

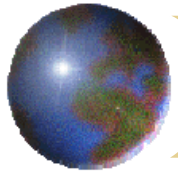
Rethinking Risk Management

PRMIA Presentation

April 2009

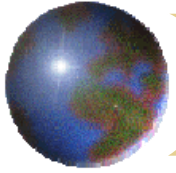
John C. Hull

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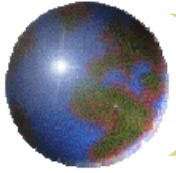
Agenda

- Brief history of events leading to the crisis
- Explanation of the derivatives that were created from subprime mortgages
- How risk management must change



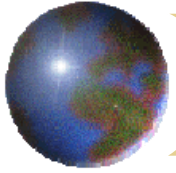
U.S. Real Estate Prices, 1987 to July 2008: S&P/Case-Shiller Composite-10 Index





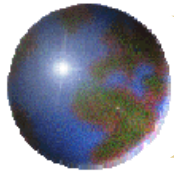
What happened...

- ❑ Starting in 2000, mortgage originators in the US relaxed their lending standards and created large numbers of subprime first mortgages.
- ❑ This, combined with very low interest rates, increased the demand for real estate and prices rose.
- ❑ To continue to attract first time buyers and keep prices increasing they relaxed lending standards further
- ❑ Features of the market: 100% mortgages, ARMs, teaser rates, NINJAs, liar loans, non-recourse borrowing

