

Credit securitisation and system stability

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The leveraging of credit that precipitated the subprime crisis was vectored via a proliferation of investment vehicles and credit derivatives, driven in part by competitive pressures to enhance returns by economising on economic capital. Theoretically, this should have spread risk and improved economic efficiency, but in practice it exposed the system to a meltdown. Critical points for system stability are the certification of credit equivalence required by decentralised information trading, and the portfolio equivalence of credit default swaps and physical loan book. Deficiencies can pass via systematic risk to systemic risk. Regulatory implications include full liability recognition for credit default swaps, enhanced tests for fiduciary duty, and periodic advisories as to state dependence of credit ratings.

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The credit crunch & credit securitisation

The credit crisis has been (is) both an economic and financial meltdown.

While the antecedents might have existed for an economic slowdown, it was precipitated and aggravated by a financial crisis that had structural origins:

- In the extensive securitisation of credit risk;
- More controversially, in shortcomings in financial regulatory systems, notably
 - Some regulatory regimes allowing banks activities that levered up risk on scarce economic capital
 - Loopholes opened by credit default swaps and similar instruments
- Other influences, especially managerial pressures and incentives to enhance returns at a time of falling world interest rates.

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Credit securitisation & the crisis

- The purpose of this talk is to expand on the securitisation aspect:
 - its nature and motivations;
 - its limitations; and
 - appropriate regulatory responses.
- A history and exposition of the crisis to March 2009 can be found by going to:
 - [http://www.wellesley.org.nz/papers_public.asp *The subprime crisis and the economic fallout*].
- The present talk is loosely based on a paper provisionally entitled "Credit securitisation and system stability"

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Starting note: Banks are special

- They form the payments system
- They act as funds recyclers
- Have very different balance sheets to other (non-financial) companies
 - Almost all banks' assets are financial – mainly forms of lending
 - Very small % of fixed assets – buildings & equipment
 - Large % of debt on the liabilities side: deposits & wholesale funds
 - Relatively low % of capital (e.g. equity) – very high gearing
- Banks manage significant financial risks as a natural part of their business, key of which are:
 - Credit risk: from lending activities & other contracts
 - Liquidity risk: their business naturally attracts short term liabilities (deposits), and long term assets (e.g. mortgages)
 - Market risk (e.g. Interest rate risk, FX risk, other trading book risk...)
- For all of the above reasons, banks are regulated

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Banks & the need for regulation

- Another differentiating feature of banks is their relatively low return on assets; yet their return on equity is (under normal conditions) as high as other companies.
- $ROE = ROA * \text{Assets/Equity}$ ($ROA = \text{Profit/Assets}$)
- Shareholders always want higher ROE. Banks can deliver this by increasing their ROA, or by increasing leverage (economizing on capital).
- Hard to increase ROA
 - bank margins falling over time (the difference between what banks earn from lending and pay on deposits and other liabilities)
 - depositors wish to be paid more interest; borrowers wish to pay less
- To protect the financial system, regulators have put in place capital adequacy requirements for banks
 - Basel I & Basel II are international initiatives to protect global financial systems by ensuring banks are sufficiently capitalised

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The securitisation explosion



Although antecedents existed for some of the instruments, the years 2000-2006 were marked by an explosion of instruments and their use, that securitised credit in one way or another.

Many of these followed a common model of originating loans and repackaging them into securities that could be sold off to a special entity or investing clientele.

Same or similar model was applied to home mortgages, commercial loans, credit card debt (ABS). The packages were often divided into 'tranches' of successively better credit quality.

Generically, could all be called credit securitisation.

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Structures in the subprime crisis

Many banks in the US and UK, seeking higher market share and returns on shareholder funds, economised on capital by using *structured investment vehicles (SIVs)* and other conduits.

