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Contents

FOREWORD

This 10th edition of the Banque de France's Financial Stability Review is a special issue dedicated to hedge funds, whose growing contribution to financial transactions has been drawing much attention.

With the aim to shed light on the multiple issues at play, the review brings together pieces from a weighty group of professional and economists representing various business areas: financial institutions, academia, supervisory authorities and central banks. It also includes a comprehensive bibliography. The combination of views expressed here provides useful insights on the most relevant topics in terms of financial stability and regulation and will probably contribute to shaping the debate regarding the challenges brought by hedge funds to the world economy.

I thus wish to express my profound gratitude to each distinguished author. We are indeed indebted to all of them for allowing us to benefit from their tremendous expertise and experience gained at the very heart of the financial system.

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Hedge funds, credit risk transfer and financial stability

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Over the past decade, central bankers and financial institution supervisors have sharpened their focus on the increasingly important role that private pools of investment funds play in global financial markets. The growth in these pools has contributed significantly to market efficiency and financial stability by expanding liquidity in many financial markets, improving price discovery, and, ultimately, lowering the costs of capital. Private investment pools and the alternative investment strategies they pursue have contributed to a significant expansion of the global markets and have helped accelerate the evolution in traded credit products such as credit derivatives, collateralized debt obligations, and the securitization of an increasing array of traditionally illiquid assets. However, because of the lack of transparency and an established regime of supervision of these investment vehicles, policymakers and supervisors have become concerned about customer protection and the potential for systemic risk. This paper discusses some of the key issues confronting supervisors in light of the recent growth of private investment pools and the rapid developments in the area of credit risk transfer, with a particular focus on the implications of these trends regarding systemic risk and financial stability.

NB: The authors are grateful for insight provided by John Colwell, Robert Cote, James Embersit, Patrick Parkinson, and others at the Federal Reserve Board and the Federal Reserve Bank of New York (FRBNY).

Private investment pools pursue a diverse set of investment strategies, and it would be useful at the outset to broadly differentiate between those that specialize in privately held investments (private equity funds) and those that focus primarily on traded instruments (hedge funds). While the lines between the two are increasingly blurring, such distinctions permit supervisors and policymakers to better target issues that may be of concern. Hedge funds, the primary focus of this symposium, can be defined as private pools of funds that invest in traded instruments (both cash securities and derivatives); can employ leverage through various means, including the use of short positions; and are generally not regulated. Their increasingly important role as counterparties to established investment and universal bank dealers, combined with the fact that they pursue many of the same strategies as regulated dealers, has given rise to increasing concerns about their potential for contributing to systemic risk. The concern is that in the event of a major financial shock, the complex web of exposures among highly leveraged hedge funds and dealer institutions may increase the risk that problems at one financial institution would spread to other institutions. Given the difficulties that would be involved in creating a global supervisory framework for hedge funds, significant responsibility falls upon dealer banks that extend leverage to hedge funds and their supervisors. The risk-management processes employed by dealer banks are critical elements in preventing a financial shock from spreading.

1| THE GROWING IMPORTANCE OF HEDGE FUNDS

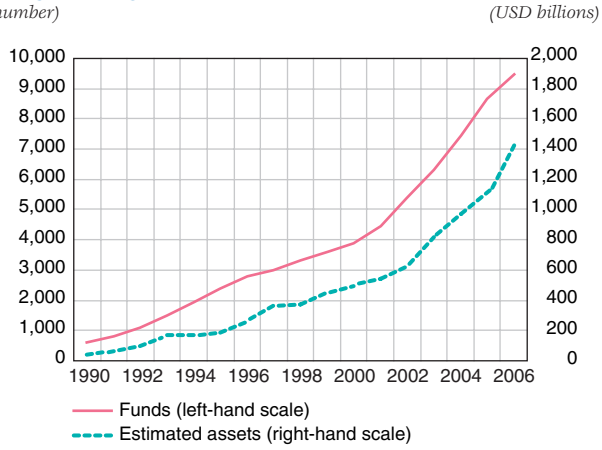
Over the past decade, hedge funds have grown rapidly in both size and importance. At the end of 2006, they managed an estimated USD 1.426 trillion in assets, over 700 percent more than in 1995 (chart 1[1]). Hedge funds now account for a significant share of the trading in many markets.

