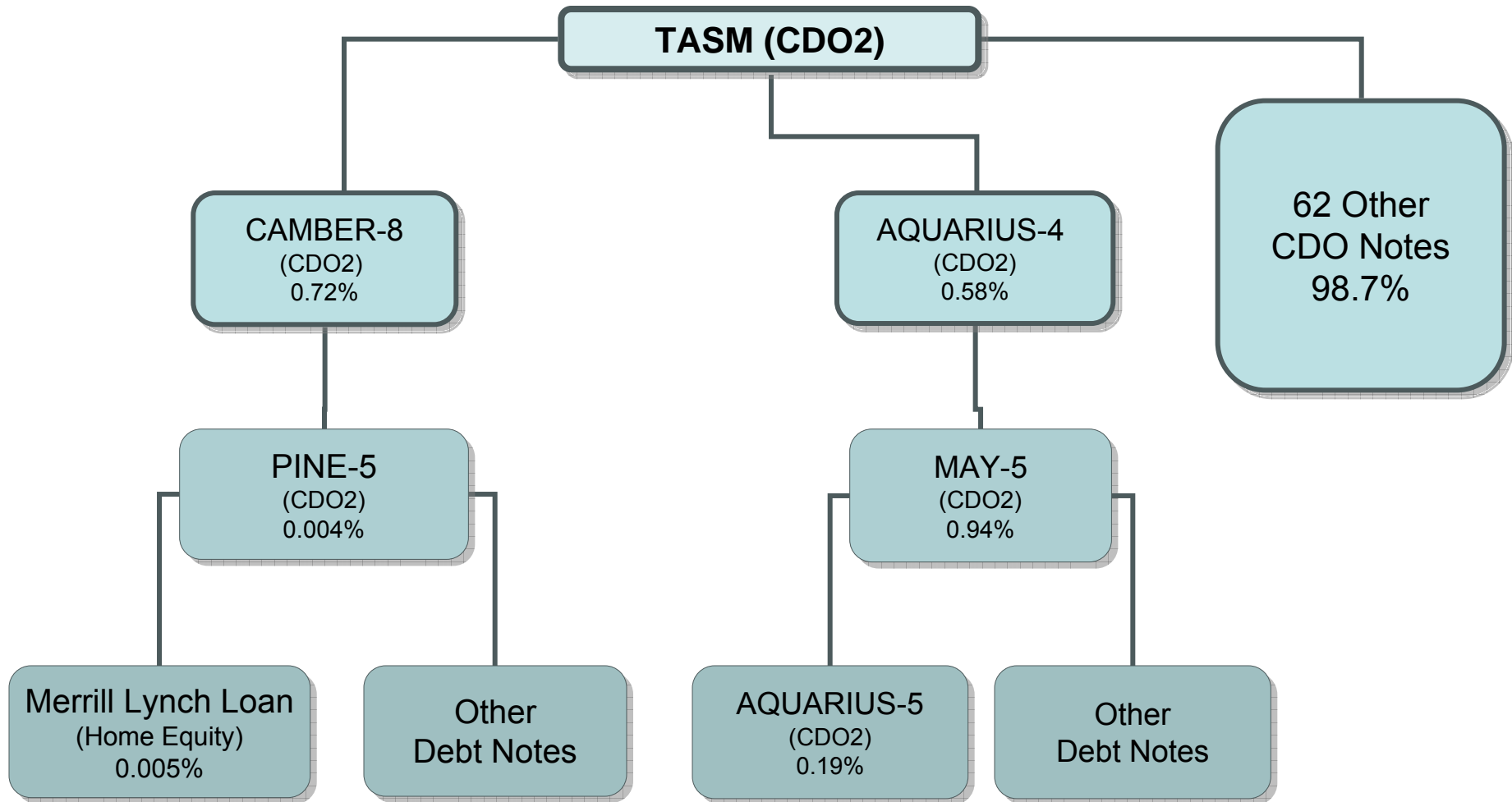
Tasman CDO – Liabilities

Class Name	Issue Amount (\$MM)	Initial Rating
A1S Senior Secured	\$164	Aaa
A1J Senior Secured	\$30	Aaa
A2 Senior Secured	\$58	Aa2
A3 Secured Deferrable	\$20	A2
B Mezzanine Secured Deferrable	\$12	Baa2
C Mezzanine Deferrable	\$4	Ba1
U.S Subordinated	\$12	NR

