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Understanding the structured credit crisis

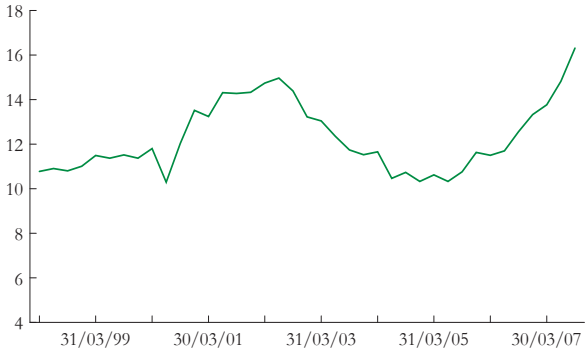
The financial crisis which is raging in the West is quite strange. Why is it that repayment problems in a very particular segment of the United States housing finance market (subprime mortgages) has degenerated into a generalised credit crisis which could have completely paralysed the international bank liquidity market without the repeated and massive intervention of the central banks? To understand this we have to delve into the arcane world of the financial model called the securitization of debts which has become prevalent in the United States since 2001. Recent studies have shown that this model leads to reduced risk aversion on the part of lenders and an under assessment of the risk attached to loans. The spreading of risk, which is the purpose of securitization, is accompanied by a loss of information on the risk of loans right along the chain, from the end borrower to the buyers of tranches of secured debt. This financial model has become a loss generating machine.

The origin of the problem: securitization without safeguards

Some orders of magnitude give an idea of the strength of the wave of debt which has gripped American households in the last ten years. Between 1996 and 2007, mortgage debt and house prices have multiplied three-fold, while other household debts (credit cards, car loans, student loans) have doubled. Household debt has progressed in proportion to both the revenue and wealth of households.

For the lenders, the reduction of risk aversion is revealed in two ways. The numbers of mortgage loans accepted doubled from 1996 to 2005; the spread of 30 year subprime debts on government bonds of the same maturity fell from 225 to 175 base points between 2001 and 2005. A recent study using area data broken down to the zip code confirms that it really is the explosion in loans offered which is responsible for the inflation of household debt[1]. This data shows, for each year, the latent demand which hasn't been met, measured by the fraction of mortgage requests refused, in the various areas of the geographical panel. The result is impressive: the areas where unmet latent demand was the highest between 1996 and 2000, that is, where households tended to be the least solvent, saw the highest increase in credit offered between 2001 and 2005. This wave of poor quality loans caused an increase in the defaulting rates between 2005 and 2007, at a time when the economy was very buoyant (diagram 1).

Diagram 1 – Rate of failure of subprime loans (%)



Source: Thomson Datastream.

1. A. Mian & A. Sufi (2008), *The Consequences of Mortgage Credit Expansion: Evidence from the 2007 Mortgage Default Crisis*, University of Chicago Graduate Scholl of Business, January.

Table 1 – Two models of credit

Initiate and hold	Initiate and distribute (or sell the risk)
• Lenders profit is an increasing function of risk borne	• Lender s profit is an increasing function of sales of credit
• Incentive to assess the solvency of the borrower	• Incentive to sell credit against collateral
• Info asymmetry contained by proximity of borrower and lender who monitors the loan during execution of contract	• Info asymmetry magnified by the weak incentive of the initiator to value the risk of the borrower
• Credit supplied by banks with expertise in credit risk assessment	• Credit supplied by both banks and by unregulated private firms
• Prudential control: capital provisions modulated on credit risk tails	• No prudential control, no capital provision
Contained moral hazard	Moral hazard maximized

This explosion in mortgages is very strongly associated with the development of their securitization by private financial institutions, aside from that traditionally provided by the public agencies Fannie Mae and Freddie Mac. The percentage of mortgages sold to be securitized by the investment banks went from 30% of the total in 2002 to 55% in 2005. Whereas the two agencies securitize and guarantee loans to the first rate borrowers (prime mortgages), the investment banks have been securitizing more risky loans (subprime mortgages), not covered by the agencies' guarantee. Therefore, there has been a radical change in the credit model that can be contrasted with the standard bank credit model (table 1). This change is essentially the result of the "regulatory arbitrage" by the banks: in securitization they have found a way of escaping the regulatory framework imposed on their assets held on their balance sheet[2]. The result of this change without prudential caution has been an expansion in the capacity to offer credit combined with a massive under-assessment of the risk.

The mechanics of securitization

Securitization transforms loans into financial securities in a process made up of three operations[3]: :

✦ *pooling* : an investment bank buys loans from those who have issued them. The result is a pool of homogeneous or heterogeneous structured credit: MBS (mortgage-backed securities), ABS (asset-backed securities), CDO (collateralized debt obligations).

