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ET DE DÉVELOPPEMENT ÉCONOMIQUES

Financialisation and the "sub-prime" financial crisis – Issues for future regulation

TUAC Secretariat
Paris, 5 September 2007

The phenomenal growth of the derivative markets in recent years was seen by most financial observers as a positive development of financial innovation that helped spreading, and hence mitigating markets risks. The transformation of the US mortgage crisis in February into a global financial turmoil during the summer 2007 showed the opposite. The derivative markets served as an accelerant to the crisis. Contagion was fuelled by the opacity of derivatives' asset price fixing and underlying risks, the widespread use of off-balance sheet and un-regulated 'special investment vehicles', the absence of publicly accountable supervisory market authorities combined with highly leveraged investment strategies of hedge funds. The broader debate on the appropriate reaction by financial authorities has only begun. This paper proposes some issues for discussion.

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The trigger: the collapse of the US residential mortgage credit market

The trigger for this summer turmoil in global financial markets – including a 10% fall of main stock markets indexes first week of August – was the collapse of the US residential mortgage credit market in February 2007. The housing market in the US has been booming since 2001 thanks to low interest rates and a continuing weakening of lending standards. In 2006 mortgage credit risk quality rapidly deteriorated, as seen in the rising number of delinquencies and foreclosures. At the end of the year, the least secured credits – the sub-prime loans – accounted for almost a fifth of total mortgage credit in the US (see annex 1 figures 1-4). Much of the growth of the market and of its declining quality was due to the aggressive lending policy of mortgage brokers whose regulation (lending standards, solvency requirements, prevention of conflict of interests) is less stringent than traditional banking regulation. Hence it is the relaxation in regulation that seems to have led to excessive risk-taking in lending and that allowed unscrupulous lenders to deceptively sell sub-prime mortgage loans to American households.

As such, the US mortgage crisis should be first seen by its social impact on American working families: since end-2006 thousands of households whose living standards was not a priori close to poverty lines, have been expelled from their homes, and access to decent housing has become problematic for millions of others. Under these circumstances, it may not be incongruous to recall that access to housing is a fundamental human right[1] and that the international community – including the US government – committed in 1996 "to expand the supply of affordable housing by enabling markets to perform efficiently and […] assisting those who are unable to participate in housing markets"[2]. This commitment appears more topical than ever in the US context. The priority for now is for the US Congress to draw the necessary lessons and one might expect swift regulation reaction in the coming months[3].

The sub-prime crisis should also be assessed in the light of its contagion on global credit markets, including the brutal correction of equity markets early August. Indeed, there was *prima facie* no reason to believe that this collapse would alone trigger a domino effect on global credit markets – assuming that the US mortgage credit risk system would work efficiently.

The accelerant: credit derivatives' pooling, offloading, and slicing.

Compared to the credit crunch in the early 1990s – the Savings & Loans crisis – the distinct feature of the sub-prime crisis is the high level of securitisation of US mortgage loans. Instead of holding loans on their balance sheets, mortgage lenders have increasingly sold them as listed securities, like corporate bonds, on the US and global credit markets. This securitisation process has been accompanied by a continuing stream of "financial innovation" in the recent years. Mortgage securities have been repackaged into complex collateralised debt obligations (CDOs) and others asset backed securities (ABS). These "derivative" products are built around successive risk and/or ownership transfers between the originator (i.e. the credit institution who underwrites the loan) and investors who hold the loan (or its credit default risk protection) and can be summarised in three steps: pooling, offloading and slicing. (Annex 5 includes a more detailed presentation of two specific classes of CDO).

- Pooling: a credit institution (the 'originator') pools different fixed in-come assets – loans, bonds, other fix-income securities – into one portfolio of reference. The portfolio has a weighted yield and risk level: for example a B-rated (i.e. medium secured), 7% interest yield €100m portfolio ;

- Offloading (or de-linking): the originator transfers ownership of the portfolio to an off-balance sheet and un-regulated Special Investment Vehicle (SIV) – also known as a 'conduit'. Alternatively, it can retain ownership of the portfolio, but transfers the credit default risk to the SIV – for that it buys a credit default swap (CDS) to the SIV. In both cases, the off-balance sheet nature of the transaction entails that the credit institution can free up regulated capital on its balance sheet.

