AIG and CDOs

Case 3

AIG

AIG is a very large insurance company – with about $1 trillion of assets before the 2008 crisis.

During 2008 it lost $99 billion. AIG had created a market in “wrapping” assets that were not AAA rated and insuring against default. This wrap transferred AIG’s AAA rating on to the asset.

Many of these assets went wrong in the crisis:

- AIG lost by investing collateral received in real estate investments, and lost $21 billion
- AIG sold CDSs on tranches of CDOs on MBSs – and lost over $30billion

The real estate investment was just poor risk-management.

The CDOs were much more interesting.

MBSs and CDOs

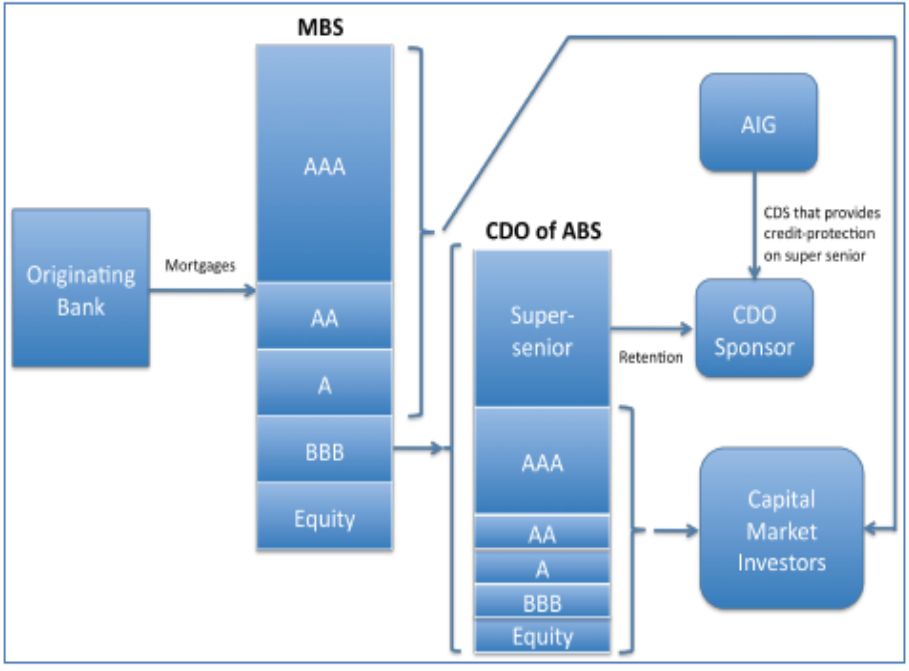
An MBS (mortgage-backed security) is made up of a bundle of mortgages, and the MBS structure receives all the payments by the mortgagees.

The cash flows first to the AAA tranche, until it has received all its share, and then to AA, etc.

A “cash waterfall”

Since the AAA tranche gets their cash first, they will receive 100% of the expected unless there is a significant failure of mortgage payments.

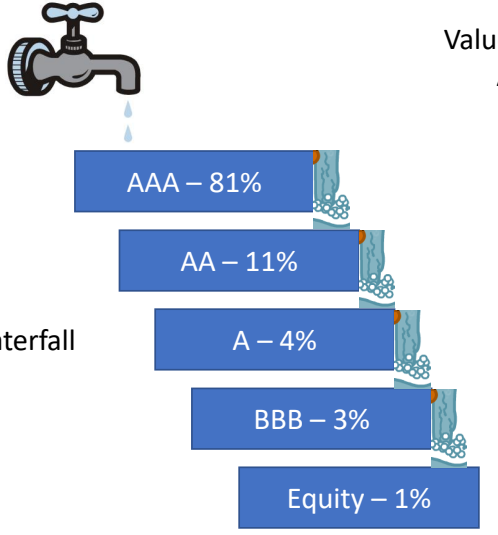
The BBB tranche will only receive any cashflow if all the tranches above have been fully satisfied.



