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The regulation of hedge funds under the prism of the financial crisis

Michel Aglietta

Sandra Rigot

UMR 7166 CNRS

Université Paris X-Nanterre
Maison Max Weber (bâtiments K et G)
200, Avenue de la République
92001 NANTERRE CEDEX

Tél et Fax : 33.(0)1.40.97.59.07
Email : secretariat-economix@u-paris10.fr

Université Paris X Nanterre

The regulation of hedge funds under the prism of the financial crisis

Policy implications

Michel Aglietta (Paris X EconomiX et Cepii) & ***Sandra Rigot*** (Paris X EconomiX)

Abstract

This paper deals with two issues. On the one hand, it shows that structural changes in financial markets and in the *hedge funds* industry make the "*light-touch*" arguments for regulating *hedge funds* no longer relevant. On the other hand, pleas for stronger regulation of *hedge funds* are getting more attention. In the first part of the paper the huge expansion of the industry is outlined and the state of current regulation is highlighted. In the second part an in-depth analysis of risks associated with *hedge funds* is carried out. It is shown that systemic risk can arise from leverage and from concentration of exposures amongst *hedge funds*. The part played by *hedge funds* in the spread of the crisis of structured credit is portrayed. In the third section, the recommendations of professional organisations, regulatory authorities and international institutions are summed up within the framework of risk mapping. This oversight shows the ways of reform: the need of direct regulation, the enhancement of indirect regulation and the overhaul of securitization. The prospective pattern of regulation encompasses macro and micro issues, and impinges upon factors of demand and supply. It emphasizes the enhanced role of public regulators and displays the conditions of an effective market discipline performed by long run institutional investors.

Keywords: financial leverage, prime brokers, securitization, extreme risks, systemic risk, opacity, long run institutional investors, due diligence, monitoring, disclosure, market discipline, public regulator

JEL : G23

Summary

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Introduction

The debate about the role of hedge funds regulation started some ten years ago. It is based on spectacular failures that threatened financial stability, like the near collapse of LTCM (1998) or the bankruptcy of Amaranth (2006). More recently, the subprime crisis in the summer of 2007 has revealed the weaknesses and the risks of securitization, in which the hedge funds industry has been deeply involved. This latest event bolsters the debate about the risks embedded in hedge funds. Pleas for stronger regulation are getting more attention.

Hedge funds have three main structural features: they are private pools of capital, they pursue multiple and complex strategies and their returns are boosted by financial leverage. They undergo few restrictions in their investment strategies[1]. They are regulated only indirectly through their prime brokers and a loose market discipline resting on the promotion of standards of good conduct (basically not compelling). The hands-off approach was advocated as long as hedge funds managed private assets of wealthy individuals. The argument is no longer relevant. Indeed, in the last few years, hedge funds have attracted public money. Furthermore structural changes have arisen in financial markets with the huge development for credit transfer. The crisis of structured credit has pointed out to malfunctions throughout the process of securitization. It raises the issue of systemic risk transmitted by hedge funds in stress situations. Hedge funds have hidden risks that show off rarely. Instead of endemic volatility they generate extreme losses with low probability. This type of risk is easily ignored or underestimated to say the least.

In the first section, we explain the main characteristics of hedge funds and we outline the huge expansion of the hedge fund industry and the state of current regulation. In the second section, we look into the specific risks of hedge funds and their vulnerability to systemic risk in relation with structured credit markets. In the third section, we discuss the recommendations of professional organisations, regulatory authorities and international institutions within the framework of risk mapping. In the fourth section we mention some regulatory policy implications of the ongoing crisis. In the conclusion the model of investment banking that has dominated finance is questioned.

[1] Most hedge funds are domiciled offshore and are completely unregulated. Their managers in financial centres benefit from tax advantages and a very loose regulation

I. Historical development: hedge funds have become systemic agents

There is no legal or universal definition of hedge funds. They must be defined according to their characteristics. A hedge fund is managed by a general partner who combines various long short strategies[2], a very active trading and a leverage via derivatives markets[3] in order to obtain an absolute return[4]. Because there is no benchmark and no track record to assess performances, the general partner can extract a double structure of very high fees from the investor (management and performance fees). Besides, the latter shall respect extended lock-up periods before being able to liquidate her investment .

Hedge funds managers can engage in a broader set of investment strategies than more restricted asset managers because they enjoy a very flexible regulatory framework. Whereas managers operate in large financial centres, hedge funds are legally domiciled in offshore places to benefit most of fiscal advantages and lenient regulation[5]. Managers concentrate on research and asset allocation. Associated services in law, administration, custody, brokerage and the like are outsourced.

The financial leverage (via derivatives markets) is the major service that prime brokers offer to hedge funds. Prime brokers are usually the lending arm of investment banks; they bear the counterpart risk. For their part, hedge funds offer two opportunities to investment banks: first they reduce bank credit risks because they sell credit risk protection. Second, they provide liquidity for securitization operations and other strategies of financing. The hedge funds industry is very concentrated, so is the prime brokerage. Two investments banks, Morgan Stanley and Goldman Sachs, count for more than 40% of total assets. Hedge funds provide 20% to 30% of the profit of investment banks. Two thirds of this percentage come from the 200 main hedge funds. So hedge funds are very profitable clients for investment banks. It illustrates the interdependence between prime brokers and hedge funds, generating vulnerability whether a big hedge fund fails.

The characteristics of hedge funds emphasize the following issues: on the one hand, the lack of transparency in relation with their private structure, on the other hand, the leverage through off balance-sheet instruments in credit derivatives markets (See table 1). Likewise, it is also important to emphasize the dependence of prime brokers income vis-à-vis hedge funds.

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[2] Long short strategies allow to make return on arbitrage bets.

[3] The number of hedge fund strategies has increased. About twenty strategies can be categorized in the three following ones: arbitrage, even-driven and directional. The most recurring strategies are: multistrategy (30.6%), Long short equity (23.2%) and even-driven (13.3%)(Mac Kinsey, 2007).

[4] Lack of transparency in hedge fund industry can be explained by several reasons: firstly, original clients of hedge are high-net-worth people who are looking for confidentiality, secondly, hedge fund managers feel threatened by more regulated asset managers who could steal their strategies based on algorithms. This disclosure would lead to an efficient closing of arbitrage opportunities. From an hedge fund point of view, these arguments are understandable, however they are quite detrimental to investors and market authorities. It is therefore not justifiable that regulators, who are supposed to promote the public interest have let this exorbitant situation to pervade with dire consequences in the present financial crisis.

[5] Three quarters of hedge fund managers all over the world are located in the United States and three quarters of European hedge fund managers are located in the United Kingdom. This industry is very concentrated. By 2006, 200 of the biggest hedge funds amounted to three quarters of assets under management (FSF, 2007).

Table 1: Growth of credit derivatives 1996-2008 ($billions)

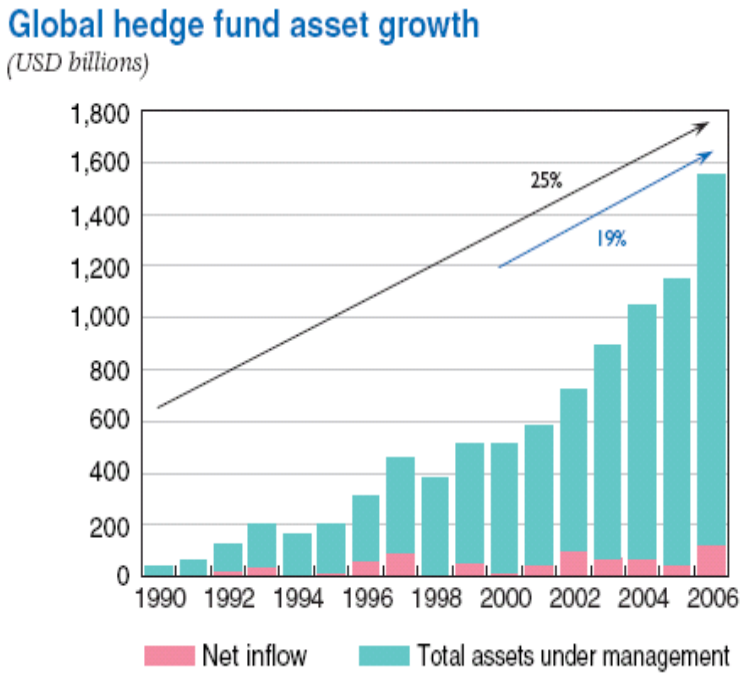
	1996	1998	2000	2002	2004	2006	2008
Notional Amount	180	350	893	1952	5021	20 207	33 120

Source: British Bankers Association; Mac Kinsey 2007

1. The huge expansion of hedge funds industry and the structural change of financial market

Between 2000 and 2007, the number of hedge funds has increased twofold (3335 to 7321). Their assets under management (AuM) have tripled since 2000 reaching an estimated 1740 billions of dollars that is to say an annual growth rate of 20%. If we were to include leverage, the industry's gross investments assets would rise to as much as $6trillions. Regarding the volume of trading of hedge funds, they amount to about40-50% of trading of New York Stock exchange and London Stock Exchange. (Hedge fund research, Mac Kinsey Global Institute Analysis, 2007).