With that growth has come some measure of maturity. Hedge funds were once typically small groups of entrepreneurs; today many are large financial institutions employing hundreds of people. In 1990, "macro" strategies accounted for over 70% of hedge fund assets; today, hedge funds invest in diverse asset classes and strategies, with no single strategy accounting for more than a third of hedge fund assets (chart 2[2]).[3] Even within a strategy class, hedge funds now use more diverse methods to select and manage positions. Although hedge funds can still take concentrated positions in a single market, this diversity may reduce the potential that hedge funds may act in concert and disrupt markets by pursuing similar trades, which has been one of supervisors' major concerns. Academic studies have found little evidence that hedge funds have systematically caused market prices to deviate from economic fundamentals during major market events.[4]

2| CREDIT RISK TRANSFER MARKETS

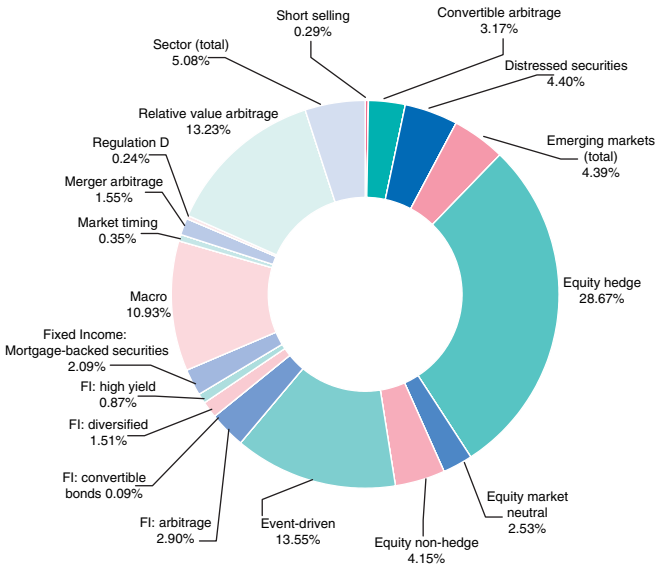
The growth in assets managed by hedge funds and the increasing diversity of hedge funds' strategies reflect the growing importance of hedge funds in a wide range of financial markets. Of particular interest is the role hedge funds play as providers of liquidity and the ultimate holders of risk in the dynamic and growing credit risk transfer markets, which include such products as credit derivatives, secondary loans, securitizations such as mortgage-backed securities,

Chart 1
Hedge fund growth



1 *Hedge Fund Research, Inc., © HFR, Inc., January 2007,* www.hedgefundresearch.com.
2 *Hedge Fund Research, Ibid.*
3 *Macro funds attempt to identify inefficient pricing in stock markets, interest rates, foreign exchange rates, and physical commodities. Their top-down approach concentrates on understanding how global macroeconomic and political events affect the valuations of financial instruments; they tend to have broad investment mandates that allow them to hold positions in practically any financial instrument in any market.*
4 *Fung (W.) and Hsieh (D. A.) (2000): "Measuring the market impact of hedge funds",* Journal of Empirical Finance, *vol. 7, pp. 1–36.*

Chart 2
Estimated strategy composition by assets under management



and other structured credit products. As an indication of the increased role of hedge funds in credit risk transfer markets, the percentage of hedge fund assets categorized in strategies that usually invest in credit-linked assets increased from 6 percent in 1990 to 16 percent in 2006. Hedge funds are now investing in assets once widely held by banks through lending activities.[5]

While commercial banks traditionally used their deposit base and other funding sources to finance, originate, and hold loans to maturity, today they can remove these loans, or the credit risk underlying these loans, from their balance sheets through securitization, the bond markets, the issuance of derivatives products, or outright sale on secondary loan markets. In 2006, a total of USD 4.6 trillion was issued in US credit market instruments;[6] by comparison, all insured US commercial banks had USD 9.6 trillion in assets as of September 2006.[7] Many banks have found a successful business model as originators and distributors of credit risk, and hedge funds have stepped in as key buyers and holders of that credit risk. Hedge funds thus provide a double benefit to banks. They reduce banks' credit risks by taking assets off of their balance sheets, and they improve banks' liquidity by providing a market for their securitizations and other financing strategies. At the same time, of course, for banks that do business with them, hedge funds pose a number of new challenges in managing credit, market, and operational risk, as discussed in greater detail below.