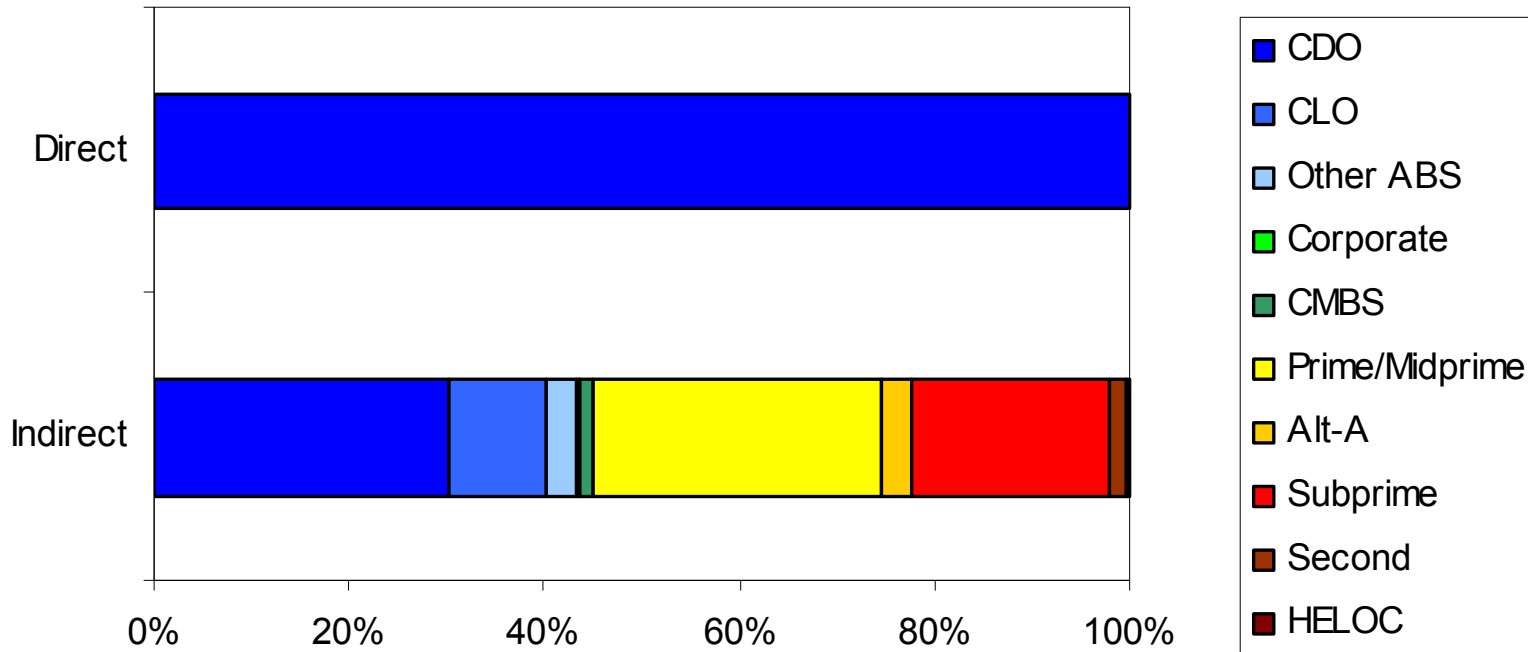
Maturity: 03/21/2047



Tasman CDO – Assets



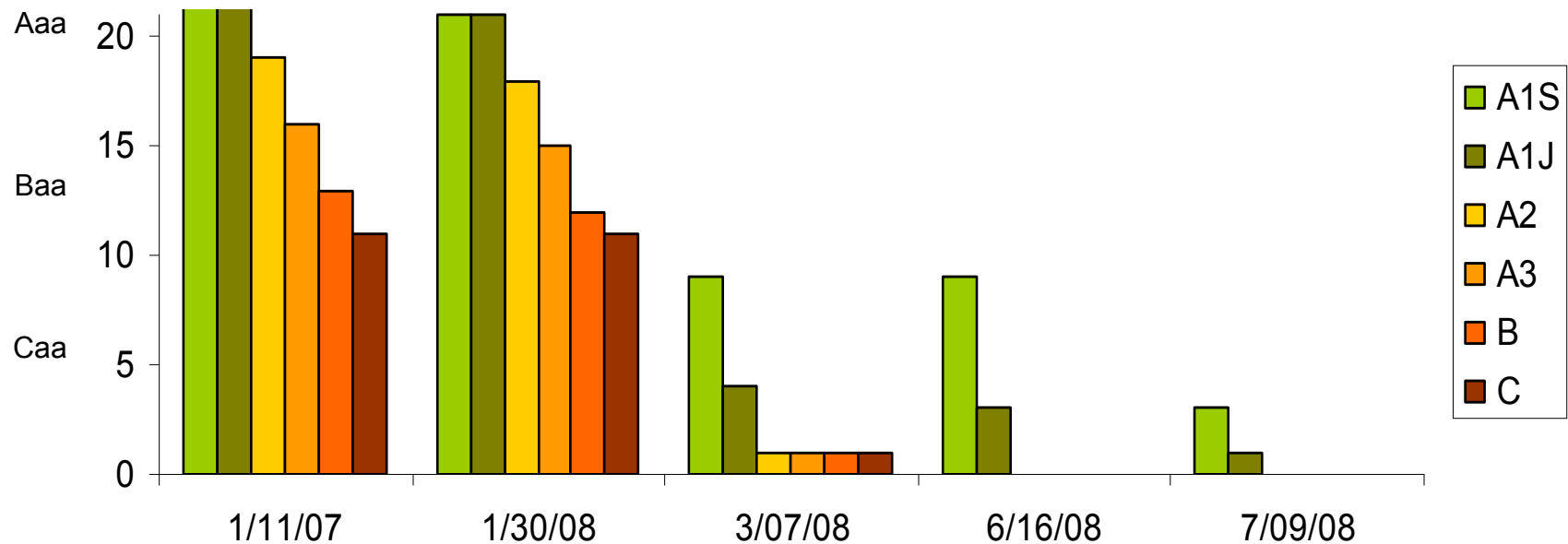
Tasman CDO – Assets



Note: "Indirect" exposure tabulated at three-level depth.