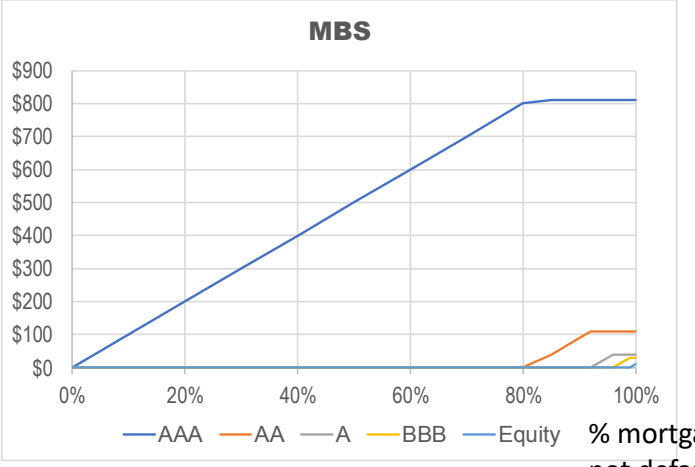
How sensitive are MDSs and CDOs to mortgage default?

Using Hull's example (Fig. 6.5) for the ABS / MBS, and a $1000 ABS:

The cash waterfall



Value of ABS



% mortgage not defaulted

Collateralised Debt Obligations

MBS-1

	Cashflow	Tranche	% share	Cashflow	Par
Par cashflow	1000				
		AAA	81%	810	
Actual Cashflow	1000	AA	11%	110	
% of cashflow	100%	A	4%	40	
		BBB	3%	30	
		Equity	1%	10	

MBS

High-grade CDO

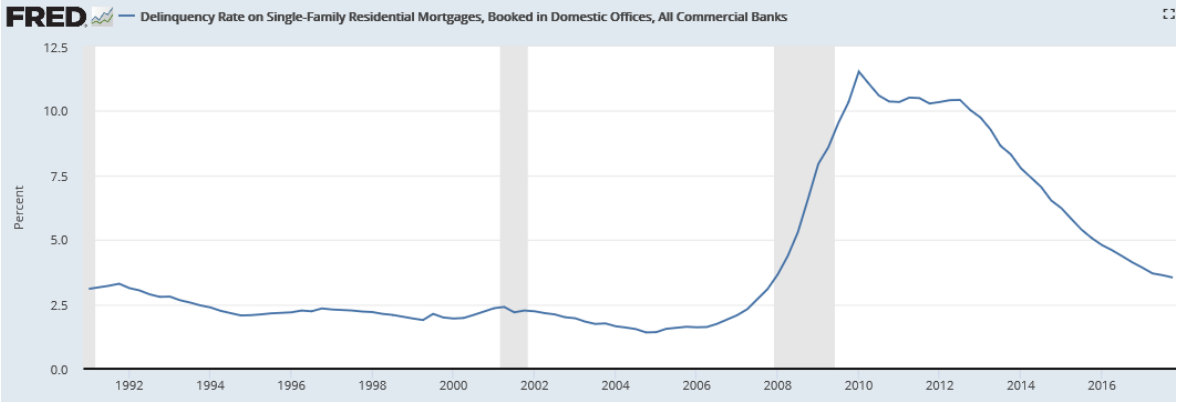
	Cashflow	Tranche	% share	Cashflow	% of full
Par cashflow	960				
		Super-senior	88%	845	100%
Actual Cashflow	960	AAA	5%	48	100%
		AA	3%	29	100%
		A	2%	19	100%
		BBB	1%	10	100%
		Equity	1%	10	100%

Mezz ABS CDO

	Cashflow	Tranche	% share	Cashflow	% of full
Par cashflow	30				
		Super-senior	88%	26.4	100%
Actual Cashflow	30	AAA	5%	1.5	100%
		AA	3%	0.9	100%
		A	2%	0.6	100%
		BBB	1%	0.3	100%
		Equity	1%	0.3	100%