[1] under Article 25 of the Universal Declaration of Human Rights and Article 11 International Covenant on Economic, Social and Cultural Rights
[2] 1996 UN Istanbul Declaration on Human Settlements,
[3] "(Sub)prime argument for more regulation", Op-Ed by Barney Frank in the Financial Time, 19 August 2007.

- Slicing: the SIV issues debt obligations which are backed (collateralised) by its ownership of the portfolio (or alternatively by the revenues it gets from the CDS sold to the originator). These collateralised debt obligations (CDOs) are then sliced into different 'tranches' (i.e. classes of holder) reflecting different credit risk quality. In the above b-rated €100m portfolio, the three tranches would be:
  - an AAA-rated (highly secured) but low yield 4% interest €70m 'senior' tranche,
  - a BBB-rated 7% interest 'mezzanine' €15m tranche, and
  - an un-rated (very risky) high yield 15% interest €15m 'equity' tranche.

The great merit of the invention of the CDO is that it concentrates credit default risk in a small portion of the total portfolio (the 'equity' and 'mezzanine' tranches), thereby artificially inflating the credit quality of the remaining portion (the 'senior' tranche). In the example above, the B-rated €100m portfolio miraculously transforms into a very secured 'triple A" rated €70m, the remaining €30m tranches functioning as a buffer. In case of a default of reimbursement on some of the loans included in the original €100m portfolio, the financial losses are entirely supported by the equity tranche, then by the mezzanine tranche, before the senior tranche gets activated.

Banks and mortgage institutions had a clear interest in promoting derivative products because it allowed them to transfer the credit default risk to the markets, and thus to 'clean' their balance sheets which are otherwise tied by strict prudential investment rules and solvency requirements. On investors' side, the popularity of the derivative products is explained by their very disconnection from the real economy: unlike corporate bond markets whose growth is tied by companies' need for financing, there is no restriction *per se* to the growth of derivative markets – a part from the expectations of investors in terms of the risks of the underlying bonds. The growth of derivative products has been phenomenal by all account, although no reliable and government-backed data exists. For example the CDS markets are believed to be 10 times larger than the actual bond markets that they are supposed to cover. In the case of the US mortgage market, Residential Mortgage Backed Securities (RMBS) have taken an increasing share of the total US home mortgage debt (annex 1 figure 5).

From a financial stability point of view, the recent growth of derivative markets has been portrayed as a welcome development of financial innovation in so far as it has contributed to spreading credit default risks among a broader, if not infinite, pool of investors. Assuming that the risks were well understood by market participants, such spreading would mitigate the systemic impact on financial markets and the global economy at large of any large scale credit events. Hence, when half the value of the US mortgage-backed securities was wiped out in February (see annex 1 figure 6), most observers agreed that the impact on global markets would be limited. For example, in April 2007, the OECD Secretariat noted in a report to Member states:

> *"The general consensus seems to be that there is not going to be broad adverse contagion effects* [of the US mortgage crisis] *at this stage. In contrast to the S&L crisis of the late 1980s and early 1990s, a lot of the balance-sheet risks were shifted from banks via credit risk transfer mechanisms and the securitisation process. Even if the exact identity of the final holders of the securities is less well known, this shifting of risk away from financial intermediaries reduces systemic risk—in fact 40% of the mortgage backed securities are distributed outside of the USA"* (OECD 2007a)

The toxic combination of derivatives and leveraged investment

This general consensus proved to be wrong in the developments of the crisis between May and early August 2007. The risk spreading effect did not produce the expected mitigation of the impact of the US mortgage crisis on global credit markets. Quite to the contrary, the widespread use of derivative products proved to function as an accelerant of the contagion to other markets: first to the global credit markets then, first week of August, to stock exchange equity markets (see annex 2 & 3).