Graph 1: Global hedge funds asset growth - 1990-2006 ($billions)



Sources : *Hedge Fund Research*, and *Swiss Re Economic Research & Consulting*.

Although the contribution of hedge funds is growing continuously, the institutional investors remain the biggest contributors. The assets under management of hedge funds (6 trillions $) are lower in comparison to pension funds ($21.6 tr.), mutual funds ($19.3 tr.) and insurance companies ($18.5tr.)[6].

[6] There is no obligation for hedge funds to disclose their assets under management. Therefore, we have to take these figures carefully into consideration

The sovereign wealth funds such as the Asian central banks and the petrodollars investors have registered an increase of the assets under management (AuM) comparable with those of hedge funds industry. Since 2000, the annual growth rates respectively 20% and 19% and the AuM rose to $3.1 tr. and $3.4 tr. (See table 2). These sovereign funds have gone through an important development and are at an early stage of a new capitalism. Under some assumptions like an annual growth rate of 20%, these assets under management could reach $7.5 tr. in 2012 (ESN, Sustainable investment research, 2007)[7]. The huge expansion has some consequence for hedge funds because sovereign funds turn more and more in alternative investments in order to have a diversify, particularly in hedge funds and funds of funds. Consequently, hedge funds encourage adopting very risky strategies. Indeed, given the increasing assets under management of hedge funds, return on arbitrage strategies tend to decrease due to reduction of inefficiencies in price formation.

Table 2 : Assets under management of institutional investors in 2006 ($ trillions) and annual growth rate (%)

	Assets under management 2006	Annual growth rate 2000-2006
Pension funds	21.6	5
Mutual funds	19.3	8
Insurance companies	18.5	11
Petrodollars	3.4-3.8	19
Hedge funds	1.5 (6 with leverage)	20
Private Equity	0.7	14

Source : Mac Kinsey (2007) ;

2. The institutionalisation of the hedge fund industry

After the stock market crash (2001-2002) and the decrease of long-term interest rates, the institutional investors have been looking for higher sources of return[8]. Consequently they have tried to reorganize their management for better strategic asset allocation. They have set up the core-satellite governance that allows them to delegate the management of alternative asset classes. The hedge funds industry seemed very attractive because of its high and allegedly uncorrelated returns.

The largest share of hedge funds capital has historically come from high net worth individuals. Since 2000, we an institutionalisation of the hedge fund industry has occurred under the spur of pension funds and funds of funds. For the first time, in 2007, institutional investors account for more than 50% of hedge funds inflows (Mac Kinsey, 2007).

From 1997 to 2006, the share of wealthy individuals in hedge fund capital decreased from 61% to 40%, the share of funds of funds increased from 14% to 23%, the share of pension funds from 5%to 11% with some peaks at 15% between 2001 and 2004 and the share of endowments from 11% to 18%. Pension funds and funds of funds registered the highest

[7] On the assumptions : increase of change reserve (5% a year), reserve change reallocation to fund money (25% a year) and capitalisation of profits with 7% return rate.

[8] Hedge funds returns were very high between 2001 and 2003 in bear market. This explains the importance of hedge funds inflows over the last four years.

annual growth rate (see tables 3 and 4)[9]. One argument for a lenient regulation was that most of capital came from quite a small number of wealthy individuals and prone to risk taking. This argument is no longer relevant with the increasing institutionalisation of the hedge funds industry.

Table 3: The evolution of hedge funds capital 1997-2006 (*Asset under management* – AuM- $ billions and share of AuM en %)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total of Aum ($ bilions)	368	375	456	491	539	626	820	973	11105	1465
Share of AuM (%)										
Individuals	61	54	53	**54**	48	42	44	44	44	**40**
Funds of funds	14	18	20	**17**	20	27	24	24	30	**23**
Pension funds	5	10	12	**14**	15	15	15	15	12	**11**
Corporations and institutions	9	8	7	**7**	8	7	8	8	7	**8**
Endowments and foundations	11	10	8	**8**	9	9	9	9	7	**18**

Source : Hennessee Group LLC ; estimates ; Mac Kinsey Global Institute Analysis

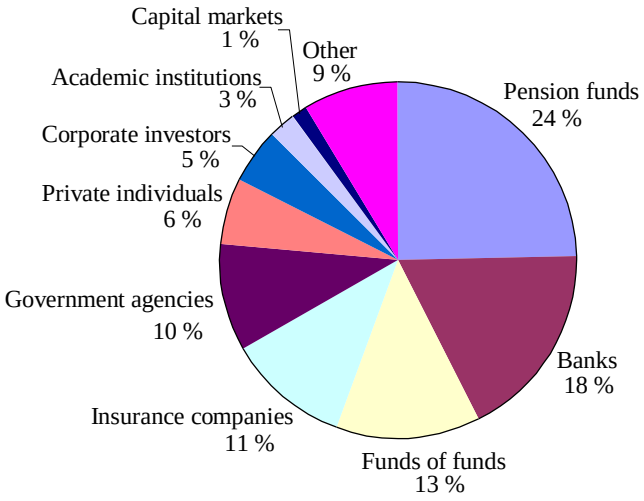
Table 4: Evolution of hedge funds capital (growth rate of Aum %)

Growth rate(%)	1996-2000	2000-2006
Individuals	14	16
Funds de Funds	19	31
Pension Funds	52	17
Corporations /Institutions	8	20
Endowments/foundations	22	17

Source : Hennessee Group LLC ; estimates ; Mac Kinsey Global Institute Analysis

[9] Fund of funds are collective investment vehicles which allocate assets to several hedge funds in order to get benefit through diversification of advantages. As a general rule, they are managed by private banks, mutual funds, institutional assets managers. This is a double structure of fees.

Graph 2 - Origin of hedge funds capital (2005)



Source : EVCA/PWC/Thomson Financial.

In spite of the summer crisis, the expansion of investments funds will benefit from a shift on financial markets and their increasing complexity. In other words, hedge funds will become less markets mavericks and more mainstream players. We get a better understanding of the debate about hedge funds regulation, because the current regulation does neither take into account these structural changes on financial markets nor the related risks.

3. Market discipline and indirect regulation

Up to now regulators have pretended that hedge funds contribute to market efficiency in expanding liquidity in financial markets improving price discovery and financial innovation[10]. (Danielson and alii, 2006). Consequently, a direct regulation of hedge funds activity was thought not to be appropriate. One can hope that the weak link hedge funds make in systemic contagion within the crisis that will be documented in section II will make them change their minds.

Policymakers and supervisors have relied on an indirect regulation for hedge funds via their prime brokers. They have also supposed that their trading in equity and debt markets was subjected to market discipline from their investment partners. Indeed, most counterparts of hedge funds are regulated and have incentives to abide by the regulation. Market discipline is based on incentive mechanisms borne by the main counterparties, i.e. hedge funds investors, creditors, counterparties. Unfortunately but not surprisingly, the evidence brought upon in the financial crisis since August 2007 shows that the light touch arguments are no relevant. In section II our analysis of risks will amply demonstrate that hedge funds destroy liquidity through distress sale of assets in times of turbulence, i.e. when it is most needed.

[10] Hedge funds contribute to market efficiency because they use new complex new financial products which spread risks among markets agents.

Supervisors are confronting three key issues: systemic risk, market integrity and investor's protection. At the same time, they must offer a flexible regulatory framework not to stem innovation that hedge funds are expected to stimulate. There has been no general agreement about this trade-off among regulators. However, pleas for stronger regulation of hedge funds are getting more attention. (see table 5).