- 'Originate and distribute' model
 - Generating fees was the intention for banks under pressure
- Net effect was to move mortgages off balance sheet, economise on bank capital
 - If one bank within a trading region (e.g. UK) was allowed to use the model, then all banks needed to follow suit

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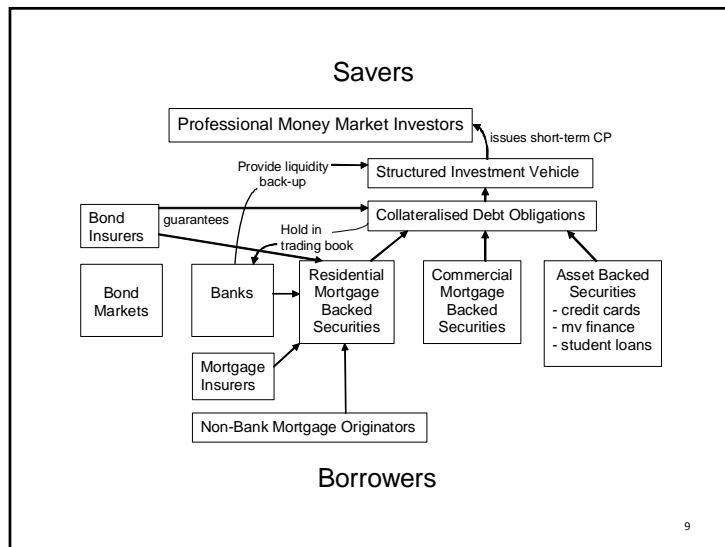
How a typical structure worked:

Subprime lending structures - continued

1. Bank or other lender (e.g. Countrywide) originates home mortgages and repackages them, often in tranches of different quality (securitisation).
2. The higher quality tranches are insured by 'monoline insurers' (e.g. AMBAC, MBIA) or have credit default swaps protection with counterparties (e.g. AIG)
3. SIVs purchase mortgage packages from the banks
4. SIVs finance purchases by issuing commercial paper (CP, mainly short term debt), collateralised by the mortgages
5. Banks support the SIV CP issues by undertaking to purchase any shortfall or otherwise provide liquidity to SIVs. (Ensures better rating for SIV – lower funding cost)

Worked well for a while

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The fallout!

Nothing very wrong with the securitisation concept itself, indeed it had been praised as a way of distributing risk to those who can best bear it, e.g. hedge funds who buy the lower grade debt.

A weak point was the liquidity exposure of the whole structure. From 2006, as US economy turned down, housing repossessions soared.

- ↓ Investor confidence in SIV (conduit) assets plummeted.
- ↓ The CP market dried up and SIVs could not refinance.
- ↓ Banks had to step in and supply the liquidity on terms that were now too generous given the impaired quality of SIV (conduit) assets.
- ↓ As the crisis spread, other institutions were affected by loss of liquidity and confidence.
- ↓ UK banks had to take back conduits' impaired assets onto their own balance sheets stressing their capital adequacy positions and their returns.
- ↓ Central bank intervention to ease liquidity, and in many cases government guarantees extended.

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Decomposing Credit

Credit securitisation itself operated on different levels, by decomposing credit.

A corporate loan or bond (pricing) could be 'deconstructed' as:

- A very high grade base such as US Govt or World Bank;
- A credit margin or spread on top, that would vary according to the credit quality of the borrower.
- In principle, the two elements could be separated and sold off separately.
- This was often done by creating credit default swaps (see later slides).
- But a variety of other credit derivative instruments were also originated and traded
- Index products also created.

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Credit, certification and conditionality

Certification has always been vital to the debt markets. The ratings by majors such as Moody, Standard and Poor, and Fitch are relied on by:

- Investors, in portfolio decisions
- Corporates, in pricing for debt issuance
- Regulators, in deciding how much capital banks should be required to set aside to cover potential default or downgrades. The Basle II Standardised Approach specifically incorporated credit ratings.
- Historically, credit ratings have always been extremely important in determining how debt is priced, and even the type of debt to be issued.