Like any other financial turmoil, the reason for the contagion appears to be a combination of factors. First and foremost, the mortgage credit market happened to be abnormally composed of high risk 'equity' tranches. In a context of low yield credit environment, the demand of investors was high for high yield, and thus low-rated CDOs. This apparently produced incentives for lenders to contract more high risk loans such as sub-prime mortgage loans. A vicious cycle then emerged: banks and mortgage companies were willing to follow the move because by definition the CDO system meant that the credit risks would be transferred to the market anyway – irrespectively of the credit ratings of the loans that they had underwritten.

Second, the mortgage crisis revealed a deep problem of asset pricing of credit derivatives and, with that, the fact that investors simply did not understand the complex products they were buying and thus the extent of their exposure to market risks. The sequencing of the crisis contagion is very telling in this regard: the series of implosions, or temporary closures, of hedge funds and bank investment funds began in July 2007 only, that is almost 6 months after the initial shock (see annex 2).

> *"What does BNP* [Paribas] *actually mean when it says it cannot "fairly" value some of the funds' holdings? Is determining a price for certain assets – or the structured products*[4] *that contain them – now impossible, or is it just that prices have fallen to unpalatable levels? To be fair, it is likely to be both."* (FT, 9 August 2007)

The above quote from the Financial Times points to the heart of the problem. The absence of transparent and accountable trade exchanges and the complexity and opacity of the derivatives products made them hard to understand and thus difficult to value[5]. Regulated accounting rules require assets to be priced at "fair value", that is the price should the asset be sold immediately. Fair value thus pre-supposes the existence of a tradable and transparent exchange market. No such transparent and market-based asset pricing exists for derivative products. These are usually sold 'over the counter', that is outside any exchange infrastructure. And where such exchanges do exist[6], they operate outside the scrutiny of any publicly accountable authorities. Instead of a 'mark-to-market' pricing, CDOs are most often valued according to complex mathematical models, of which the design and control may be at the discretion of the fund managers themselves or the banks that created the product. Rating agencies (Moody's, Fitch and Standard & Poor's) have also been pointed out for their lack of prudence in granting 'triple-A' credit risk rating to some CDOs. This lack of prudence from rating agencies may be re-interpreted as a lack of independence: the fees that rating agencies earn on high risk derivative products are reported to be three times higher than on

[4] Structured products are understood to be the latest generation of CDOs.

[5] Speaking of the latest financial innovation, the structured products, the OECD Secretariat wrote in April : "These products are difficult to understand for technical analysts, so there can be no doubt that the retail buyers of these products will not understand what they are buying." (OECD2007d)

[6] Un-regulated private exchanges exist for a few standardized products such as Itraxx in Europe and CDX in the US (credit default swap exchanges) and ABX in the US (asset-backed securities).

conventional fixed-income securities. Conflicts of interests seem to abound in the credit derivative pricing.

When investors intended to sell their holdings in derivative products during the month of July – thereby confronting these securities with the reality of markets for the first time – the liquidity of the markets instantly dried up. Even at a substantial discount, no one would take the risk of buying assets which price fixing suddenly appeared to be dubious to say the least. For what created contagion and turmoil in the global credit markets was less the effective collapse of those funds, than the incapacity of their managers and partners to measure exactly the risks of derivative products, the extent of their losses and thus to help measure the exposure of other investors to the sub-prime crisis. Risk-aversion concerned the whole range of derivative products and no discrimination was made between the so-called triple-A rated tranches of CDOs and the riskier sub-prime related ones, as noted below by the asset management branch of AXA insurance company:

> *"[L]iquidity in that market is virtually non-existent currently, given the level of risk-aversion shared by all market participants. As a result, they do not even try to distinguish between the well-structured, good credit-quality bonds and the badly-structured ones that bear default risk. They indeed tend to quote all bonds according to the worst possible scenarios. In that respect, the contagion of this situation to the Alt-A and Prime parts of the market, has also impacted the performance.[…] In other words, in this environment, the very notion of market price is a very challenged one."* (Communication on AXA WF US Libor Plus strategy, 20 July 2007)

In a sense, the crisis did not materialise into a fall in valuation of derivative products but into the very disappearance of any form of valuation of those assets. This explains the delay between the initial shock in February and the reported losses or closures of hedge funds in July. From there, the contagion to the equity markets went rapidly given the pivotal role of hedge funds in the credit derivative markets – holding circa 60% of the US market according to OECD estimates (OECD 2007b). As the derivative markets had become illiquid, hedge funds were forced to sell in disproportionate levels their holdings in other asset classes – including equity – in order to cover the losses of their highly leveraged investments in the derivatives markets.