Table 5: Summary table of characteristics of *hedge funds* and arguments of opponents and proponents of hedge funds impact in financial markets

Characteristics	*Arguments of proponents*	*Arguments of opponents*
• pool of private capital • offshore domiciliation • opacity because of lack of regulation and bias of databases • fiscal advantages • active trading on quoted negotiable and liquid assets • high double fees (management and performance) • Search for absolute return on short horizon • Broad investment strategies on capital markets with research for high return(α) and weak volatility (low β) • Financial leverage via short selling, collateralized borrowing and derivatives markets	• Price discovery (market efficiency) • Diversification of institutional investors (a new asset class) • Weak correlation between HF returns and market return in equities and bonds • Higher return and less volatility • Dispersion of risks • Liquidity	• Destabilisation • Leverage • Counterparty risk • (endogeneity of risks and pro-cyclicity) • Mimetic behaviour • Liquidity risk • Operational risk • Lack of transparency • Light regulation • Systemic risk

II. In-depth analysis of risks associated with hedge funds.

In light of the recent growth of these private investment pools and the development in the area of credit risk transfer, hedge funds are becoming a major player in risk dynamic, which leads to systemic risk. This issue is vital since crisis starting in the summer of 2007, because hedge funds have been major buyers of structured credits, above all the more speculative subordinated complex CDO tranches (table 6). Their influence and the lack of transparency (concerning information disclosures) have been becoming sources of mistrust on the part of institutional investors.

Table 6. CDO buyers

CDO tranches	Insurance cies	Hedge Funds	Banks	Asset Managers
AAA	6.9	12.1	14.5	5.8
AA	1.2	4.0	3.5	4.0
A	0.3	4.6	1.4	2.9
BBB	0.6	4.3	0.3	4.0
BB	0.0	2.3	0.3	0.3
Equity	0.9	19.1	4.9	1.7
Total %	9.8	46.5	24.9	18.8
Total $b	295	1396	746	564

Adrian Blundell Wignall, « *Structured Products : implications for financial markets* », OECD, December 2007, p45

Hedge funds have bought almost half the toxic products from sub prime and Alt-A household borrowing that have been arranged into pools of MBS and ABS by investment bankers and rating agencies. CDOs are second and higher order of securitization of those pools, mixing a hodge podge of credits based upon collateral of dubious value. The risks of such pools are impossible to assess, as much as the variable correlations within the pools, while the underlying collateral value has been plummeting, are unknown. Holding illiquid assets that they did not have to mark-to-market thanks to the locking up periods imposed to their partners, hedge funds could smooth out their losses and were paradoxically protected in the wake of the crisis. However the crisis has caught them up when their prime brokers at bay demanded pressing margin calls in March 2008, increasing the haircut. Unable to sell the assets that had lost most of their values, hedge funds have been withdrawing liquidity from the financial markets in trying to deleverage desperately.

Hedge funds risks raise issues because they have serious repercussions on finance and the real economy. Three parties are particularly concerned: institutional investors, prime brokers and prudential authorities. First, institutional investors amount to a main part of hedge funds capital because they have indulged to alternative investments in their drive to diversify. The question is the market discipline. In other words, have these investors the capacity to understand hedge funds risks and to monitor hedge funds? Second, prime brokers are always investments banks departments. The issue comes from the counterparty risk due to the interdependence between hedge funds and prime brokers, particularly in their short–term borrowing (reverse repos, loans against security deposits, leveraged derivatives, margin loans)..Third, market and banking prudential authorities are supposed to be responsible of the well- functioning of financial markets and to ward off systemic contagion leading to full-fledged crisis.

We are interested in hedge funds risk analysis in order to detect weaknesses in regulation and supervision vis-à-vis regulators and potential market discipline players. This entails to underline hedge funds hidden risks due to inadequate reporting. This lack of transparency is detrimental for several reasons. Hedge funds can give rise to systemic risk due to their own strategies (with potential extreme losses) and to the use of immoderate leverage, as displayed with the near collapse of LTCM in September 1998. Finally, hedge funds carry out risk-arbitrage in the credit structured markets. They have been a major buyer of illiquid structured credit vehicles, such as collateralized debt obligations (CDOs) and asset backed securities (ABSs). Due to their huge positions in these markets, they can be the weak link in the channel

of credit contagion. Consequently, as components of the unregulated shadow banking system, hedge funds can transmit systemic risk as much as banks do.

1. The hidden risks of hedge funds

Hedge funds boost high returns to lure institutional investors. Table 7 depicts annualized returns for the period January 1994 to December 2006. About half the strategies beat Stock market yields. They are often directional strategies. Furthermore arbitrage strategies ((*equity market neutral, convertible arbitrage, event-driven and multi strategy*) are less volatile as expected. However those performances are largely spurious because they are worth only in a Gaussian world. To pretend achieving absolute returns hedge funds resort to highly non-linear strategies Those strategies exhibit extreme risks due to asymmetric risk profiles and thick tails risks since they all have excess kurtosis. Some of the apparently most successful strategies (*event driven* and *fixed income arbitrage)* display vulnerability to extreme losses (negative skewness and very large kurtosis), as portrayed on table 8.

Moreover it is not the end of the story. Hedge funds data bases suffer from severe biases that can skew returns. They come from the lack of compelling information disclosures that hedge funds enjoy. It is not at all in their interest to disclose information when they are about to close or when they have poor performance. There are two main biases that add up: *survivorship bias* (due to the fact that some funds are liquidated and dropped from the sample) and *backfill bias* (when new fund are added, they may report only positive past returns). Much of the attractiveness of hedge funds returns for investors stem from those biases. Malkiel and Saha have attempted to correct the biases in getting back the data on the funds that have been dropped from the published hedge fund indexes. The results are spectacular indeed. In the best years the average performance is divided by more than two and in more dire times hedge funds fare worse than the Stock markets.(table 9).

These biases which skew hedge funds returns are becoming a greater problem for institutional investors with the crisis starting in the Summer of 2007. Indeed, hedge funds fees are very high: 25% of returns are attributed to general partners and 20% of these gains are prime brokerage fees for operational services or others.

Hedge funds must perform a minimal gross return of (11.3/1-0.20-0.25)=20.5% to make sure net expected return of institutional investors is more than 10%. It is impossible without a high leverage that makes hedge funds vulnerable to stress situation. Moreover, it is impossible to sustain such performance as long run return. The leveraged return is generated for its most part by in and out trading with dubious economical value, whose purpose is to generate performance fees at the expense of investors. Half of the time such market timing is not motivated by *contrarian* behaviour that might stabilize markets, but by strategic *momentum* to exploit the gregarious mood of the market.

Table 7 – Average return and standard deviation of different strategies of hedge funds (1994-2006)

Strategies	**Average return**	**Standard deviation**	**Sharpe ratio**
Convertible Arbitrage	9,04 %	4,62 %	1,09
Dedicated Short Bias	-2,39 %	16,97 %	-0,38
Emerging Markets	9,25 %	16,00 %	0,33
Equity Market Neutral	10,01 %	2,88 %	2,09
Event Driven	11,77 %	5,54 %	1,40
Fixed Income Arbitrage	6,46 %	3,66 %	0,67
Global Macro	13,54 %	10,75 %	0,89
Long/Short Equity	12,09 %	10,05 %	0,81
Managed Futures	6,50 %	11,84 %	0,21
Multi-Strategy	9,57 %	4,29 %	1,30
Indices boursiers			
Dow Jones	9,18 %	14,60 %	0,35
Russel 2000	8,69 %	18,56 %	0,25
Nasdaq	8,87 %	26,10 %	0,19
S&P 500	8,66 %	14,27 %	0,33
DJ EUROSTOXX 50	10,77 %	18,93 %	0,36

Source : Sabrina Khanniche, « *Mesurer le risque des hedge funds* », Groupama-am, mai 2007.

Table 8 - Non Gaussian risks of hedge funds strategies

	Skewness	**Excess of Kurtosis[1]**
HF strategies		
Convertible Arbitrage	-1.37*	3.39
Dedicated Short Bias	0.4*	2.15**
Emerging Markets	-0.70*	4.90**
Equity Market Neutral	0.33	0.43**
Event Driven	**-3.45***	**25.06****
Fixed Income Arbitrage	**-3.11***	**17.07****
Global Macro	0.03	3.13
Long/Short Equity	0.21	4.03**
Managed Futures	0.03	0.40**
Multi-Strategy	-1.21*	3.40

Source : Sabrina Khanniche, *« Mesurer le risque des hedge funds »*, Groupama-am, mai 2007.
*Skewness ≠0 at 5 % level. ** Kurtosis ≠3 at 1 % level
1.Excess Kurtosis is the measured kurtosis of each strategy minus 3 (the level of kurtosis for Gaussian distribution)

Table 9. – Average return with and without adjustment for hidden biases

	1994-2003	**1995-1999**	**2000-2002**	**2003**
Tremont HF index : return ***without*** adjustments Malkiel-Saha [1]	11.11	18.16	4.09	15.47
Tremont HF index : return ***with*** adjustments Malkiel-Saha[1]	2.32	9.37	-4.66	6.72

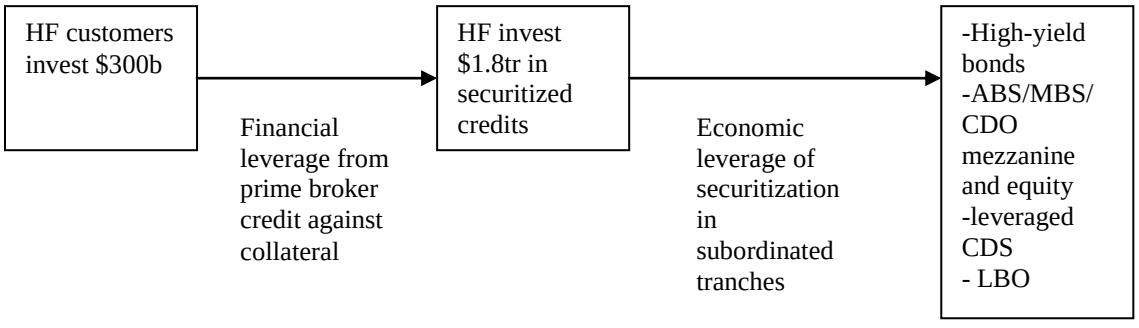
[1] Malkiel, B. G./Saha, A. (2005): "*HFs: Risk and Return*", Financial Analysts Journal, Volume 61, Number 6, CFA Institute. (TASS data base).