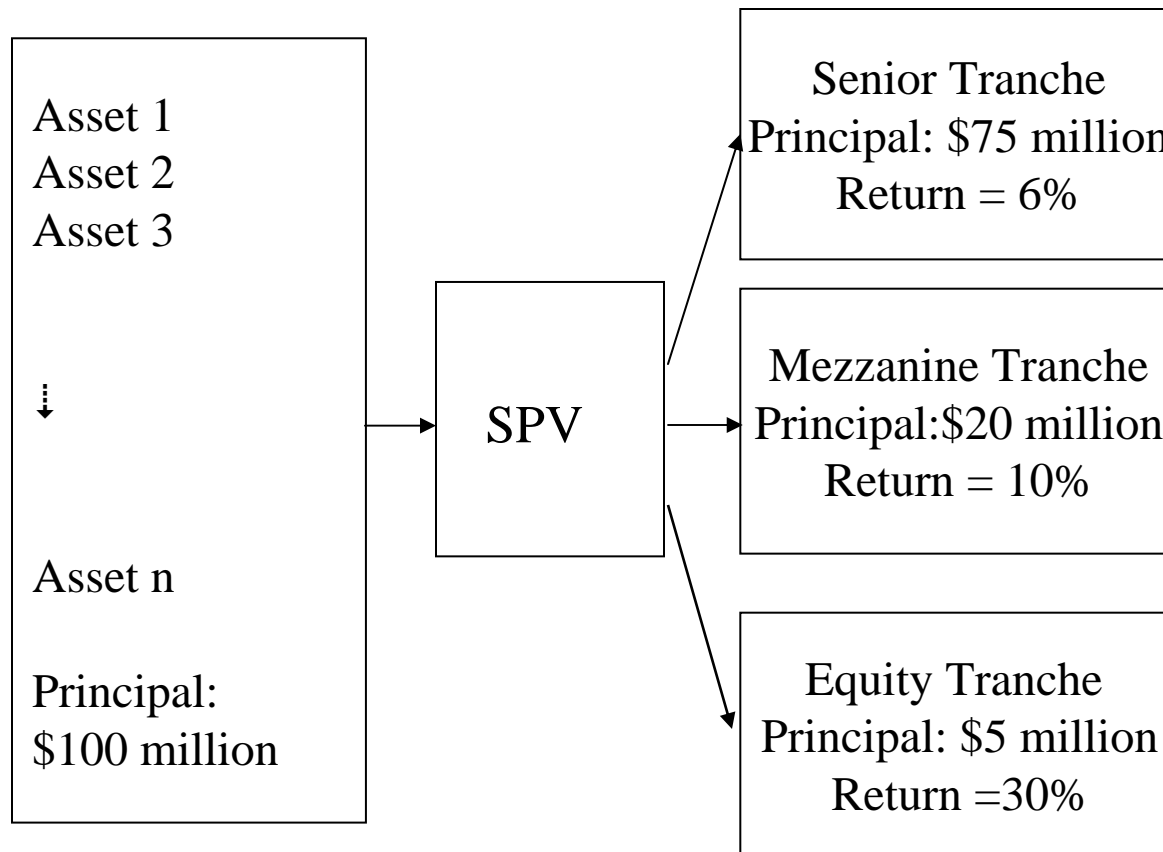


What happened...

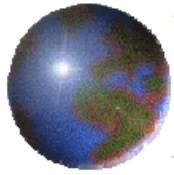
- ❑ Mortgages were packaged in financial products and sold to investors
- ❑ Banks found it profitable to invest in the AAA rated tranches because the promised return was significantly higher than the cost of funds and capital requirements were low
- ❑ In 2007 the bubble burst. Some borrowers could not afford their payments when the teaser rates ended. Others had negative equity and recognized that it was optimal for them to exercise their put options.
- ❑ U.S. real estate prices fell and products, created from the mortgages, that were previously thought to be safe began to be viewed as risky
- ❑ There was a “flight to quality” and credit spreads increased to very high levels



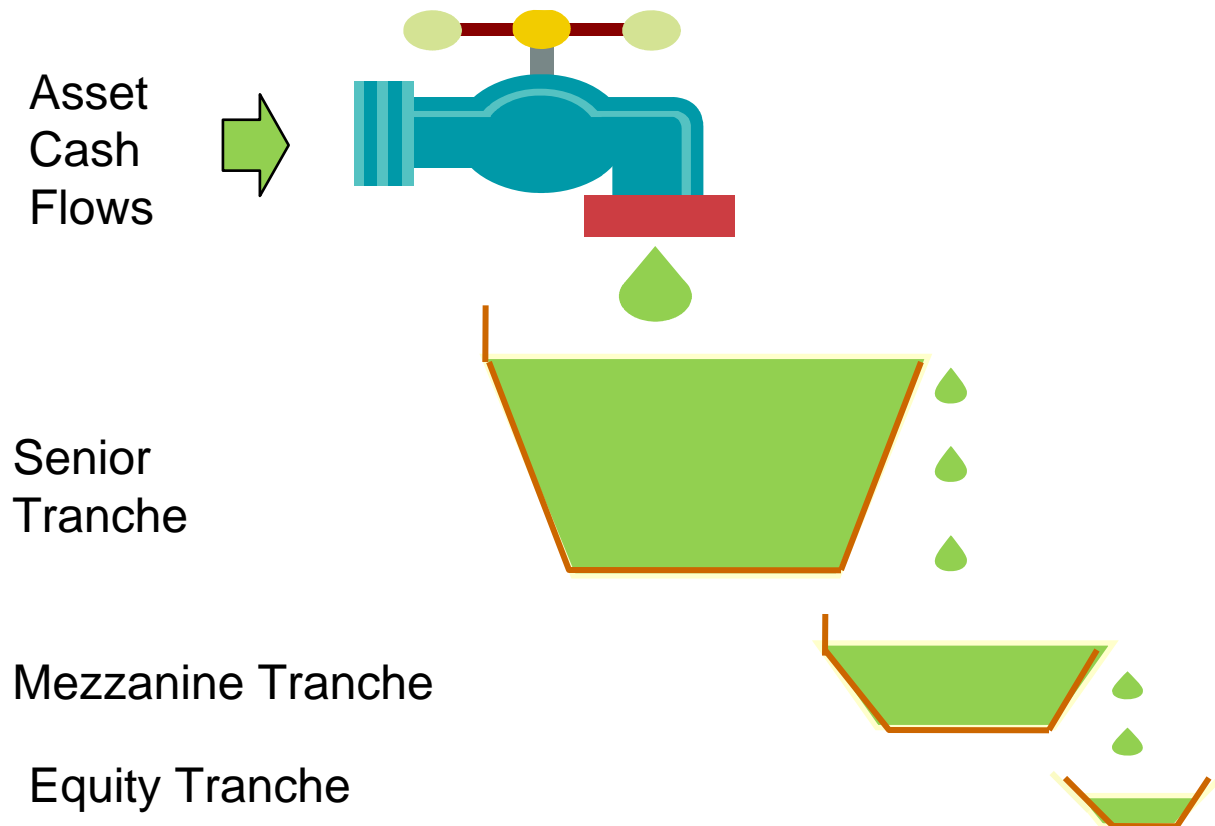
Asset Backed Security (Simplified)