✦ *offloading* : lthe loans in the pool are taken out of the investment bank's balance sheet to be registered in special structures, "ad hoc vehicles" (SPV special purpose vehicles), also called "conduits" or SIV (special investment vehicles). These structures are, in fact, equivalent to unregulated and unsupervised money market banks. They issue securities against the pools of credit to sell them to investors (hedge funds, asset managers, etc.) but also to banks.

✦ *tranching* : the securities are issued in structured tranches according to their level of risk. From a pool of MBS, rated BBB for example, the vehicle is able to offer tranches of securities to the investors which have different levels of risk and returns: "super senior" tranches, rated AAA, "senior" rated AA and A, "mezzanine" rated BBB and BB, down to "equity" tranches which are not rated (see the example of table 2). The better rating of the higher tranches is justified by the fact that, according to the principle of subordination, in the event of a deterioration in the revenue of the pool, it is the lower tranches which first suffer the losses and so protect the higher ones[4].

From the point of view of the investment banks, the purpose of the securitization is to generate an excess spread[5] from the conduit. This is the difference between revenue earned from the pool of loans in the conduit's asset base (interest paid by the initial borrowers) on the one hand, and the sum of the commissions of all the intermediaries and the payments to the investors who buy the tranches on the other hand. Table 2 gives the example of the balance sheet and the income account of a CDO of 720 million dollars structured in a conduit. We see that, to maximise the profit from the securitization, the upper tranches, with a low rate of return, have to be thick tranches. But the lower tranches are thin: they give a protection which justifies the AAA rating of the upper tranches only if the credit pool has limited losses[6].

Table 2 – Balance and income account of a conduit (millions of dollars)

Assets		Liabilities		Rating and yield	Income		Payments	
Pool of credits outstanding	720	Security tranches			Income of the pool	62		
		Supersenior, senior	504	AAA et AA (25) A (75)			Supersenior, senior	30
		Mezzanine	202	BBB (180) BB (475)			Mezzanine	15
		Equity	14	non rated			Equity	2
							Fees	11
							Excess spread	4
	720		720			62		62

Note: Excess spread = Revenue of the pool - (Payments + fees).
Source: A. Blundell-Wignall (2007), *Structured Products: Implications for Financial Markets*, OECD.

2. W. Buiter (2007), "Lessons from the 2007 financial crisis", CEPR *Policy Insight* n°18, p. 1-17, December.
3. A. Blundell-Wignall (2007), *Structured Products: Implications for Financial Markets*, OCDE, draft, December.
4. Committee on the Global Financial System (2005), "The role of ratings in structured finance: issues and implications", bis, January.
5. J. Mason & J. Rosner (2007), *Where Did the Risk Go? How Misapplied Bond Ratings Cause Mortgage Backed Securities and Collateralized Debt Obligation Market Disruptions*, mimeo, May.
6. D. Reiss (2006), "Subprime standardization: how rating agencies allow predatory lending to flourish in the secondary mortgage market", *Florida State University Law Review*, pp.986-1065.

Moreover, to take the maximum possible fees and to get a maximum excess spread, the professionals prefer multi-layer securitization (CDO of CDO) which lengthens the chain of transfers between the buyers of tranches as far as possible from the source of risk. This process entails a loss of information on the loans as they become more complex and opaque. This is why investors are totally dependent on the credit rating agencies.

The loss generating machine

Securitization which spreads the risk over a much bigger population of agents is supposed to make the financial system more robust. But this convenient arrangement depends on hypotheses which have turned out to be false. The first is that to sell the loans, rather than keeping them and bearing the risk, does not affect the quality of the risk assessment; this hypothesis has been shown to be false. The second hypothesis is that the pooling of different independent loans reduces the average risk. But the individual loans were not independent since they had been taken on against the same type of collateral: real estate. Finally, the way in which the securitization has been implemented may worsen the exposure to risk.

As it is possible to make multi-layered securitization by mixing assets which are included in the pool at each stage, the financial products which result have impenetrable risk characteristics. When defaulting on the initial loans increased, the models for credit risk measurement proved to be grossly inaccurate. In fact, the sources of risk in structured credit are not of the order of volatility which can be represented by standard laws. They are extremely asymmetrical risks in terms of losses, involving rare but very heavy losses.

The failure of the architects of securitization has been felt at every stage, resulting in a generalised crisis of structured credit. Upstream we have seen that the credit supply model for the sale of the risk brings with it an incentive not to invest in its assessment, worsened by the entry on the scene of non-banking lenders, completely unregulated and unsupervised. Then, the investment banks bought up these credits without worrying a great deal about the quality of what they were buying since the magic of securitization was supposed to turn lead into gold; that is, to obtain cast-iron protection for the senior and super senior tranches[7]. Furthermore, the investment banks and the credit rating agencies work together in an iterative process to achieve the structuring of the tranches which will attract a maximum of asset managers acting on behalf of institutional investors.