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Credit ratings & debt products

During the subprime build up, structured debt products relied heavily on credit ratings:

- Banks and investment banks would create structured investment vehicles whose assets were successive tranches of mortgages and other types of debt obligations
- These SIVs would fund by issuing longer term debt of their own, but largely by rolling over commercial bills
- It would not be possible to sell this debt at fine pricing unless it had a strong credit rating, e.g. the senior tranche had to be AAA.

Credit ratings were important in other types of instrument, such as credit default swaps.

Credit ratings were effectively qualifications for entering the financial network as whole. In a globalised system investors relied on ratings as an informational base.

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Rating grades for long-term debt and issuer credit assessment

S&P	Moody's	Fitch	Interpretations
AAA	Aaa	AAA	Extremely strong High quality
AA+	Aa1	AA+	
AA	Aa2	AA	Strong payment capacity
AA-	Aa3	AA-	
A+	A1	A+	
A	A2	A	Adequate payment capacity
A-	A3	A-	
BBB+		BBB+	
BBB		BBB	Likely to fulfil obligations
BBB-		BBB-	
BB+	Ba1	BB+	High risk obligations
BB	Ba2	BB	
BB-	Ba3	BB-	
B+	B1	B+	Current vulnerability to default
B	B2	B	
B-	B2	B-	
CCC+	Caa1	CCC+	In bankruptcy, default or similar
CCC	Caa2	CCC	
CCC-	Caa3	CCC-	
CC	Ca	CC	
C	C	C	
D		D	

Credit ratings:
Concordance
between
Moody's, Fitch
Ratings and
Standard &
Poor's

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The credit raters come under heavy fire...



An ideal credit rating system should exhibit credit equivalence: an AAA rating for a structured finance tranche based on e.g. home mortgages, credit card debt, commercial loans etc, should have just the same probability of default or downgrade as e.g. US treasury or World Bank debt.

Relative credit equivalence was arguably built into regulatory systems in allowing a lower level of economic capital to be kept against structured finance products that carried AAA ratings.

(However sovereign AAA rated credit exposures carried zero capital requirements, while bank or corporate AAA exposures carried a 20% risk weighting.)

In mid 2008, the ratings majors severely marked down the liabilities of a range of institutions that had been active in or exposed to the subprime crisis. *Ex post* actions of this magnitude raised some serious problems about *ex ante*: why were such problems not earlier foreseen -- or if they were, why were they not built in?

And what other problems with the ratings, or with their use, might have been hidden in the woodwork?

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Criticisms that were raised (a)

1. Not an arms length relationship

- Ratings paid for by the debt issuers, not the investors
 - Potential self selection problems, arising from shopping round for the best rating.
 - Can lead to upward bias in published ratings
- SIV ratings, and other structured products, were a huge source of income to the agencies
 - Questions asked on the reliability of these ratings

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Criticisms that were raised (b)

2. Ambivalent nature of the certification process

- The scoring or historical approach, which estimates default probabilities over a long period – ‘10 year cycle’
 - [Even though based on the given current corporate accounting ratios for the firm being rated; e.g. firms with the same set of numbers will go broke on the average 2% over a ten year horizon.]
- The conditional model, often called the EDF (expected default frequency), and typically based on the Merton options interpretation of corporate debt.
 - These models estimate the probability of default over the coming period, conditional upon all sorts of information.
 - They do require modelling the intrinsic value of the firm, its asset value (difficult for new structures).

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The conditionality problem

For the Basle II Standardised Approach, capital adequacy ratios are based on the *historical model*.

This means that they have less reference to current states of the world (the ‘state vector’) that might have the potential to generate stress.

Example:

Option adjustable rate mortgages (ARMs) in the US had such potential. Homeowners could elect to pay a low interest rates for the first years of a mortgage (e.g. for 6% mortgage, pay only 2% for the first 5 years). The balance would be accumulated at the proper rate (6%). Even by 2006, 20% of these loans had accumulated balances more than the value of the house – negative owner equity.