Tasman CDO – Performance

Tranche Credit Ratings (21 Notch Scale)



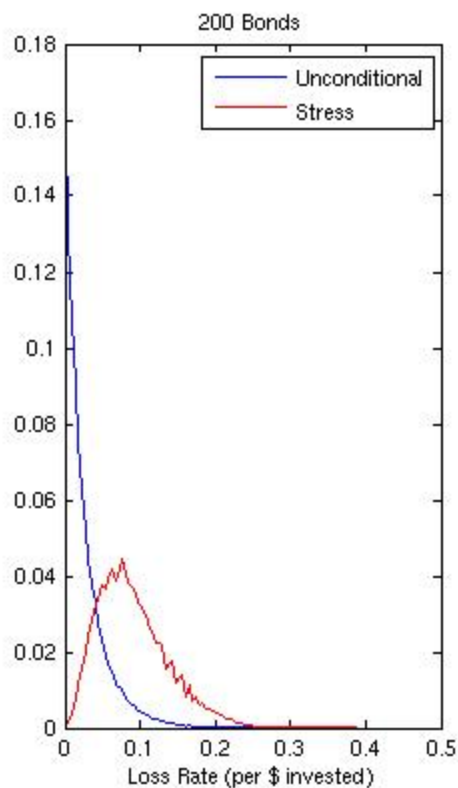
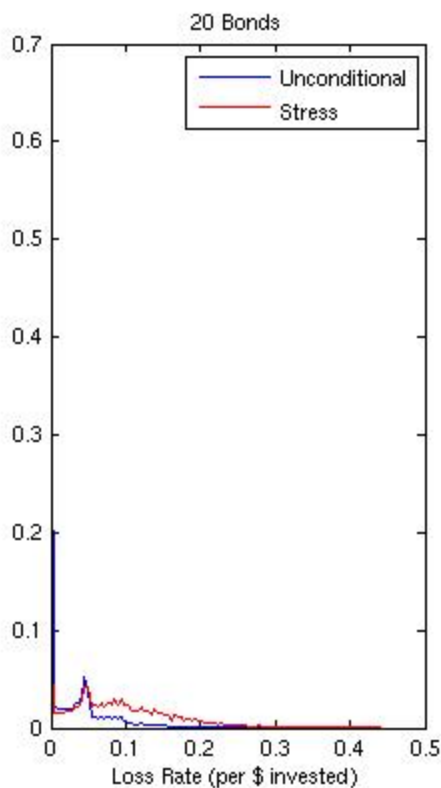
Entered accelerated repayment on March 17, 2008