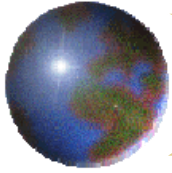


A “waterfall” defines the precise rules for allocating cash flows to tranches

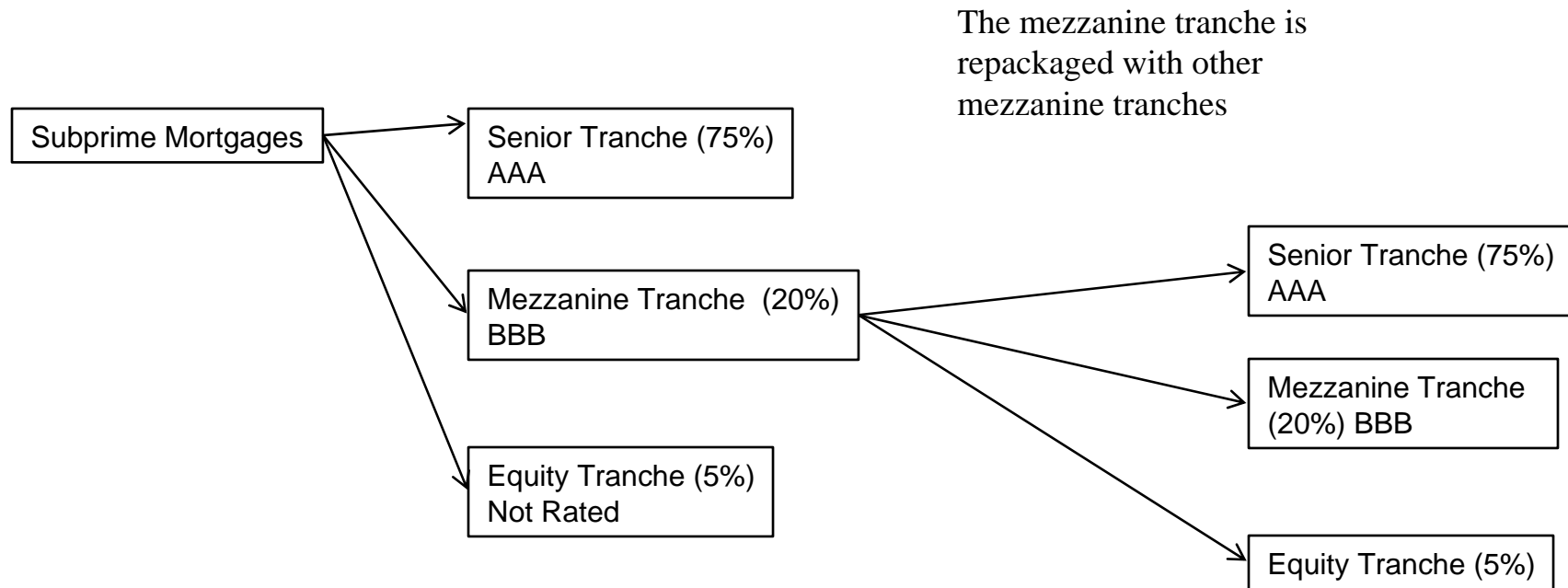


The Waterfall

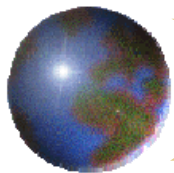




ABS CDOs or Mezz CDOs (Simplified)

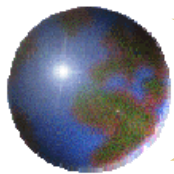


How much of the original portfolio of subprime mortgages is AAA?