2. Hedge funds generate systemic risk

Long-run real growth rates are low in developed countries: about 3% in the US, 2% in the Euro area. With 2% inflation target, nominal bond interest rate is 4 to 5%. The equity risk premium may be 4 to 6%. Therefore the average return to equity is between 8% and 10%. In those financial conditions, hedge funds cannot expect to perform absolute gross return over 20%, necessary to offer investors a net return higher than low cost indexed funds, without an aggressive risk appetite spurred by high leverage. There are several sources of potential extreme losses: first, the purchase of illiquid assets like CDOs on sub prime mortgages; second, non-linear risk profiles and inconsistent risk evaluations, third, immoderate leverage. All these risks are encapsulated in the heavy involvement of hedge funds in structures credit. securitized credit (graph 3).

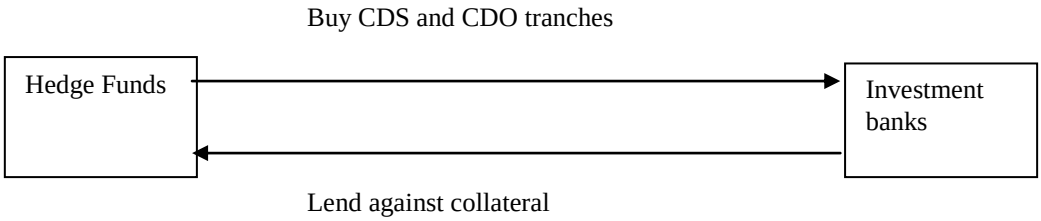
Average hedge funds leverage would be about 3 ($6 tr. with a 2 tr. capital). In securitized market, financial leverage is 6 (1.8 tr. with a 300mds. capital). This leverage has been increasing because hedge funds invested in leveraged products to boost their returns.

Graph 3. Added leverage on securitized credit



Concentration in illiquid assets attests the aggressive risk-taking of hedge funds between 2005 and 2007.Leverage generates important counterparty risks between hedge funds and prime brokers (graph 4).

Graph 4. Counterparty risk



In a speculative credit spree, prime brokers provide leverage to hedge funds on lax credit conditions (i.e. very narrow credit spreads and low initial margin).using leverage, hedge funds invest in more and more risky assets. They get the best price for their borrowing in making the most of the competitive market for prime brokerage.

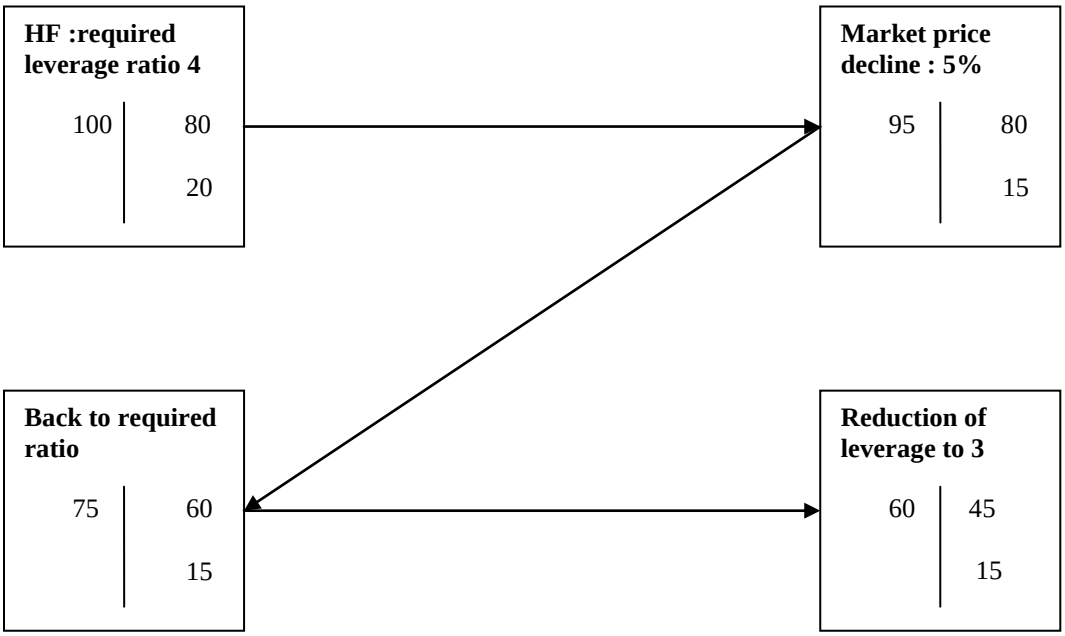
The increasing influence of hedge funds has been amplified by their concentration in the same strategies. A research study from ECB confirms: "… correlations between hedge funds strategies have been continually increasing since mid-2003 with a peak in 2005".

The compound of a strong correlation of hedge funds positions on the same instruments and an immoderate leverage generates a vulnerability of counterparty risk to an underlying assets prices turnaround. Hedge funds buy leveraged illiquid risky assets funded on short-term borrowing and ABCP (*asset-backed commercial paper* issuance). Consequently, hedge funds have the balance sheet structure of non-regulated banks. With the conduits and SIV (*Special Investment vehicles)* set up by investment bankers to shed the risks of asset pooling when they arranged the securitization process, hedge funds belong to the shadow banking system.

The build-up of the shadow system has been inconspicuous since the beginning of the growth of non-conform mortgage loans under the private aegis of investment bankers in the early 2000's. The standard banking model "*originate and hold"* has been replaced by another concept "*originate and distribute"*, whereby risk is sold, repackaged and disseminated to an array of investors. Eager to arbitrage between the securities tranches of structured credit, hedge funds are active participants with very little capital. This model is not regulated and lacks transparency. It holds and grows inordinately as long as the asset prices that back the whole process of credit and its transformation into securities keep on increasing. A sharp price reversal deteriorates the quality of the pooled credit and makes the securities issued against them illiquid. Hedge funds are very sensitive to the lack of liquidity resulting from the declining value of their portfolios. The more hedge funds engage in leverage, the more they must sell their liquid assets to provision their losses on the illiquid ones in stressful markets. This behaviour extends the propagation of distress from one market to another.

On graph 5, the destabilizing mechanism of leverage is illustrated. Let us consider a hypothetical hedge fund leveraged at 4 times the cash invested by its clients. Let us suppose that prime brokers do not want or cannot provide financing at a higher leverage ratio. If the value of the hedge fund's portfolio were to decline by 5%, the hedge fund would have to sell 25% of assets to maintain a leverage ratio of 4. In turbulent markets, prime brokers, which are underwriters of ABS and CDO, often impose a higher margin to respect the fact that the assets are now riskier. The resulting margin call (hair cut) requires hedge funds to reduce borrowing further and redemptions require further asset sales. Hence, hedge funds would have to sell 40% of assets (graph 5).

Graph 5. Distressed asset sales on bear market and balance-sheet contraction



Thus, in normal market conditions, hedge funds provide extra liquidity to financial markets via leverage. However, they propagate systemic risk in bear markets whenever the slump in the markets curtails their collateral value drastically. Incipient losses lead to a drying up of liquidity, which in turn induces investment banks to upgrade margin calls that hedge funds try to meet through distress sales of whatever assets they can sell.