Leveraged exposure to
systematic risk

Pooling assets does not reduce systematic risk

- Performance of collateral assets depends on two types of risk factors
 - Idiosyncratic factors unique to each asset (e.g., quality of a firm's management, homeowner's individual financial condition)
 - Systematic factors shared by all assets (e.g., macro environment, aggregate home price appreciation)
- Pooling assets limits importance of idiosyncratic risk
 - Law of Large Numbers implies that loss rate for a pool of securities is less volatile than the loss rate for an individual security
- But pooling assets does not diminish systematic risk
 - Systematic risk factors induce correlations in losses across securities
- Loss rate for a large pool of securities has less dispersion overall, but systematic factors play a bigger role

Large asset pools may not be safer under systematic stress conditions



Loss Exceedance Probabilities (%)

Num. of Bonds	Loss > 5%	Loss > 10%	Loss > 15%
Unconditional			
20	18.6	6.3	2.0
200	16.3	3.1	0.5
Systematic Stress*			
20	67.2	39.4	16.5
200	81.2	37.5	11.6

* Assumes 99th percentile draw of systematic risk factor

Senior tranches are sensitive to macro shocks

- Senior tranches are always safer than junior tranches of the same CDO

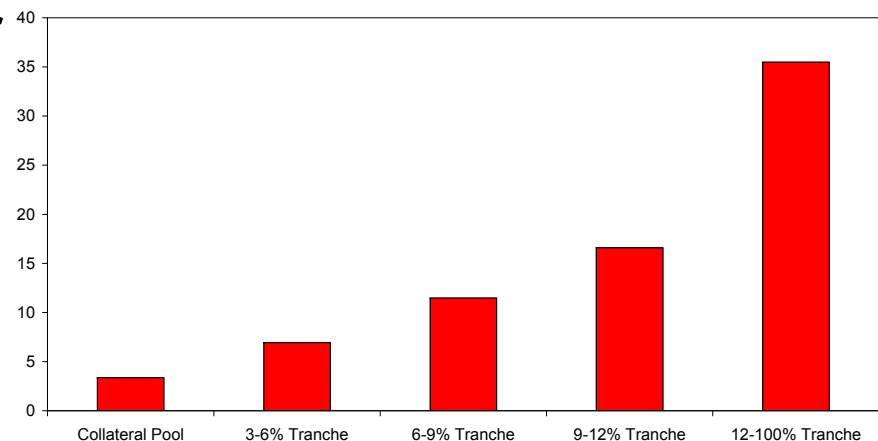
Expected Losses (%) for Simulated CDO Tranches

Tranche	Unconditional Expected Loss	Stress Condition Expected Loss*	Ratio
Collateral Pool	3.5	11.7	3.4
3 - 6%	10.4	72.0	6.9
6 - 9%	3.6	39.8	11.5
9 - 12%	1.2	20.4	16.6
12 - 100%	0.0	0.5	35.5

* Stress condition assumes 99th percentile draw of systematic factor.

- But credit performance of senior tranches is more sensitive to systematic shocks