If owners defaulted and walked away, this could precipitate a house price collapse that would see even prime borrowers – with conventional mortgages– also in negative equity.

Likewise the state vector might also include large contingent exposures that do not figure in the historical model.

Thus AIG had globally written huge volumes of CDS. But kept its AAA rating.

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Enter one of the villains...



What is a credit default swap (CDS)?

A derivative contract used to transfer risk

- from a credit protection buyer
- to a credit protection seller.

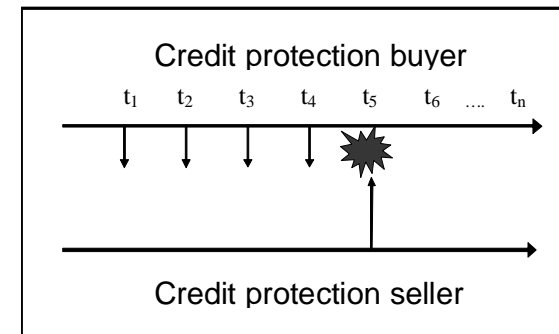
It operates very like an insurance policy.

The credit protection buyer pays a periodic fee of X basis points per year on a notional principal amount over a specified time (like series of premiums) to protect against a defined credit default ‘event’ by a specific reference entity. This could be default on a bond payment, bankruptcy, or credit down grade.

An AAA CDS --- money for nothing?

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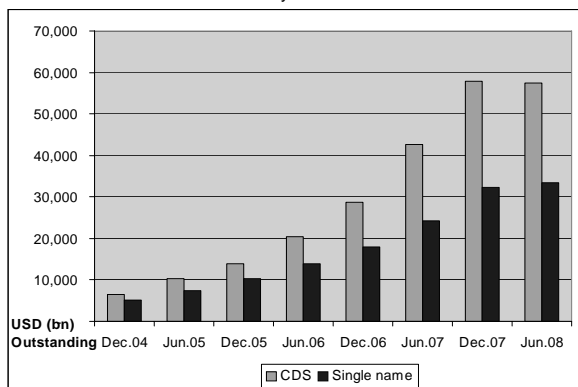
Credit event triggers payment



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Growth in Global CDS Market

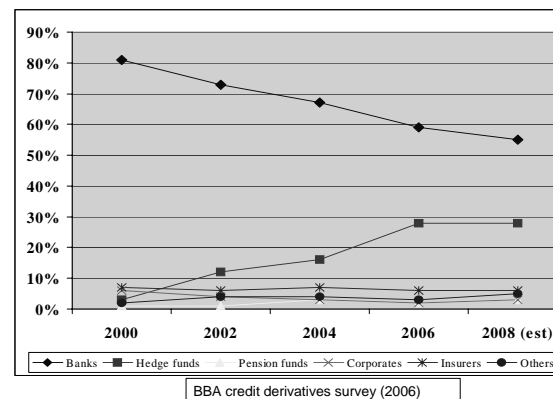
BIS data: Quarterly Review December 2008



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Credit Protection Buyers

% of total buyers by type



BBA credit derivatives survey (2006)

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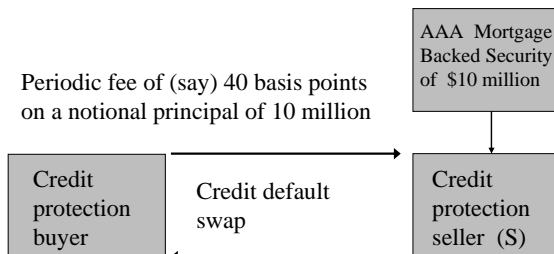
Credit Derivatives attract Investors

In the role of Credit Protection Sellers

- Access to new asset classes, for example:
 - Synthetic bank loans (without incurring the back office processing)
 - Ability to take a short position through selling the total return on bond or loan
- Can sometimes reduce transaction costs
- Permits leveraged positions on bonds, loans
- May enable exploitation of pricing disparities
- Exploitation of regulatory arbitrage
- Can isolate credit risk from interest rate risk
 - Applies to bought positions as well
- Synthetic assets can meet specific investment criteria