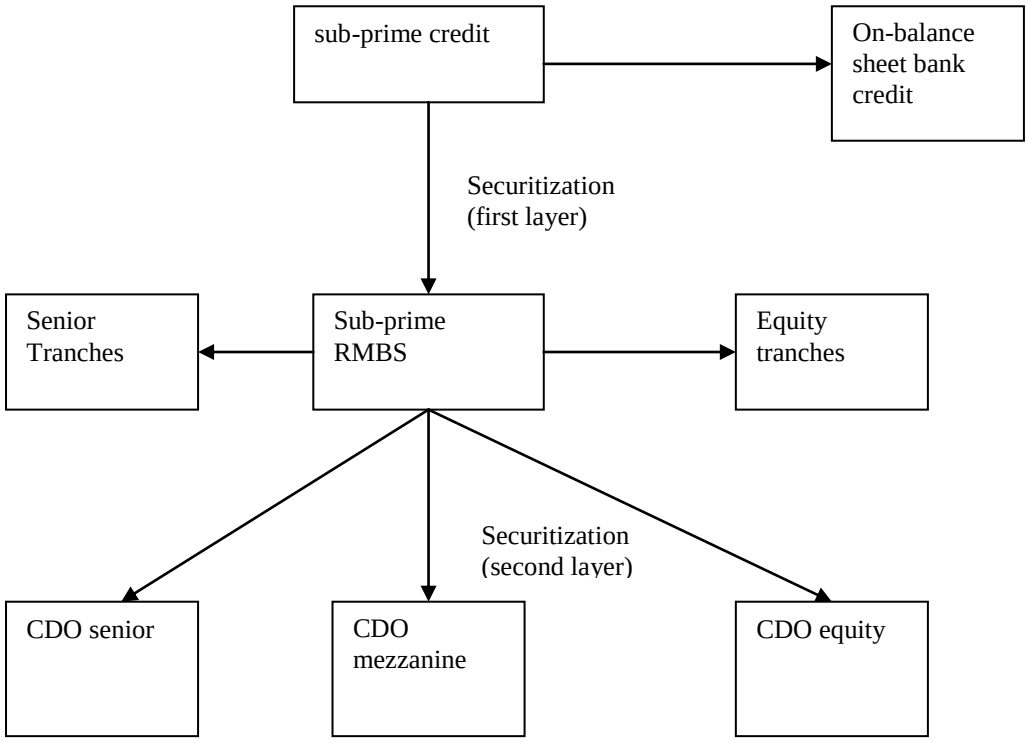
3. Hedge funds and the structured credit crisis

As noticed on table 6, hedge funds have been major buyers of illiquid structured credit vehicles such as collateralized debt obligations (CDOs) built upon pools of "sub prime" mortgage-backed securities. Because of their vital dependency to prime brokers, hedge funds are weak links in the spreading of systemic risk that has been revealed in March 2008. In order to understand fully the role of hedge funds, the development of the crisis must be investigated further. The crucial question is the following: why has the model of securitization become a machine to generate losses and propagate systemic risk, whereas it was supposed to disseminate risk and make the financial system more robust?

Securitization is a transformation of credit into securities. This change tampers risk profiles in order to disseminate risks on broader risk bearers. First, investment banks buy credits from initiators. Second, these credits are pooled and offloaded by investment banks, i.e. the portfolios of credits are taken out of their balance sheets and located into special investment vehicles (SIV) or conduits. In those structures the pool of credits is tranched. Securities are issued on the liability side of the structures applying a principle of subordination. The upper tranches are protected from losses emanating in the pool by the lower tranches according to

attachment points and thinness of the tranches. It ensues a profound change in risk profiles. In order to extract maximum fees, the intermediaries working in the process rely on multi-stage securitization, making risk assessment inextricable. Graph 6 exhibits a two-layer securitization. In the securitization channel, the more the risk is repackaged and the further from initial credits, the more illusory is risk valuation by quantitative models. These products have become very sensitive to underlying assumptions. Because correlations are badly known, and because they can change dramatically and unexpectedly, leading to huge increase in volatility, the behemoth pyramid of securitized assets is vulnerable to mistrust and defiance of investors. It has arisen after the fall in real estate prices has taken investors unaware, since the carelessness of investment banks and rating agencies had securitized the mortgage credits under attractive rating due to the assumption of a very low probability of a slump in real estate prices. This crucial assumption was rational from the point of view of the arrangers given that the whole process entailed massive moral hazard. It was in their best interest to sell as many securities as possible for maximum fees, while transmitting the risk elsewhere, and therefore to grant the highest rating to the upper tranches.

Graph 6. Successive levels of securitization



We have a better understanding when we analyse the CDO balance sheet and revenue account of a conduit. A numerical example is given for a $720 millions CDO (table 10). Securitization aims at obtaining an excess spread which is the difference between the asset pool revenues on the receipt side, the fees and the interests paid by on the tranches of the securities on the expenditure side.

Table 10: Balance-sheet and revenues of CDO

Balance sheet		**Revenues and payments**		
Exposure pool(mil $)	Security tranches (mil$ et %)	payment et fees	Amounts (mil$)	Rating and return (pb > Libor)
720	Super senior and senior 504 (70%)	Fee	10,8	
		super senior and Senior	30,24	AAA et AA (25) A (75)
	Mezzanine 201 (28%)	Mezzanine	15,3	BBB (180) BB (475)
	Equity 14 (2%)	Equity	1,8	No rating
		Excess spread	3,7	
720	Total 720	Revenue pool	61,9	BBB (200)

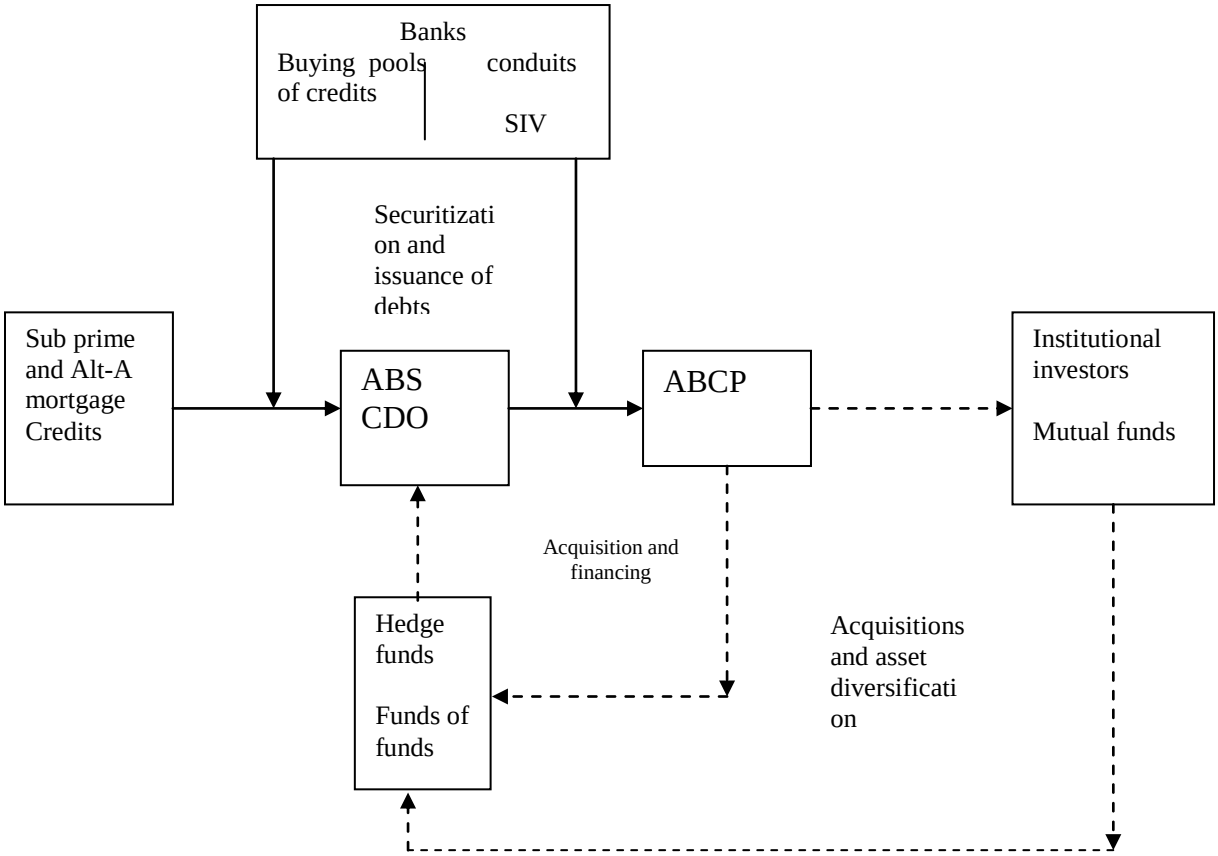
Source :A Blundell Wignall, « structured products : implications for financial markets », OECD, 2007

Given high fees, super senior tranches must be AAA and AA rated tranches, so that the promoters of securitization obtain an excess spread (net profit). Rating agencies play an important role in this process. Indeed, they must give an AAA rating to the super senior and a AA rating to the senior tranches built upon a BBB rated ABS pool so that institutional investors buy them. This alchemy is justified by subordination, i.e. the slicing/tranching process. Super senior tranches are protected from potential pool losses by lower tranches which cushion them.. However, to gain an excess spread, the low return tranches (high rating) must be thick. In other words, subordinated tranches constitute a too thin cushion to justify AAA rated senior tranches. That is why it was necessary to enhance the risk quality of the super senior tranches by means of insurance guarantees by provided by monoline insurance companies.