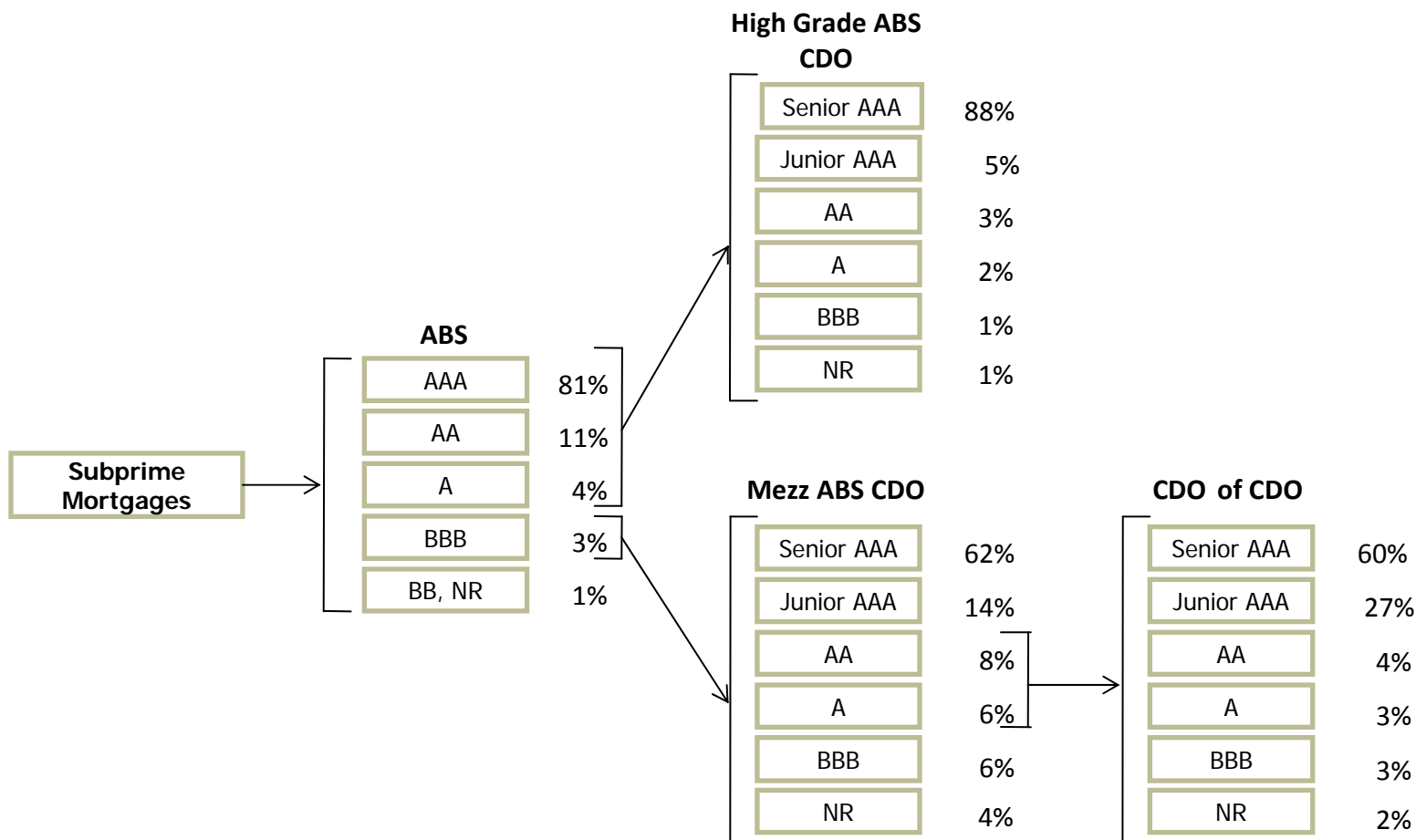


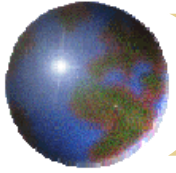
Losses to AAA Tranche of ABS CDO

Losses on Subprime portfolios	Losses on Mezzanine Tranche of ABS	Losses on Equity Tranche of ABS CDO	Losses on Mezzanine Tranche of ABS CDO	Losses on Senior Tranche of ABS CDO
10%	25%	100%	100%	0%
15%	50%	100%	100%	33.3%
20%	75%	100%	100%	66.7%
25%	100%	100%	100%	100%



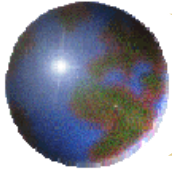
A More Realistic Structure





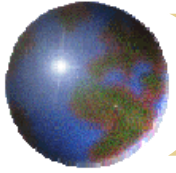
What is different about rating structured products compared with rating bonds?

- Bond ratings are based on judgment; structured product ratings are based on a model
- Structured products required a assumption about correlation
- Ratings for structured products tend to be “negotiated” ratings
- Structured products are arguably more likely to be downgraded than bonds
- Getting accurate information on structured products for inputs to a model is difficult



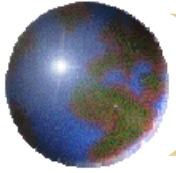
Key Mistakes Made By the Market

- Assumption that factors are normally distributed
- Assumption that a BBB tranche is like a BBB bond



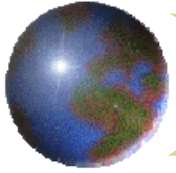
Need to Align Interests of Originators and Investors

- ❑ There is evidence that mortgage originators used lax lending standards because they knew loans would be securitized
- ❑ For a rebirth of securitization it is necessary to align the interests of originators and investors
- ❑ My suggestion: when credit risk is being transferred originators should be required keep some percentage (say 20%) of each instrument created



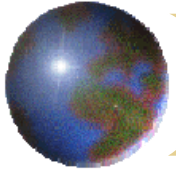
Role of Compensation Plans