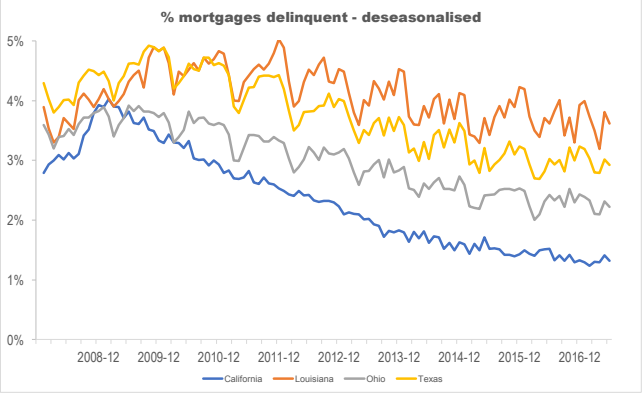
- BBB tranche of MBS was difficult to sell
- Add a diverse bundle of BBB tranches from MBSs from other states, other types of mortgages. Hope they diversify well.
- Then try to parcel up the tranches again, with cashflow waterfall to make sure any cash first goes to the super-senior tranche.

US mortgage defaults



- US mortgage rate “delinquencies” historically were about 2.3%, and well-diversified geographically.
- In 2008-20010 they rose rapidly to over 12%
  - ~20% of “delinquencies” are sorted out, so no eventual loss.
- That is Probability of Default (PoD). How about Loss given Default (LGD)?
  - For remainder ~38% loss given default for 2005-2008 loans; 23% loss given default for pre-2005 loans
- Expected loss rises from 0.5% to 4.6%

Correlations



2008-09	California	Louisiana	Ohio	Texas
California	1	0.45	0.64	0.47
Louisiana	0.45	1	0.79	0.93
Ohio	0.64	0.79	1	0.88
Texas	0.47	0.93	0.88	1

2015-16	California	Louisiana	Ohio	Texas
California	1.00	0.02	0.13	0.16
Louisiana	0.02	1.00	0.73	0.71
Ohio	0.13	0.73	1.00	0.81
Texas	0.16	0.71	0.81	1.00

Not only did defaults increase in 2007-9, but also the correlations between regional data increased

- Very obvious between California and the rest of the market.
- Most states saw the same effect.

Data more available after the event, but we see a return to pre-crash normality.

- Defaults dropping
- Correlations dropping (especially for California with the rest of the States)

Answers:

2-3 slides and 5 minutes presentation on some facet of the case for next Monday

Report the following Monday:

- Explain how a large bundle of relatively weak BBB-rated mortgages could be turned, through the use of CDOs, into AAA-rated debt.
- Explain the importance to the risk evaluation of assumptions about the correlation of mortgage defaults. What caused those assumptions to fail?
- Was this just a temporary liquidity problem brought on by disagreement over Mark-to-Market pricing that would go away as the insurance policies and CDOs reached maturity, as AIG claimed? Or was this a fundamental insolvency issue from AIG making bad bets in the financial markets? Or both?
- What went wrong with their risk management processes? How would you have strengthened the risk management process? What other measurements might you have used, and how would they have helped prevent the failure?
- Consider a BBB-tranche from a mortgage-backed securitisation deal (MBS) as shown in Exhibit 4. Assume, for simplicity's sake, that this is a zero-coupon security – so all the value is exchanged at maturity. Also assume that:
  - The mortgage pool as a whole is worth $1 million.
  - MBS AAA tranche is 80% of original mortgage pool, other tranches are 5% each.

  Construct a pay-off diagram at maturity showing the payoff to holders of the BBB tranche as a function of the value of the underlying mortgage pool.
- A CDO is made up from four BBB tranches from MBSs from different US States. If the super-senior tranche of the CDO backed by the BBB-tranche of the MBS above is 70% of the combined face value of all the CDO tranches, and the MBSs in all states are perfectly correlated, draw the pay-off diagram for the Super-Senior tranche as a function of the value of the underlying mortgage pool. How would the diagram change if the four tranches had a correlation of 0?
- Summarise in one paragraph (less than 100 words) the main 1 or 2 mistakes made by AIG that led to the loss.
- 5-10 pages + any appendices of calculation – Either essay or by question