So the agencies have a role which is very different to that of certification which they play for those companies which issue bonds. Their judgement comes up against that of an army of analysts when it comes to companies. It is preponderant, but not exclusively so, in determining the range of prices at which the company may issue. In structured credit, the agency's rating is *a priori*. It is inherent in the structuring of the tranches. The agencies are therefore judge and plaintiff, which exacerbates the conflicts of interest. In the event of the structuring of property loans, profitable securitization could not be created without giving a very low probability to a fall in property prices.

The downturn of the property market had a dramatic effect on structured credit. Firstly, the fall in the value of the loans' collateral increased the probability of default on the loans, the quality of which depended in the first place on the collateral. Then, in the event of a default, the fall increased the banks' losses since the asset that they seized could only be resold at a lower price. Finally, it cemented the correlation between the loans that had been supposed to be independent, while their profitability depended on the same collateral. As a consequence, the probable losses on the pools of assets supporting the securitization were greatly re-assessed.

When the probable losses on the underlying pools were re-assessed, they firstly wiped out the subordinate tranches. But as the defaults on the loans were much higher than the agencies had anticipated, the senior and super senior tranches were affected by the reduction in the flow of payments (table 3). For the rate of failure of 16.5% on the subprimes recorded in November 2007, the senior tranches were widely affected. In January 2008, the super senior tranches were attacked in turn and the insurers (monolines) which had been supposed to guarantee their quality found themselves in difficulties. As these insurers also raise the quality of the structured

Table 3 – Sustainable losses at each rating level

Rating	Sustainable losses ont MBS pool (%)	% of rated amount in 2006
AAA	26-30	80.8
AA	18-21	9.6
A	13-15	5
BBB	10-11	3.5
BB	7-8	1.1

Source: Moody's et Morgan Stanley.

7. J. Frye (2003), "A false sense of security", *RISK magazine*, p. 63-67, August.

credit on company bonds and credit default swaps, it was the whole of structured credit which began to be mistrusted by investors.

A final mystery remains: the massive losses of the banks which had transferred the risk. We should remember that securitization had been removed from of the banks' balance sheets in conduits and SIV. But these structures are unregulated shadow banks. They are therefore entities that have very high leverage debt in instruments which are presumed to be liquid to finance non-liquid assets. Table 4 describes the typical financing of a conduit which holds, for sale, securitized assets of different categories.

Table 4 – Financial structure of a conduit of 2 billion dollars of the highest rating

Asset Portfolio		Financing		
Structure	Size (%)	Structure	Size (mil$)	Size (%)
RMBS	47.3	Primary dealer credit + ABCP	1820	91
CMBS	15.4	Senior Securities	120	6
CDO	25	Mezzanine Sec	57	2.85
Other ABS	12.3	Capital	3	0.15
	100		2000	100

Source: R. Down (2007), "CDOs: toxic or tonic?", HSBC Global Research, 26 July, p. 7.

We can see that the liabilities are made up essentially of bank debt, which is short term, and commercial paper issued against assets (ABCP, asset-backed commercial paper), which is presumed to be liquid since it is held principally by the "dynamic" money market funds. The leverage of the conduit is therefore enormous. When the securitized credit in the asset base became unsellable, the conduits could not refinance their commercial paper, thus creating an enormous panic in the money markets. The banks had to re-intermediate their conduits to avoid a collapse of all securitized credit. But as the distribution and the total amount of losses were unknown because the CDO and other ABS could not be valued, the banks stopped the flow of liquidity between one another. On the August 9, 2007, the central banks had to intervene in last resort to avoid a dislocation of the international interbank market. From this moment on the crisis became systemic.

Toward a stricter regulation of securitization

The principle to be followed is to encourage securitization only if it is economically more efficient than normal bank credit. So incentives to regulatory arbitrage need to be eliminated: re-intermediate the conduits and other SIV in the investment banks' balance sheets, keep the "equity" tranche and back it up with adequate regulatory capital. Securitization must also be simplified and a secondary market created for the trading securities issued on the pools which should be made more homogeneous, in accordance with the prudential rules applied by the Stock Exchanges. Finally, the statutes of the credit rating agencies, which now have a pivotal role both in prudential regulation of the banks and in the certification of marketed products, should be changed. They generate a public benefit in the same way as the central banks and should have the status of independent public agencies with terms of reference and accountability. This would also have the advantage of creating new agencies in Europe and the developing nations. Responsibility must be regained so that financial liberalisation may be perpetuated.

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