The fallouts of the crisis

The hedge fund industry was not the only industry to be hit, mainstream investment banking was hit too, as shown in the sequencing of the contagion in annex 2. Ironically, the banking industry created the derivative products to precisely shield itself from the credit default risk. Despite the off-shoring and off-balance sheet nature of the derivative products, banks had nevertheless kept credit line arrangements with the SIVs they had created. These credit lines were activated in June and July when normal funding of the SIVs abruptly dried up. In any case, banks and insurance companies were forced to rescue their SIVs as a matter of public image and client confidence. Equally worrying is perhaps the involvement of little-known German banks, such as IKB and Sachsen LB. In the highly regulated German banking sector, well established institutions were able to engage into risky off-balance sheet investment strategies.

A big question mark surrounds the level of direct and indirect exposure of pension funds. As fixed-income securities, derivative products are likely to constitute an attractive investment for pension funds seeking balanced diversification of their portfolios. No data exists on the

pension funds' holding in derivative products as such. However pension funds' investments hedge funds may give some indication of their exposure to the derivative markets. The preliminary findings of an internal OECD Secretariat survey show that pension funds' allocations in hedge funds is either very marginal or limited to around 3% of their total assets under management (OECD 2007c). Accordingly the most immediate threat to pension funds' financial sustainability would rather be the collateral effects of the sub-prime crisis, including future corrective measures by financial authorities[7], than the crisis itself. The current turmoil may however bring further attention on the regulation of pension funds' investments and their legislated prudential rules. As indicated in annex 4, at least half of OECD jurisdictions apply quantitative restrictions on pension funds. These restrictions apply either directly (a % cap on investment in hedge funds) or indirectly (limits on or ban of financial products or transactions that are characteristic of hedge funds). In the broader debate on pension reform, the sub-prime financial crisis also shows the exposure of pre-funding pension systems to financial market risks and fluctuation in comparison to publicly financed pay-as-you-go systems.

The impact of the crisis on the leveraged buy-out industry is another source of concern. For example, a tightening of bank lending standards might pressurise companies that were acquired by private equity funds during the boom time in 2003-2006 and have since been loaded with "recapitalisation" debt[8].

The broader debate on the appropriate reaction by financial authorities has only begun. Early August, central banks' immediate concern was to ensure short term liquidity on the credit markets. The European Central Bank injected massive liquidities into the money markets (i.e. the ultra-short-term finance) offering unlimited credit to banks at its base rate. Other central banks, including the US Federal bank followed the move. Although the liquidity injection was welcome, some observers have questioned whether central banks overreacted to the crisis. The massive injection of liquidity could indeed give the impression of a generalised bail out operation that had not discriminated between the victims (the banking system as a whole) and the troublemakers (hedge funds and banks' special investment vehicles), thus creating moral hazards for the future.

Some issues for discussion

The sub-prime crisis reveals, once again, grave questions as to the capacity of national and international financial authorities to regulate global financial systems, and in particular to anticipate the creation of asset price bubbles. Here the key question is whether central banks can measure financial asset price inflation and from there take pre-emptive measures when the prices of a given class of assets significantly depart from market fundamentals. The sub-prime crisis may also fuel the discussion on the role of financial markets in the economy and whether global financial markets have fallen into a state of permanent instability, "moving from one bubble to another[9]".

[7] for example a decrease of central banks' base rates would require lower discount rates on liabilities, causing those to increase.

[8] Recapitalisations consist in substituting new debt contracted by the target company to the acquiring private equity funds debt that was raised to finance the takeover of the company; the exchange happens by way of mega dividend proceeds (ie. "dividend recapitalisation").

[9] For example, see interview of Michel Aglietta in Le Monde, 1 Sept. 07. Indicative English translation is available on demand.