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Credit-linked Note example

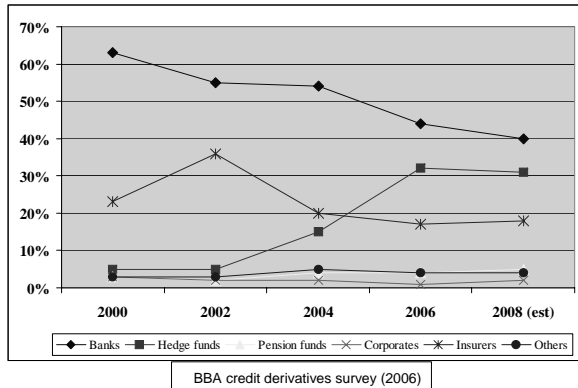


Payment contingent on default of 3rd party reference credit (e.g. bankruptcy, or obligation default of 3rd party). S pays difference between face value & new M-to-M on reference debt obligation.

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Credit Protection sellers

% of total sellers by type



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Portfolio equivalence

Q: *When is a loan not a loan?*

Ans: *When it is a credit default swap*

Recall, an ordinary commercial loan can be deconstructed into:

1. A very high grade base such as an AAA govt bond
2. A margin for credit that depends upon the borrower, the credit spread for the loan.

Portfolios of commercial loans are expensive to administer and require long term customer relationships, monitoring, book building etc.

So why not simply supply the credit spread component by receiving on a portfolio or CDS's?

This is 'portfolio reconstruction'.

Banks, including high street banks, built up large portfolios of CDS. They could be held as either bought (buying credit protection) or sold (selling credit protection)

Capital adequacy requirements remain very unclear as to the precise treatment of CDS. It appears likely that different national regulators applied a range of different treatments.

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Are synthetic loan portfolios really the same as home grown loans?

By the time that high street banks had built up their portfolios, traded CDS indexes had become established, notably CDX (US) and Itraxx (Europe).

This meant that early signs of trouble would quickly become reflected in the index.

Any individual CDS credit had a large systematic risk element reflecting co-movement with the CDX or Itraxx index.

And in contrast with local home grown and incubated credits, the CDS portfolio had a large international component.

So a CDS portfolio arguably had a large degree of systematic risk from the world markets the pricing of which would react to adverse news, and spread much quicker.

The individual credits within the portfolio would therefore be more highly correlated per unit of time than would the equivalent portfolio of local credit spreads.

... A CDS portfolio could be likened to catastrophe bonds.

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Policy Implications (a)

1. Economic capital
 - Needs to be tightened up with respect to implicit guarantees, including liquidity assurance
 - Credit default swaps are [bank] liabilities that take the form of assurances given on the basis of assets of some other party. A broader definition of bank assets should extend to this.
2. More attention to liquidity risk arising from maturity mismatches
 - For instance mortgage funding via commercial bills by NZ banks
3. Monitor counterparty exposures in the system
 - Better disclosure needed wrt exposures such as CDS holdings
 - CDS trades through central clearing houses would ensure trades collateralised through margining & would reveal concentrations of risk

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Policy Implications (b)

4. Recognition that credit ratings
 - Must be fit for the intended purpose;
 - Are inherently fuzzy;
 - As far as possible should exhibit credit equivalence
5. If credit ratings are long run in nature, issue financial health warnings when the economic state vector looks troublesome
6. Review tests for fiduciary duty of bank executives to ensure consistency with moral hazard
7. Review and issue risk guidelines for managerial incentives; make sure bonuses are sequestered for high volatility positions
8. Develop more rigorous tests for rescues, including just who needs to be rescued and why; rescue structures should as far as possible avoid future moral hazard

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That's all for now

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