Off-balance vehicles have sold leveraged structured credit, mainly the subordinated tranches to hedge funds. When home prices have started falling, losses on ABS pools have widely exceed the losses estimated by rating agencies and embodied into their ratings. In that case, subordinated tranches were quickly annihilated and senior and super senior tranches got under attack. Risk re-evaluation has had dramatic repercussions on securitization channels, in particularly for hedge funds heavily leveraged and loaded with mezzanine and equity tranches.

Hedge funds position in the securitization labyrinth is described on graph 7. Hedge funds have been heavy buyers of ABS and CDO (sold by off-balance-sheet vehicles). They have financed these illiquid assets by two main ways: first, by prime broker credit mechanisms such as collateralized loans, reverse repos, derivatives and margin loans. All devices create counterparty risk. They have also issued ABCP (Asset-backed commercial paper,) i.e. commercial paper secured by ABS pools. This paper was bought and hold by unit trusts and mutual funds, which are providers of liquidity.

Graph 7. Securitization labyrinth



Hedge funds have a lot of leeway to hide their losses. They can capture their partners in long lock-up periods and they do not have to mark-to-market their positions. Consequently they can smooth out their performances. It is why they often appear less volatile than the markets. When the crisis erupted in August, the big hedge fund lie could work again. They claimed that they were immune to the crisis. Considering their involvement exhibited on table 6, it was nothing but a lie. But hedge funds could manage liquidity needs despite the acute liquidity crisis in selling some of their tradable assets. They contributed to episodic pressures on the Stock market but nothing dramatic arose before the first quarter of 2008.

With the continuous fall of real estate prices, more and more household borrowers suffered from negative equity values. They exerted their options of foreclosure, walking out their debt and abandoning a growing inventory of depreciated assets to the banks. Having to finance the forced inventory or to sell in a plummeting market, the banks have been running out of liquidity in early March. The worsening of the crisis has triggered a bold move by the Fed who has accepted to swap with the banks mortgage assets against Treasury securities that can be sold to get cash. Meanwhile the banks have to provision a growing amount of credit losses. In this bleak mood the primary dealers have begun calling back loans and issuing margin calls to hedge funds whose day of reckoning has finally arrived.

Hedge funds are being forced to deleverage, triggering the mechanism depicted on graph 5. They are selling their best assets to try to meet their debts, pushing all asset prices further down, except the most liquid Treasury securities that benefit from the flight to quality. Lots of hedge funds are going to become insolvent and lots will close, inflicting huge losses to their credulous institutional partners. Carlyle Capital, a highly geared fund launched by the Carlyle

Group (a private equity firm) to invest in mortgage-backed securities just before the crisis erupted, is the most spectacular casualty to date. On march 12 it defaulted on $16.6b of debts and expected to default on the rest after failing to come to an agreement with its creditors. The leverage ratio of the funds was 32 to buy AAA-rated paper that become worthless. It had to sell prime mortgage bonds whose price fell in tandem with home prices. Two days later the Carlyle Group acknowledged the insolvency of the fund. The banks will take possession of the remaining assets and sell them at loss feeding the spiral of declining real estate prices.

There will be many more casualties. Every hedge fund that has operated with a high gearing is going into trouble. They will entail boomerang effect on investment banks who have procured leveraged finance. Counterparty risk is leading to more deleveraging requirements and the failure to meet the commitments will widen bank losses. Already Bear Stearns has been destroyed by its heavy exposure to the Carlyle Group and to other highly speculative hedge funds.

At the time when the priority of hedge funds is shifting from performance to capital preservation and survival it is timely to overhaul the void of regulation that has allowed such a mess.

III. Analysis of guidelines in the framework of risk mapping

Professional organisations, regulatory authorities and international institutions have issued some recommendations regarding the regulation of hedge funds: FSA[11], SEC[12], AIMA[13], HFWG[14], FSF[15], IMF[16], PWG[17]...They are summed up within the framework of risk mapping in table11 which indicates the organizations, the risks drawn from the analysis in section II and the content of the recommendations. This oversight points out to the directions of future reforms.

1. The content of guidelines from professional organisations, regulatory authorities and international institutions: an oversight

Most recommendations of professional organisations recognize the hidden risks of hedge funds due to hedge funds Gaussian assumptions and several biases that can skew returns. In other words, these organisations are concerned as a whole by a lack of transparency of the hedge funds industry. There are few recommendations to prevent the systemic risk due to tight links with banks and to the heavy participation of hedge funds in financial markets (except the use of stress tests). There are no recommendation regarding the liquidity risk via the structured financial markets that are so worrisome and threatening to-day. Recommendations are always not compelling and focus on the contractual relation between investors and hedge funds managers. The manager always maintains a few restrictions for its investment strategies. To sum up, these guidelines correspond to a willingness to keep a light

[11] Financial Service Authority
[12] Secutities and Exchange Commission
[13] Alternative Investment Management Association
[14] Hedge Fund Working Group (created in 2007).
[15] Financial Forum Stability
[16] International Monetary Fund
[17] President Working Group

touch regulation, i.e. voluntary disclosures from hedge funds to investors, regulators and prime brokers. As for risk management procedures, these organisations assert that there have been some improvements and that the trend should continue. Therefore they are far from meeting the need of regulation displayed by the unfolding events.

The regulation authorities recognize the three types of hedge funds risks. But their recommendations are only concerned with the hidden risks and the systemic risk. There are no recommendations about hedge funds as propagation agents of systemic risk via the securitization process. The regulators trust market discipline mechanisms and indirect regulation. In their opinion, there is no need to increase the level of constraints and to strengthen the incentives mechanisms. More specifically, these recommendations emphasize manager registration with market regulators, due diligence, use of stress tests and reinforcement of cooperation between supervisors, as well as between supervisors and hedge funds/prime brokers.

Contrary to previous recommendations, those issued by international organisations are compulsory. They tend to give more obligations and responsibility to hedge funds managers and not only to investors. They are particularly interesting because they take into account all sources of hedge funds risks. They aim at making private and public disclosures compulsory (to reduce the reporting bias for example). These disclosures are important because they allow an easier monitoring of the individual hedge funds by investors.

Because they defend the interest of the hedge funds industry, recommendations of professional organisations seem quite consistent. The stance of regulators is more paradoxical. On the one hand, regulators are concerned about the potential for systemic risk and the financial stability. On the other hand, they value hedge funds for their contribution to market efficiency. Because of this dogmatic position, they are reluctant to compelling recommendations and prefer to promote due diligence by counterparties. Three reasons explain this position: first, the dispersion of prudential responsibility among the supervisors regarding the objectives of customer protection, financial stability and market integrity. Some economists advocate a closer collaboration between the Bank of England and the FSA (Danielsson). Another explanation is the willingness of regulators to make their financial centre more attractive even if risks are bigger. Finally, we have to note that hedge funds lobbies have a lot of influence.