Banks now participate in credit risk transfer markets in several ways. They use syndications, securitizations, and credit derivatives to transfer credit risk to other banks, allowing them to reduce credit concentrations and diversify their exposures. Banks also use these techniques to distribute credit risk to other investors, reducing both their own credit exposure and the banking system's. As the investment base for these credit products has grown, banks have become dealers in the credit risk transfer markets, serving as intermediaries between investors who are adjusting their exposures to various credit risks. The last category comprises the dealer banks, that is, investment banks, and universal banks that make markets in traded credit instruments.

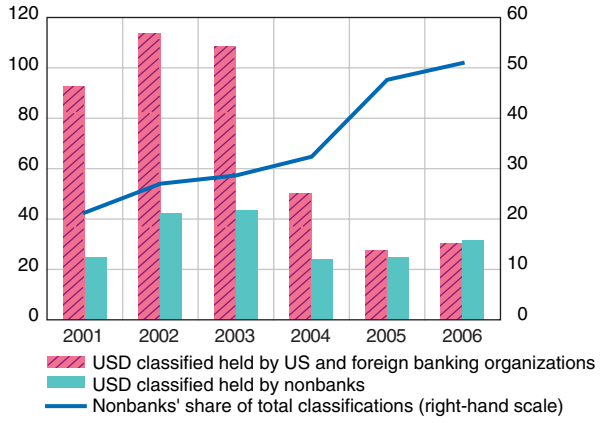
It is difficult to quantify the role hedge funds have played in the disintermediation of commercial banks' traditional lending role, since hedge funds are not required to report their investment holdings. However, US banking supervisors have some understanding of hedge fund activities through the Shared National Credit (SNC) program, an annual joint examination of major syndicated credits in the United States. According to SNC data, nonbank lenders (including hedge funds) have increased their holdings of syndicated loans in the United States from USD 178 billion in 2002 to USD 267 billion, or 14 percent of total credits, in 2006 (Table 1). The SNC data also suggest that hedge funds (along with mutual funds, pension funds, and insurance companies) have become significant holders of some of the riskiest assets in the financial system: between 2002 and 2006, nonbank lenders

Table 1
Share of total commitments
(%)

	2001	2002	2003	2004	2005	2006
US banking organizations	46.2	45.2	45.4	46.4	44.8	44.3
Foreign banking organizations	45.6	45.2	43.8	41.6	42.0	41.5
Nonbanks	8.2	9.5	10.9	12.0	13.2	14.3

5 *Basel Committee on Banking Supervision (2005): "Credit risk transfer", March, provides an overview of the trading of credit risk.*
6 *Securities Industry and Financial Markets Association (2007): "US market outlook", January.*
7 *Call Report data.*

Chart 3
Nonbanks hold a rising share of classified credits
Total classifications: US & foreign banks vs nonbanks
(USD billions) *(%)*



increased their holdings of classified credits from 27 percent to 51 percent of total classified credits (chart 3).[8] In 2006, USD 10 billion of these credits would have been on nonaccrual status had they been held by banks. Hedge funds' willingness to hold high-yielding assets has clearly provided banks with a new way to exit risky credits.

2|1 Supervisory concerns about credit risk transfer

Although the transfer of risk from banks to hedge funds allows banks to better manage their credit risks, some supervisory issues surround this transfer. One concern is that this risk hasn't been transferred so much as transformed into counterparty credit exposure to the hedge fund. For example, in the purchase of credit protection on a loan via a credit default swap with a hedge fund, a bank would no longer bear direct credit risk to the original borrower but would instead have counterparty credit risk to the hedge fund. Another concern is that banks that provide financing to hedge funds may find securitized assets coming back onto their balance sheets at inopportune times if losses on the securitized assets cause hedge fund failures.

Dealer banks in credit risk markets must adapt traditional market risk management tools to these markets. New credit risk instruments create additional challenges: for example, many credit derivatives require the delivery of senior debt instruments in the event of a default. The amount of senior debt that must be delivered to fulfill the credit derivatives contracts can be more than the amount of senior debt that has been issued by a company. Market participants have worked diligently to develop an orderly process for fulfilling credit derivatives contracts, but the process remains largely untested. Dealer banks may also find new credit instruments difficult to price. Without liquid markets to provide price discovery, different dealer banks may value these transactions quite differently. As liquidity improves, banks will have to adjust and calibrate their pricing in these markets.