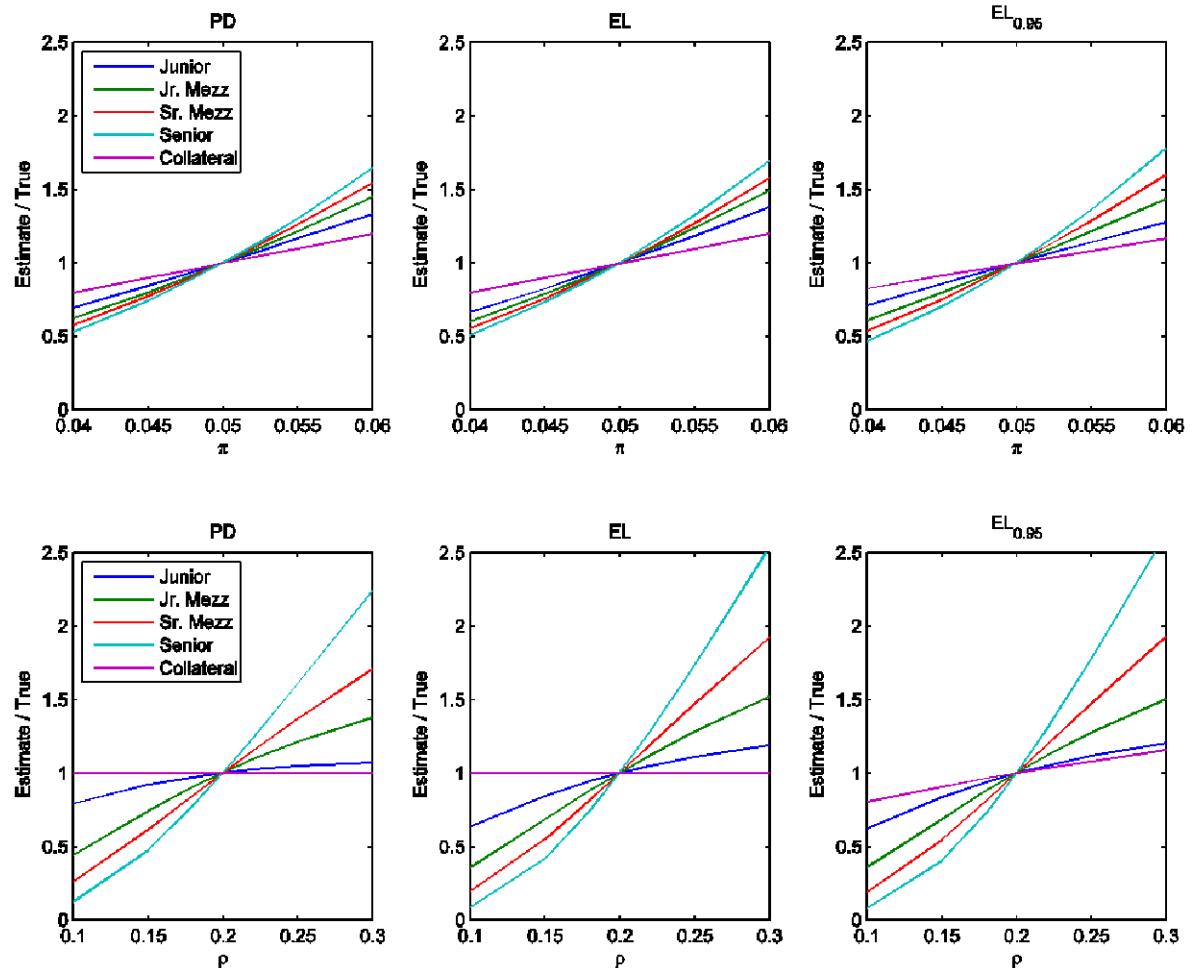
Ratio of Stress Expected Loss to Unconditional Expected Loss
Simulated CDO of 200 Mezzanine Bonds