2. ***Table 11. Summary of recommendations and hedge funds risks: an analysis***

Recommendations/ HF risks	**FSA**	**SEC**	**Fed**	**AIMA HFWG**	**FSF**	**G8**	**IOSCO**	**FMI**	**PSE**	**PWG**	**FMG**	**interview**
Risks related to strategies: opacity and no disclosure of reporting =hidden risks and bias returns	RR ++	RR ++	RR	RR ++	RR ++	RR++	RR	RR++	RR++	RR	RR++	RR+
Compelling registration of HF managers to regulators (C)	+++	+++	-	+		+++			+++		+	big HF- small HF+
Compelling public disclosure of regular and reliable information: (management models, risk profile, strategies, positions, fees structures, stress testing, liquidity, management incentives structure…	-	- -	-	-	+	+		-	+++ +++ +++ +++ +++ +++ +++ +++	-	-	---
Setting-up of a public database about HF (fees, risk profile…)(C)		+ +										
Setting-up of an International Credit Registration					+++	+++			+++			
Private compulsory disclosure from HF to PB about liquidative value of HF, risk exposure, liquidity…) -from HF to regulators: -from HF to investors:	 ++	 ++	 + ++	 ++	 ++	 ++ ++		 ++	 + ++	 ++	 - ++	 + ++ ++

Recommendations/ HF risks	**FSA**	**SEC**	**Fed**	**AIMA HFWG**	**FSF**	**G8**	**IOSCO**	**FMI**	**PSE**	**PWG**	**FMG**	**interview**
Implementation of a differentiated rating for structured products								+++				
Initial/ ongoing Due diligences by investors (NC)	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Influence of institutional investors in the promotion of transparency of HF					+++ (cole)				+++	+++	++	-
Reinforcement of the industrial cooperation (good practices / professional guidelines) (NC)	+++	+++		+++	+++		+++			+++	+	+/-
Reinforcement of the international cooperation Formal and informal (NC) -between regulators (BC et AR) - between regulators and HF	+++ +++ +++	+++		+++			+++	+++			+++	+
Risks linked to strategies: sources of systemic risk =non Gaussian risk profile, extreme losses amplified by high leverage	RR ++	RR ++	RR ==	RNR	RR ++	RR ++	RR	RR ++	RR ++	RR	RR++	RR+-
Aggressive risk taking spurred by competition and by high performance fees =counterparty risk et extreme loss on complex markets					RR++			RR++	RR++			

Recommendations/ HF risks	**FSA**	**SEC**	**Fed**	**AIMA HFWG**	**FSF**	**G8**	**IOSCO**	**FMI**	**PSE**	**PWG**	**FMG**	**interview**
Bi-annual inquiries on PB to assess HF exposures and risk profile for an increased monitoring and direct dialogue with the biggest HF	+++	+++			+++					+++	+++	++
Well-targeted inquiries on credit risk management practices on PB	+++	+++						++			+++	
Increasing correlation into strategies and between strategies in stress market period*							RR++	RR++				
Trading and concentration on illiquid markets =liquidity risk							RR++	RR++				
Stress tests (C) -at individual level -at consolidated level simulation of margin calls on the whole exposures	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Private disclosures from PB to regulators: aggregated positions of all the HF on key markets					+++	+++			+++			
Compulsory disclosures from PB to regulators : HF exposures Stress testing of *potential future credit exposure*					+++	+++			+++			

Recommendations/ HF risks	**FSA**	**SEC**	**Fed**	**AIMA HFWG**	**FSF**	**G8**	**IOSCO**	**FMI**	**PSE**	**PWG**	**FMG**	**interview**
Immoderate financial leverage and concentration in complex derivatives Extreme loss risk Counterparty risk	RNR	RNR	RNR	RNR	RR++	RR++		RR++	RR++			
Disclosure of stress test results (C)					+++			++	++			
Setting-up of a netting for derivatives on OTC markets(C)					+++			+++				
Adequate capital requirements for counterparty risk (C)					+++			++				
Transmission of prerogatives to central bank									++		+++	++

RR : recognized risk RNR : Non recognized risk C : compelling NC: non compelling
- : against
0 : unconcerned
+ : not very favourable
++ : favourable
+++ : very favourable

FSA : Financial Service Authority
SEC : Secutities and Exchange Commission
FED : Federal Reserve (US)
PSE : European Parliament report (Socialist Party)
FMG: Financial Market Group (London School of Economics and Political Science))
AIMA: Alternative Investment Management Association
HFWG: Hedge Fund Working Group (created in 2007).

FSF: Financial Forum Stability
IMF : International Monetary Fund
PWG: President Working Group (US)

The in-depth analysis of risks points out to three main types of risks: first, the hidden risks resulting from the lack of transparency of hedge funds, second, the counterparty risk (via the prime brokers and the financial leverage) and third, the liquidity risk via the structured credit markets.

Lack of transparency

The opacity of hedge funds strategies and the lack of reporting disclosures lead to hidden risks due to Gaussian assumptions and several biases of hedge funds. These risks claim for a regulation that aims at improving transparency thanks to compelling disclosures. That applies to hedge funds managers in their relationships with investors, prime brokers and regulators. By constraining the hedge funds to make disclosures, reporting biases can be reduced and the data bases made more complete and reliable. These disclosures would lead to an easier monitoring of hedge funds by investors and regulators. They are prerequisites for effective market discipline. Several compelling recommendations, such as hedge fund managers registration with regulators, are a partial but insufficient step in the right direction.

Hedge fund managers registration with supervisors is already effective in the United Kingdom (FSA), not in the United States. This registration constitutes a first morality control of managers because it allows supervisors to carry out investigations on manager background and on their investment activities. It is a prerequisite while not a necessary and sufficient condition for the improvement of transparency. Indeed, investors call on private detectives quite often to investigate further after the first control. This entails an additional cost for investors. The contract between investors and hedge funds manager is based on trust. That is why the evidence of honesty is vital. Considering the high information asymmetries and conflict of interest upon exorbitant fees, hedge fund managers are systematically suspected of dishonesty. The SEC requires registration from small hedge funds managers. It would be more logical to focus on big hedge funds, because they are the ones more prone to have a systemic impact.

Concerning private disclosures, we can point out three recommendations which go in the right direction: disclosures from prime brokers to supervisors (exposures hedge fund by hedge fund according to different type of risks); disclosures from hedge funds to prime brokers (quantitative and qualitative indicators of liquidative value, risks exposures…), information disclosures from hedge funds to supervisors (positions and some information about risk management).

Thus, voluntary recommendations, regarding disclosures, are not prerequisite for an efficient market discipline, i.e. for an effective hedge fund monitoring. Indeed, we think that private and voluntary disclosures between hedge funds managers and investors have certain limits (formalization of contracted transparency). The hedge fund manager often sets these limits individually. The interviewed hedge fund managers admit they have disclosed information to investors, but if the latter require too much information, managers refuse to communicate too extensively. In their opinion, it is part of the contract. Investors must have trust in hedge fund managers and consequently they should not ask too many questions! That is why we think that the nature of the contract must change between investors and hedge fund managers. Market discipline without mandatory prerequisite cannot be efficient.

A last recommendation brings out the role of institutional investors to promote hedge funds transparency as a source of market discipline. As we have noticed in the first section, there

has been an institutionalisation of hedge funds industry for ten years with a wider share of public saving. This evolution should logically entail a shift towards stronger hedge funds regulation. Indeed, there is a principal-agent relationship between investors and managers due to information asymmetries. These asymmetries undermine the investors' capacity (even qualified investors) to carry out due diligence. Given the complex strategies and the opacity of hedge funds, investors can make mistakes with monitoring that can lead to allocations errors. Today, there is only one control which is performed when the manager is chosen. This procedure takes time and is expensive. Moreover, investors count on consultants who often collude with hedge funds managers.

Institutional investors are basically considered as qualified investors, that is to say, they do not need additional protection like retail investors. But most interviewed pension fund managers told us how difficult it was for them to monitor hedge funds, despite their management experience. Moreover, it is easily forgotten that pension funds are not the ultimate investors. Consequently, institutional investors have an increasing need to have more information about hedge funds via compelling disclosures. It is in their best interest to play a role as a new important force of market discipline. Until now, they do not really play that part. We can expect a shift in the future. Besides, some international organisations and some hedge funds agree with that point of view. Institutional investors would be the first to benefit from a more demanding regulation.

Institutional investors can be effective principals in their relationship with hedge fund managers if they succeed in changing the nature of the delegation. The contract should be based on profit sharing as opposed to performance fees.

Counterparty risk: how could it be reduced?

Another concern underlined by our risk analysis is the financial leverage employed by hedge funds and provided by prime brokers through on- and off-balance-sheet instruments (derivatives markets). It is also called the credit counterparty risk. The results of empirical researches show that prime brokers have incentives to maximise their business with hedge funds. Their trading services are remunerated with fees that depend only on the volume of transactions. Their off-balance sheet collateralized lending eschews capital requirements. Therefore they have all incentives to reduce initial margins even if it is not justified by a decrease in risk. Therefore contrary to what proponents of indirect regulation claim, prime brokers are not encouraged to regulate hedge funds. In the present financial crisis, counterparty risk has come back with a vengeance upon prime brokers and subsequently upon investment banks, as the fate of Bear Stearns which has aggressively promoted highly leveraged hedge funds should remind everyone. One can conclude that it is a bad contention to pretend relying on indirect regulation via counterparty risk. There are better ideas.

The setting up of a multilateral netting and settlement of derivatives transactions on over the counter (OTC) markets should reduce substantially the amount of open positions.. Another more radical response would be the limitation of securitization to standard normalized credits that could be channelled on organized markets. The daily clearing service of the clearing house automatically limits open positions and triggers margin calls to back up increasing exposure.