In parallel with this broader discussion on the overarching goal of financial markets vis-à-vis the real economy[10], more specific questions arise from the growing complexity of financial products and institutions. Clearly the ultimate purpose of financial innovation is not well understood in the public or even – and more worryingly - among governmental experts. The un-controlled nature of the derivative markets, including the use of un-regulated SIVs, the legitimate suspicions of widespread conflicts of interest in asset pricing and the highly leveraged investment strategies of hedge funds are all worrying signs that need to be addressed by governments.

Two sets of issues may revolve around (i) the links (or the leaks) between regulated and un-regulated activities and (ii) the validity of the risk spreading theory.

- Assuming that financial transparency is a universal principle of modern economies, one may question the right of regulated institutions – such as banks, insurance companies and pension funds – to invest in un-regulated entities – such as off-balance sheet special investment vehicles, and hedge funds

- The whole notion of market risk spreading might need to be reviewed as well because it is a cornerstone of the legitimating discourse on "financial innovation". According to the risk spreading theory, the separation between those who underwrite credits and those who hold those credits – or the default risks attached to those credits – can help dilute, and hopefully, mitigate market risks. The theory pre-supposes that investors that buy those credit securities do understand what they are buying and the extent of their exposure to risks. The sub-prime crisis contradicts this initial assumption.

Source

Banque de France 2005 The CDO market – Functioning and implications in terms of financial stability, O. Cousseran & I. Rahmouni, Banque de France Financial Stability Review, N°6, June 2005
OECD 2007a Tour d'Horizon on Financial Markets, OECD Secretariat (DAF), April 2007
OECD 2007b Recent market developments, the boom of private equity and the rise of hedge funds, OECD Secretariat (DAF), April 2007
OECD 2007c Pension funds investment in hedge funds: questionnaire response, OECD Secretariat (DAF), June 2007
OECD 2007d An overview of hedge funds and structured products – Issues in Leverage and Risk, OECD Secretariat (DAF), 20 April 2007
OECD 2007e Draft Framework for assessing efficiency and effectiveness in financial regulation, OECD Secretariat (DAF), April 2007

[10] As quoted in an OECD paper: "A well-functioning financial system permits the economy to fully exploit its growth potential by ensuring that investment opportunities receive necessary funding at minimum costs." (OECD 2007e)