Another concern is how hedge funds will interact with commercial banks when it is time to restructure a loan with a borrower. In the past, banks that held loans on their balance sheets had a substantial financial incentive to come to an amicable workout with borrowers. When banks securitize loans, however, that incentive may be diminished because they don't bear as much of the risk of default. It is unclear whether the hedge funds that now bear those risks will monitor the condition of the borrower or seek to work out a loan with the same diligence. The advent of derivative technology takes this concern one step further: for example, hedge funds and even banks may profit from a default if they have bought protection through a credit default swap in excess of the amount of the loans they hold. This concern must be weighed against the potential for hedge funds to force needed restructurings or speed up the decision to work out or close out the loan. The role of hedge funds in these situations remains unclear. Hedge funds may even begin to specialize in holding assets where workouts are anticipated.

Credit risk transfer illustrates some of the tradeoffs faced by supervisors. Hedge funds' participation in credit risk transfer markets reduces the risks faced by supervised financial institutions and provides liquidity for the transfer of this risk. However, their participation can also affect the ability of borrowers near default to work out their problems. In this way, hedge funds, through the use of derivatives, could ultimately contribute to either an increase or a decrease in defaults. The relative importance of these effects and other determinants of defaults is unclear, as is the appropriate supervisory response.

8 *Federal Reserve Board, Shared National Credit Examinations.*

3| MARKET DISCIPLINE AND THE INDIRECT APPROACH

Policy makers have subscribed to an indirect approach in dealing with many of the issues surrounding hedge funds. A key element of the indirect approach is the reliance upon market discipline –that is, relying on hedge fund investors, creditors, and counterparties to reward well-managed hedge funds and to reduce their exposure to risky, poorly managed hedge funds. To provide proper discipline, of course, market participants need to understand the activities of the hedge funds with which they do business, in order to assess their creditworthiness and risk-adjusted returns. While hedge funds are very reticent about sharing that kind of information, and are not usually required to do so by law or regulation, it is the responsibility of investors and counterparties to pressure funds to improve their disclosures. Well-managed funds should find that it is to their advantage to be more open about their activities. Lack of transparency should come at a great price, measured by fewer investors and less favorable treatment by banks. Although basic information about hedge fund activities has begun to flow, investors and counterparties still too often obtain very limited disclosure from hedge funds.

Institutional investors should play a key role in promoting hedge fund transparency. A significant portion of the growth in hedge funds over the past several years can be attributed to institutional investors' demand for investment alternatives to standard long-only equity and fixed-income investments. In 2006, investments in hedge funds by defined benefit pension plans, a portion of the pension management business, grew 69 percent to USD 50.5 billion.[9]

Institutional investors have a fiduciary responsibility to perform appropriate due diligence when investing in hedge funds. On their own and through investment advisors, they should conduct initial reviews and ongoing monitoring of hedge funds' adherence to stated strategies, risk-management policies and processes, and internal operating controls. They should look particularly closely at funds' internal policies and operating controls surrounding the use of leverage. Moreover, they need to increasingly require that the funds in which they invest meet various industry standards, such as valuation, reporting, and ethics standards issued by the Chartered Financial Analyst Institute and risk-management standards issued by the Managed Funds Association.[10] To be sure, the extent of oversight by institutional investors varies. Larger investors may be able to devote more resources to the due-diligence process than smaller investors, and they may have more negotiating power in demanding transparency. Some observers have questioned the quality of due-diligence assessments conducted by advisors employed by smaller institutional funds and smaller public pension funds, particularly with regard to investments in funds of funds.[11]

Banks and other financial institutions are also sources of market discipline because they must perform credit assessments before providing financing or entering into derivatives transactions with hedge funds. These credit assessments usually follow a scorecard approach, in which the bank rates a fund for its management, leverage, risk measurement, liquidity, and strategy. Transparency can also play a role in a fund's credit assessment. These credit assessments should determine the amount of risk a bank will take when financing a hedge fund and are based on the information provided by hedge funds. Since this information is usually limited to basic financial information, banks' ability to determine the creditworthiness of hedge funds is also limited.