Model risk

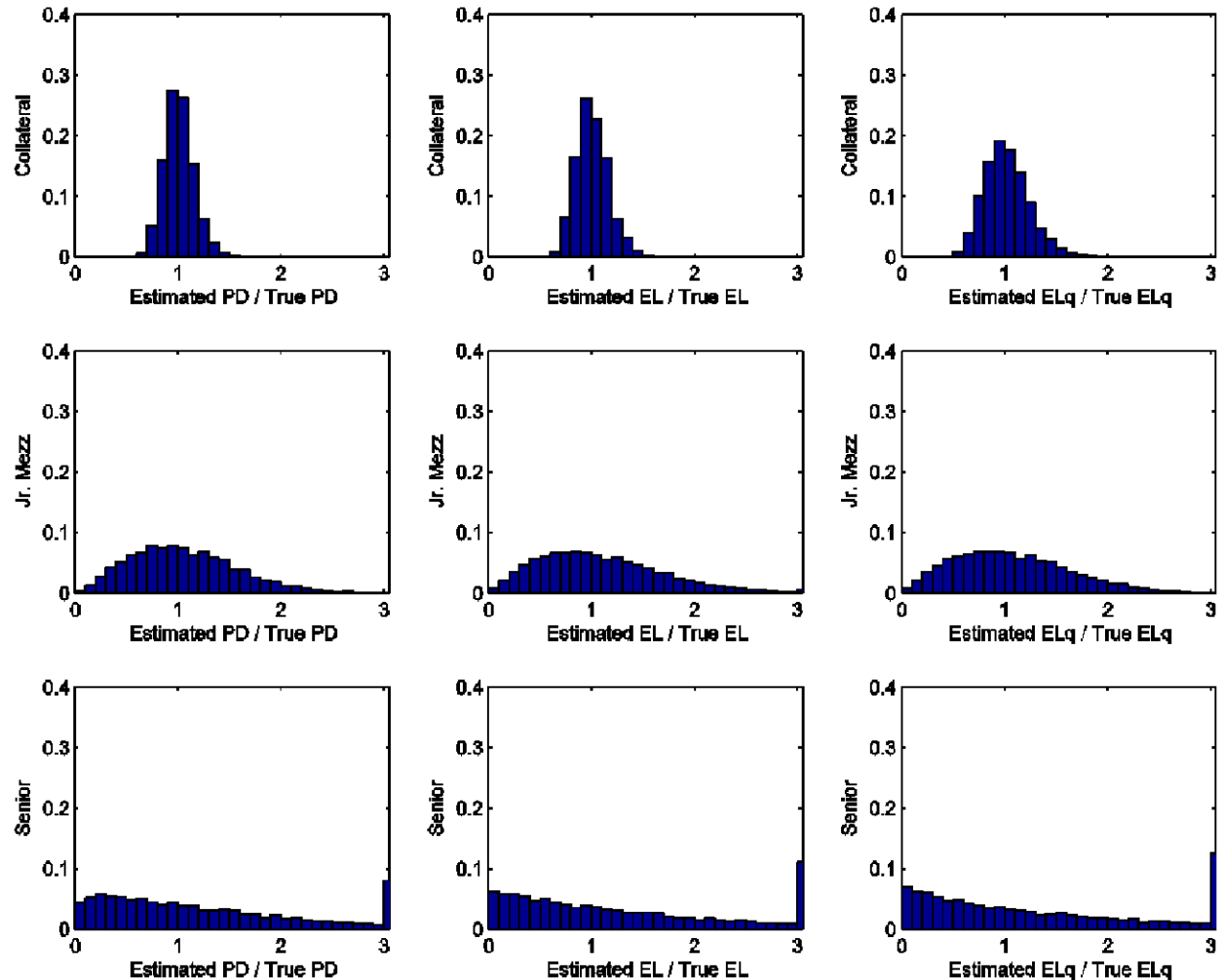
Senior tranche risk metrics are more sensitive to model errors...

Simulated CDO tranche probability of default (PD), expected loss (EL), and conditional expected loss ($EL_{0.99}$) as a function of collateral default probability parameter (π) and asset correlation parameter (ρ).



...so senior tranches are harder to evaluate given limited data

Simulated distribution of CDO tranche probability of default (PD), expected loss (EL), and conditional expected loss ($EL_{0.99}$) given historical data on the performance of 20 cohorts of 400 collateral bonds.



Conclusions

To a large degree, the potential for dramatic falls in ratings and valuations was “baked in” to the securitization process

- Complexity of exotic resecuritization deals made it difficult to evaluate risk exposures
- Pooling assets and structuring liabilities ensured that senior tranches would perform well under most circumstances, but would all fall together
- Credit rating and valuation models depended on limited data – could not accurately assess the likelihood of future losses

Looking Forward

Regulators and market participants are working to address identified problems

- Originators, underwriters, and sponsors created increasingly complex structured products, but did not always supply investors with sufficient information on the assets backing them
- Rating agencies underestimated the risk of RMBS and complex resecuritization products
- Financial regulators did not adequately distinguish between structured and unstructured credit exposures
- Investors, attracted to higher yields, relied on credit ratings, ignored exposure to systematic risk