Annex 1: US mortgage lending developments

Figure 1

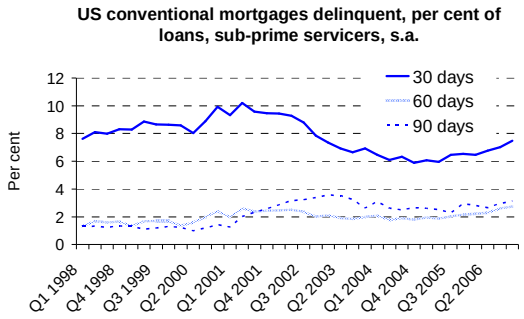


Figure 2

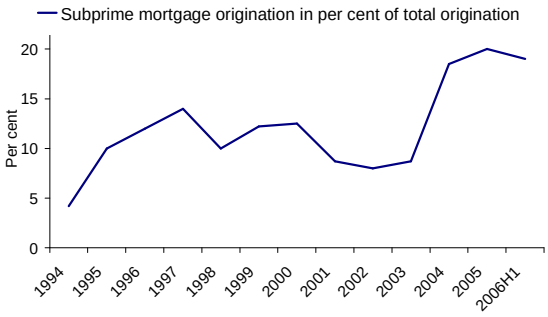


Figure 3

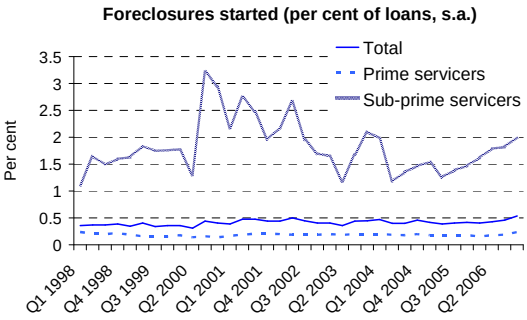


Figure 4

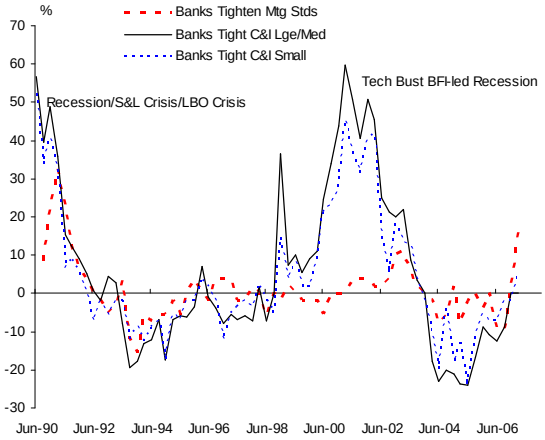


Figure 5

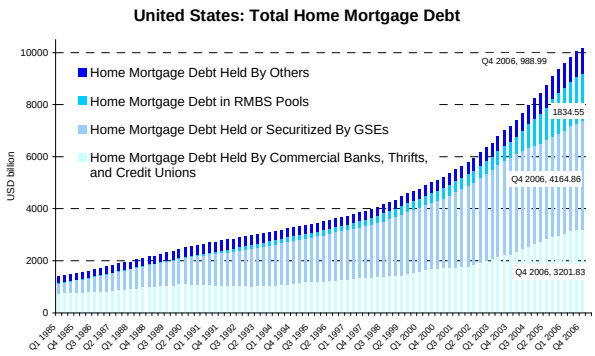
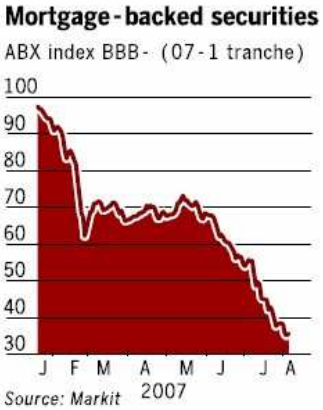


Figure 6



Source: ft.com

Source: OECD 2007a & OECD 2007b

Annex 2: Sequencing of the contagion

Early June 2007:
- UBS (Switzerland) rescues its hedge fund Dillon Read Capital after reported $123m in losses.

End-June
- Braddock Financial (US) closes a $300m hedge funds
- Queen's Walk fund (UK) reports €67,7m losses
- UnitedCapitalAssetManagement (UK) suspends investor redemptions from one of its funds

Mid-July
- Bear Stearns (US) closes two hedge funds worth $20bn, after acknowledging that it was not capable of measuring how much money was lost.
- Blackstone's listed share loose 4% on the NYSE
- Wharton Asset Management and Y2K hedge funds (UK) report heavy losses

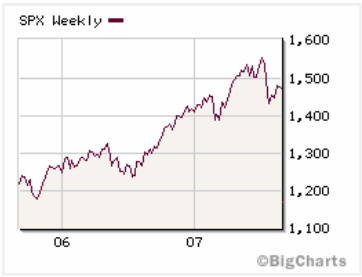
End-July
- Collapse of Accredited Home Lenders, American Home Mortgage Investments ($20bn book value) and Countrywide.
- IKB (Germany) is bailed out by over €8bn by other local banks
- Several hedge funds in Australia, US and UK either suspend investors' right to withdrawal or write down part of their own value
- AXA Insurance company (France) substitutes to investors to rescue two of its SIV
- Macquarie Bank (Australia) announces that two of its funds lost 25% of their value

Early August
- The contagion spreads to a dozen other hedge funds and investment banking funds in the US and Europe
- BNP Paribas (France) suspends three funds
- NIBC (Netherlands) reports €137m losses
- Fall by over 10% of main equity indices

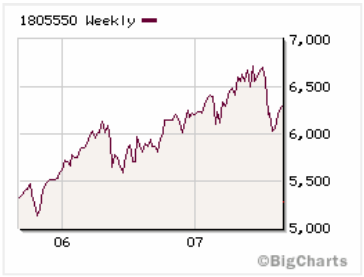
Mid-August
- After US, Australian & European funds, the crisis hit several Japanese investment funds and hedge funds
- Sachsen LB (Germany) is bailed out by peers after the closing of a €17.3bn worth special investment vehicle known as Ormand Quay