The evidence is mixed, but there do appear to be some areas where market discipline exerts itself. As sophisticated investors have poured money into the hedge fund industry, well-managed funds tend to grow, as good performance attracts new investors, while poorly managed funds tend to reduce in size or exit the market. Performance is thus one of the key determinants of turnover in the industry. As Table 2 illustrates, 2,187 hedge funds stopped reporting to a widely used database between 1999 and 2005.[12] Meanwhile, none of

9 *Williamson (C.) (2007): "Solid growth pushes assets above USD 50 billion",* Pensions & Investments, *January 22.*

10 *See CFA Institute: "Code of ethics and professional standards", "CFA global investment performance standards", "CFA asset manager code of professional conduct"; Managed Funds Association: "2005 Sound practices for hedge fund managers"; Government Financial Officers Association: "Standards and practices for selection of asset managers"; Greenwich Roundtable: "Best practices in hedge fund investing: due diligence."*

11 *Funds of funds are investment managers or hedge funds that aggregate investment funds from multiple investors and invest the proceeds with multiple hedge fund managers or managed accounts. The fund of funds manager may allocate investments to several hedge funds that pursue the same strategy or multiple strategies. The goal of the initial investor is to achieve a diversified portfolio of investments in the hedge fund sector or strategy.*

12 *Data reflect funds reporting to the Lipper TASS® Database. This source can be considered a proxy for the number of funds that begin operation or shut down in a given year. However, it is imprecise, as there could be other reasons for a fund to change its reporting status.*

Table 2

Year	Funds that reported at some point during the year	Funds in TASS at year end	Funds that started reporting during the year	Funds that stopped reporting during the year
1998	1,069	907	356	179
1999	1,187	1,005	297	199
2000	1,253	1,021	263	247
2001	1,960	1,705	956	272
2002	2,250	2,006	562	261
2003	2,682	2,415	693	284
2004	3,307	2,974	909	350
2005	4,248	3,691	1,291	574
2006*	4,621	3,900	947	738

** Data for 2006 reflect information available from TASS as of January 12, 2007.*

these hedge fund closures to date has resulted in a systemic crisis.

The evidence suggests that the indirect approach has been sufficient. In the ten years since hedge funds emerged as major market participants, markets have demonstrated surprising resilience in the face of significant disturbances, including the bursting of the technology bubble, the 2001-2002 recession, the events of 9/11, two wars, and a wave of corporate scandals. But the most recent period has been remarkable for its stable economic growth, low market volatility, and low risk premiums. Considerable uncertainty remains about the ability of today's financial system to weather more pervasive macroeconomic or financial shocks, and a lively debate continues over whether supervisors should oversee hedge fund activities more closely.

While investors, banks, and other financial institutions now receive basic financial information from hedge funds, transparency remains an issue. Hedge funds have a legitimate interest in protecting proprietary trading strategies, and a balance between the interests of investors, counterparties, and the hedge fund managers must be struck. Banks should see both quantitative and qualitative indicators of a hedge fund's net asset value, risk exposures, and liquidity. Where this information is not forthcoming from a particular hedge fund, counterparties should tighten margin collateral and other credit terms. One size does not fit all hedge funds: those that provide more information about their strategies may expand the investors who will do business with them and receive better credit terms; others may provide less information, protect their strategies from competitors, but limit their investor base and receive less favorable credit terms.

4| HEDGE FUNDS AND BANKS' RISK MANAGEMENT

Banking supervisors expect banking organizations to understand and properly manage the full gamut of credit, liquidity, and operational risks that hedge funds pose to their businesses. Supervisors expect banks and other financial institutions to continually update their risk-management and business processes to keep pace with the activities of hedge funds and financial innovation more generally. Underestimating the growth of a new product could mean lost profit opportunities for a bank or, worse, substantial losses, if the bank has not put in place sufficient controls or invested in the appropriate infrastructure. In some cases, banks may collectively underestimate the growth of a business or product, or may not have a firm grasp on the risks of and appropriate controls for a new business or product, thereby creating risks to the integrity of the broader financial system.

4|1 Counterparty credit risk

Counterparty credit risk[13] is the single most important risk for financial institutions in their interaction with hedge funds. Calculating counterparty credit risk is complicated by its two-way nature; in other words, the net exposure between two institutions can change as

13 *Counterparty exposures arise from over-the-counter derivatives trading and financing transactions such as equity margin lending, repurchase agreements, and securities lending. Hedge funds can also expose banks to traditional credit risk, in that banks can, but rarely do, extend loans directly to hedge funds. Banks may also be exposed to market risk by investing in the equity of hedge funds.*

markets prices rise and fall. With some instruments, either party may become the net debtor. A simple, but important, measure of counterparty credit risk is current exposure, which is the net exposure at current market values. This measure shows what the bank would lose if a hedge fund were to fail today. A more comprehensive measure is potential future exposure, which is the maximum amount to which an exposure could grow over a future time period with a high degree of statistical confidence, if markets move against the hedge fund. Banks also "stress" potential exposures to estimate how they may grow under adverse market conditions.