- ❑ Short term compensation (the end-of-year bonus) is the most important part of the compensation for many employees of financial institutions
- ❑ This creates short term horizons for decision making
- ❑ Bonuses should be based on performance over a longer period than one year (e.g., 5 years)



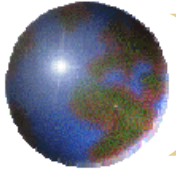
Need for Models

- ❑ Most financial institutions did not have models to value the tranches they traded (It appears that they did not follow their own procedures on this)
- ❑ ABS CDOs have the same structure as CDO squareds which synthetic CDO traders find difficult to value
- ❑ Without a valuation model risk management is virtually impossible



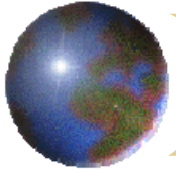
More Emphasis on Stress Testing

- ❑ We need more emphasis on stress testing and managerial judgement; less on the mechanistic application of VaR models (particularly when times are good)
- ❑ Senior management must be involved in the development of stress test scenarios



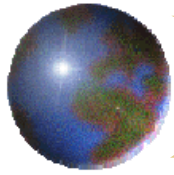
Liquidity Risk

- ❑ More transparency in securitized products and other complex OTC products (use software to describe products?)
- ❑ Funding risk needs to be monitored more carefully
- ❑ Bid-offer spreads are declining, but “liquidity black holes” are occurring more frequently
- ❑ Positive vs negative feedback trading
- ❑ A uniform regulatory environment may not be good for liquidity risk



Systemic Risk

- Clearly regulators need better ways of monitoring systemic risk.
- OTC trades have to be collateralized and a registered in some way with regulators
- Clearly international co-operation is necessary on this



Above all else....

...we must try and avoid irrational exuberance