Annex 3: Two-year time frame of main stock exchange indices (as of 31 August 2007)

SP500



FTSE 100



DAX

CAC 40

Source: ft.com

Annex 4 Pension funds' investment in hedge funds

Country	**Quantitative restrictions (% of AUM)**	**Average Exposure (% of AUM)**
Australia	None*	
Austria	30% max in unlisted securities (incl. HF)	
Canada	None*	1% (federally regulated plans)
Colombia	Indexed structured products only	
Czech Republic	5% max	Estimated up to 1%
Denmark	Solvency requirements	
Estonia		Under 1%
Estonia	10% max in unlisted securities (incl. HF); Short selling prohibited	
Finland	Authorised since 1st January 2007	3.10%
Greece	5% max	0%
Ireland	10% max in unlisted securities (incl. HF)	Thought to be extremely low
Israel		1% (estimation)
Italy	Investment in closed-end hedge funds only; 20% max in CIS (incl. HF); max 1x leverage; short selling, lending & borrowing prohibited.	Negligible
Mexico	Prohibited	0%
Netherlands	Solvency requirements	Approximately 2-3%
Poland	10% max in CIS (incl. HF)	0%
Portugal	5% max (to be raised to 10%)	3%
Slovakia	Prohibited	0%
Spain	5% max; indirect restriction via caps on fees	
Switzerland		2% in 2004
Turkey	10% max in CIS (incl. HF)	
US	None*	None*

* have 'qualitative restrictions', including general provisions of prudent person rule, and risk management and assessment licensing requirements.

Source: OECD 2007c

Annex 5 Examples of Collateralised Debt Obligations

Regulated market
('real economy')
publicly listed and/or on-balance sheet, market-based pricing

Un-regulated or lightly regulated markets

Un-listed and/or off-balance sheet
Ad-hoc model-based asset pricing

Cash Flow CDO

Stage 1: the originator sales the portfolio (loan, bond, etc) to the SIV, to free up regulated capital on its balance sheet. →

Stage 2: the SIV owns the portfolio on behalf of the bank and issues CDO tranches →

Stage3: Tranches are sold to investors

Originator (bank, credit institutions)

← funding
→ Sale of the loan/bond

Special Investment Vehicle (SIV)
Asset: portfolio of reference €100m
Liabilities: CDO tranches of €100m

← Funding €100m
→ Principal & interest

Investment funds
(Hedge funds, Bank asset management branch):
- Senior tranche low yield highly secured AAA rated €88m
- Mezzanine tranche BBB rated medium yield, €5m
- Equity tranche, unrated, high yield, €7m

↑ Principal & interest ↓ funding

↑ investment

Obligors (households, companies) €100m debt

Investors: banks, pension funds, other institutional investors, ultra-rich individuals

Partly funded synthetic CDO

Stage 1: the bank retains ownership of the €100m portfolio, but transfers the credit risk off-balance sheet: 87% of the portfolio risk is covered by a super-senior counterparty, the remaining 13% by a credit default swap (CDS) sold by the SIV →

Stage 2: the SIV receives premiums on the CDS (its 'asset') and issues CDO tranches amounting to 13% of the portfolio € 13 m →

Stage3: The SIV invests the proceeds from the sales of the tranches (€13m) in risk free assets

"Super senior" CDS ←

Super-senior counterparty
Un-funded & unrated tranche of €87m

Originator (bank, credit institutions)
Asset: portfolio of reference €100m in loan/bond

→ Credit risk transfer
→ pays a premium

SIV
Asset: CDS
Liabilities: CDO tranches of €13m

← Funding €13m
→ Principal & interest

Investment funds
(Hedge funds, Bank asset management branch):
- Senior tranche low yield highly secured AAA rated €4m
- Mezzanine tranche BBB rated medium yield, €5m
- Equity tranche, unrated, high yield, €4m

↑ Principal & interest ↓ funding

↑ Principal & interest ↓ funding

↑ investment

Obligors (households, companies) €100m

€13 m investment in risk free assets

Investors: banks, pension funds, other institutional investors, ultra-rich individuals

Source: Banque de France 2005