Alternatives to structured MBS are expanding

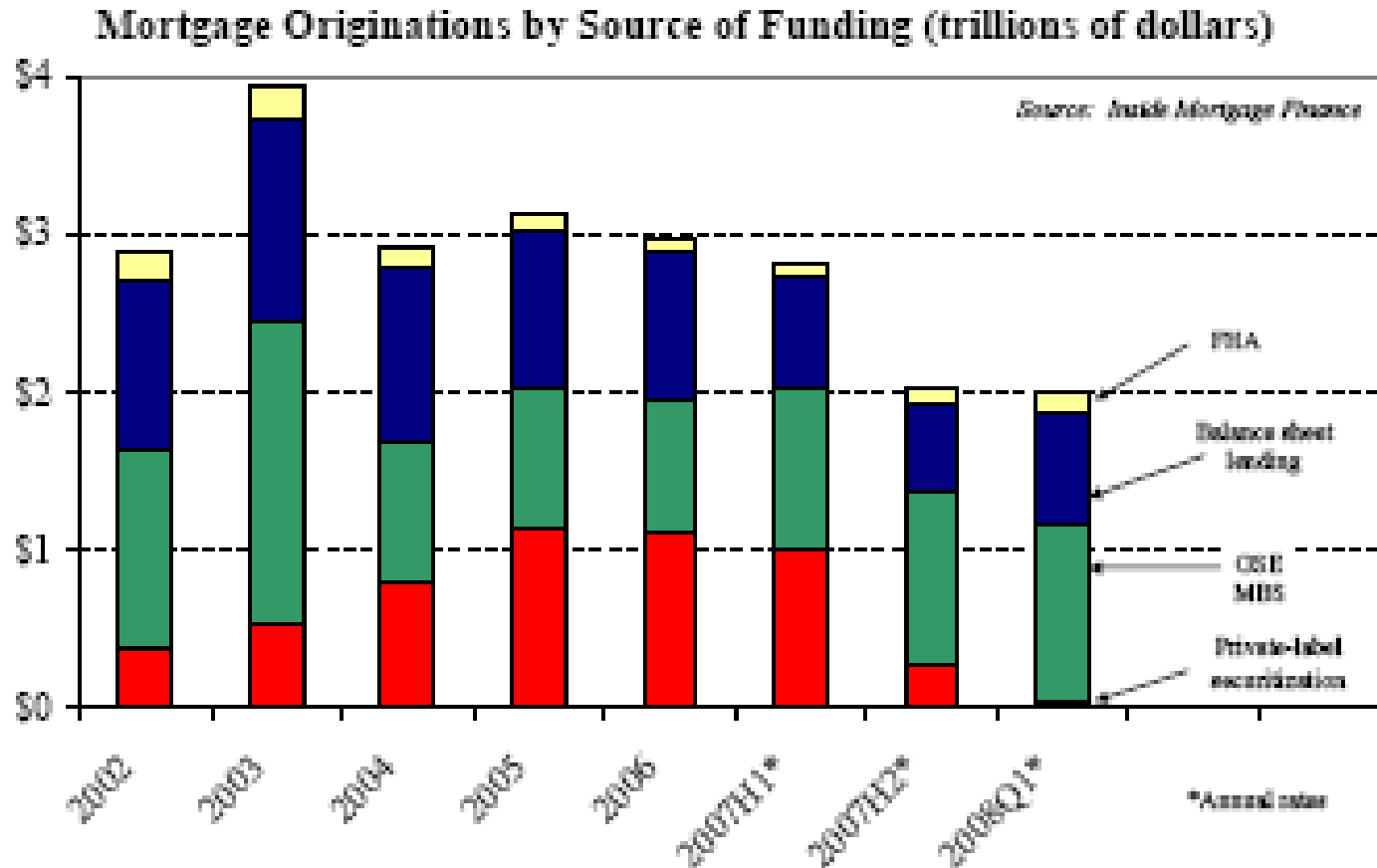


Figure extracted from *Best Practices for Residential Covered Bonds*, US Treasury Dep.

Covered bonds

- US regulators are promoting use of covered bonds to finance mortgage lending (July 2008)
 - FDIC clarified receivership treatment of covered bonds
 - Treasury articulated best practice standards for covered bonds
- Covered bonds offer an alternative funding source for banks
 - More flexible than deposits
 - Cheaper than unsecured bank-issued bonds
- Unlike securitization, covered bonds do not transfer credit risk
 - If collateral assets perform poorly, bank equity-holders bear first losses, not covered bond investors
 - Collateral performance only affects bond returns if the issuing bank defaults
- Effects on bank balance sheets
 - No direct effect on assets – pledged collateral stays with the bank
 - May increase risk to FDIC, uninsured depositors, and unsecured bond-holders
 - May make it easier for banks to manage liquidity

Will securitization come back?

- Greater emphasis on transparency and standardization
 - Example: standardization of credit default swap terms and central clearing of CDS contracts
- Rating agencies and other gatekeepers have become much more conservative
- Some structured finance products including resecuritizations such as ABS CDOs and CDO² may no longer be viable