Liquidity risk

The last concern is the liquidity risk associated with structured credit markets. Hedge funds have been major buyers of illiquid structured credit vehicles, such as collateralized debt obligations (CDOs), collateralized loans obligations (CLOs) and asset-backed securities ABSs). These illiquid assets are financed by liquid debt. Still leveraged hedge funds are not equipped to absorb risk. They carry out risk arbitrage to exploit market anomalies and are exposed to extreme losses in abnormal conditions. Under normal market conditions, they can contribute to the dissemination of risks. In times of turbulence they can be the weak links in the contagion chain. Consequently, like banks, hedge funds which are shadow banks are transmission agents of systemic risk. They are vulnerable to the interaction between credit risk and liquidity risk because of their leverage. In stress conditions, they must sell their assets in falling markets. Those distress sales feed up a contagion process across markets.

The whole structure of risks calls for a comprehensive reform in the regulation of securitization that involve all the main intermediaries, investments banks, rating agencies and hedge funds. The incentive of investment banks to securitize credit for pure regulatory arbitrage should be closed by a revision of Basel II that should cancel this incentive. Rating agencies that apply wrongly the same methodology to deal with the tranching of a fixed pool of credits and to deal with corporate bonds should review their practice. Rating through the cycle has absolutely no meaning for asset securitization, because credit and liquidity risk are intrinsically intertwined. Pretending that both credit and liquidity risks can be separated leads to mammoth errors. Hedge funds should use stress tests and disclose their results and other data such as their positions on illiquid markets to supervisors, so that they could be aggregated for a better monitoring of liquidity risk.

Indeed, liquidity risk is an aggregated risk. Only the supervisor in charge of financial stability can detect it. Stress tests can be indicators of potential losses which can be reflected in banks balance-sheets. The action of regulators occurs at the aggregated level and not at the level of the individual hedge fund. Aggregate stress tests can simulate the interaction between liquidity risk and counterparty risk. They make it possible to get some insight into the variation of correlations in pools of assets due to liquidity shocks. This is why the results of individual stress tests must be disclosed to supervisors.. Stress tests and scenario analysis are recommendations which aim at enhancing liquidity risk management.

Regulation should go deeper than disclosure requirements

Some recommendations move in the right direction too. Private disclosures from prime brokers to supervisors about aggregated positions of global hedge funds on key markets and the setting up of a public database on hedge funds (structure of fees, risk profile…) are recommendations which could help central banks to prevent liquidity risk. The setting up of a more differentiated rating scales by rating agencies for structured products should help investors not to go astray with liquidity and market risks.

As far risk management is concerned, the evidence suggests that voluntary propositions are inadequate. The crisis of the summer 2007 showed the weaknesses of the credit model "originate and distribute" which entails all the links of the transmission risk as such hedge funds. This crisis showed that credit risk management models were not adjusted to securitized products/ vehicles. There was no historic data base for these products. In stress markets, these models do not anticipate extreme losses hidden in non-linear vehicles like CDOs.

This analysis shows the directions of reform: the need for direct regulation, the improvement of indirect regulation and the overhaul of securitization. The prospective pattern of regulation encompasses macro and micro issues, and impinges upon factors of demand and supply. It emphasizes the enhanced role of public regulators and displays the conditions of an effective market discipline performed by long-run institutional investors.

IV Policy implications

There is no question that securitization is a viable principle. Under certain conditions, securitization may contribute to reducing credit costs, improving bank flexibility and making accessible credit instruments in the asset allocation of institutional investors. Nonetheless the "originate and distribute" investment bank model is a mechanism which destroys information. Indeed, on the one hand, this model has no incentives to monitor borrowers (solvability) when credits depend on expected wealth, which is itself a function of credit expansion in a roundabout process. On the other hand, the securitized chain is an information loss process in lengthening the distance from original borrowers to ultimate bearers of risk up to the point that the latter has no knowledge whatsoever on the borrowers' capacity to serve their debt.. When CDO are sold by off-balance-sheet vehicles to hedge funds and to asset managers who are the risk bearers down the line, those investors have no independent means to assess risk properly. They must rely entirely on rating agencies who have all interests in total symbiosis with investment bankers to sell the tranches for fees. Therefore securitization has entailed a massive erosion of accountability in magnifying asymmetries of information all along the tortuous chain of multiple securitization. One way to improve securitization is for regulators to accept only simple pools of homogeneous ABS. Multiple-layered securitization should be forbidden since no one can understand what a CDO^2 or a CDO^3 mean as far as risk profiles are concerned.. In other words, the benefit of transferring risk must be higher than the cost of worsening asymmetric information. This regulatory objective implies an overhaul of securitization

Market regulators should authorize simpler securitizations

Simpler securitization rests upon homogeneous asset pools and a banning of multi-level securitization of heterogeneous assets (where risk cannot be possibly evaluated by any model). Hence, the securities issued in the process could be traded at least partly on organised markets and not on OTC markets only. Furthermore, even in OTC markets, ABS trades could be cleared and settled multilaterally. Centralisation and standardisation would prevent individual risks from generating in systemic risk. The daily multilateral netting process aggregates net positions and monitors margin calls. Individual positions are sold whether they cannot satisfy margin calls.

Bank regulators should close incentives to regulatory trade-off

This aim implies: first, a compulsory re intermediation of SIV into bank balance-sheets; second, retaining equity tranches into bank balance-sheets by originators (i.e. banks); third, adequate capital requirements against these tranches.

The oligopoly of rating agencies requires terms and conditions

The credit crisis has raised paramount issues concerning rating agencies. On the one hand, many conflicts of interest have been heightened in securitized credit. On the other hand, the corporate bond rating model has been inadequately applied to securitized credit. Indeed, the most complex CDO risk cannot be evaluated. Concerning securitized credit, rating agencies aim at giving the best rating in order to sell tranches. "Mark-to-model" has been replaced by "Mark-to-myth" which consists in matching rating to sellers' interests. The result is that AAA means quite different risks according to the type of instrument that is rated. Besides, rating agencies have become part of Basle prudential regulation without any accountability requirement whatsoever. The agencies go on pretending they issue mere opinions, while they have become the fulcrum of bank capital regulation and the exclusive providers of certification in financial markets. This private oligopoly provides an indispensable public good to financial markets. It is not the best arrangement , to say the least, for a public good to be delivered by a private oligopoly. This hypocritical situation must change. The minimum that should be required is accountability towards a body of international market regulators.

How should accountability be designed?

The first best solution would be the following: rating agencies produce a public good such as a standard for financial market, as well as the unit of account is the standard for goods market. In that way, it would be logical to set up public rating agencies with a status alike central banks. Such a radical reform is not ripe as long as the ideology of self-regulating markets is still prevalent. A second best solution is more conceivable. In other words, prudential authorities may supervise rating agencies whose mission would be to provide only ratings.. Regulators should forbid rating agencies to provide consultant services. Moreover, regulators should monitor agencies models. Above all, agencies should be paid by both issuers and buyers.

Conclusion

Beyond technical reforms concerning securitization, prudential regulation is at stake. The Basle prudential regulation has a main drawback. Basle has encouraged a dubious regulatory trade off in securitized credit as well as a pro-cyclic prudential regulation. Intermediaries (hedge funds, prime brokers, investments banks…) have engaged in immoderate leverage because prudential regulation and monetary policy were permissive. The "originate and distribute" model of banking epitomises the runaway dependency of developed economies to careless credit expansion.

The same ratio of capital should be required on credit which is registered in balance-sheet or not. Risk monitoring should be reinforced whatever the type of financial institution that finally bears it. Cooperation between regulators should be strengthened in order to homogenize credit risk management. Above all, anti cyclical capital detention should be imposed on banks. Indeed, when asset prices and credit accelerate in tandem, regulators should be concerned. During the euphoric stage of the financial cycle, banks should store a part of their high profits.

Concerning reforms, of financial regulation it is important to realize that voluntary regulation is equivalent to no regulation. Codes of good practices are inefficient if there is no attached convincing threat to their failure. That is why, pleas for compelling regulation of hedge funds should get more attention.

Even if the "originate and distribute" model of investment banks is reformed, it should be partly replaced by capital financing model i.e. the long-run financial investor model. With the rapid expansion of sovereign wealth funds, this model has huge potential. It is the only one to promote long-run investment for sustainable development and to bear the extra financial risks of ageing. The long-run institutional investors must better monitor hedge funds. With a much imporved monitoring hedge funds would have to play their theoretical role in financial markets, i.e. discovery of new sources of long run economic value.

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