Financial institutions limit their counterparty credit risk exposures through the use of collateral agreements, which require hedge funds to post collateral to financial institutions daily to cover increases in current exposure resulting from market movements. These agreements often require the hedge fund to post additional collateral above the market value of the transaction at the inception of a trade to cover potential future exposure. This collateral is often known as initial margin. As a result of daily margining, counterparty credit risk to hedge funds is usually fully secured by collateral, enabling financial institutions to offset losses in the event of a hedge fund default.

Still, systemic concerns remain. In particular, in a crisis, interlocking credit exposures would be the key mechanism by which risks would be transmitted from one institution to another, potentially transforming a run-of-the-mill disturbance into a systemic situation. The near failure in 1998 of Long-Term Capital Management (LTCM), a hedge fund that had taken large, highly leveraged, and illiquid market positions, galvanized supervisory interest in these issues. Industry and financial supervisors agreed that excessive leverage and poor counterparty credit risk management as practiced by banks and other creditors raised concerns that market players seeking to sell at once could have negatively affected asset prices across markets, indirectly affecting other market participants such as mutual and pension funds.

Most banking supervisors incorporated sound practices promulgated by the Basel Committee on Banking Supervision (BCBS) into guidance and examination procedures applicable to capital market activities within a year of the LTCM incident.[14] Today, supervisors in countries where banks have significant dealings with hedge funds review banks' risk-management policies and practices regarding hedge funds in regular onsite examinations.[15] The Federal Reserve also periodically performs targeted reviews of specific credit risk management practices of banks that are major hedge fund counterparties. These targeted reviews examine in depth the banks' practices against the BCBS and Federal Reserve sound practices guidance and note areas where practices should be strengthened. Supervisors continue to press for needed improvements in counterparty credit-risk management practices. Banks have made many improvements but are not yet at the point where they can become complacent.

4|2 Progress since 1998

By most accounts, banks and other dealers have substantially improved their management of counterparty credit risk since 1998. When conducting due diligence, it is now common practice for dealers to conduct onsite visits and maintain regular contact with hedge funds to monitor their activities and evaluate their risk-management capabilities. As a result, hedge funds generally provide more information about their activities to counterparties than they did in 1998, and banks today are less likely to be surprised by an LTCM-type incident. Dealer banks have also improved their measurement of counterparty credit risk. Techniques to estimate potential exposure are more sophisticated and model-driven.

The use of collateral for over-the-counter (OTC) derivative exposures has greatly increased; the International Swaps and Derivatives Association[16] reports that 63 percent of OTC derivative exposures were collateralized in 2005, up from 29 percent

14 *Basel Committee on Banking Supervision (1999): "Sound practices for banks' interactions with highly leveraged institutions", January.*
15 *The Federal Reserve, for example, routinely examines counterparty-risk management practices to ensure that banks:*
- *perform appropriate due diligence and gather sufficient information to assess the business, risk exposures, and credit standing of their counterparties;*
- *establish, monitor, and enforce appropriate quantitative risk exposure limits for each of their counterparties;*
- *use appropriate systems to measure and manage counterparty credit risk;*
- *and deploy appropriate internal controls to ensure the integrity of their processes for managing counterparty credit risk.*

16 *International Swaps and Derivatives Association: "ISDA margin survey 2006."*

in 2002. Dealers today generally require hedge funds to post collateral daily to cover current credit exposures and to post additional collateral, or initial margin, to cover potential exposures. Current and potential future exposures to counterparties are often calculated by product for each hedge fund and for each hedge fund family.

Information technology (IT) systems for managing counterparty credit risk have improved substantially since 1998. Banks have made significant investments to comprehensively monitor and control counterparty exposures. These investments allow more sophisticated risk analyses on the part of banks.

Supervisory reviews suggest that banks' counterparty credit exposures to hedge funds remain small relative to total assets or capital. In a recent supervisory survey, they represented only a small fraction of total current counterparty exposures at those banks for which data were available; potential exposures for banks' entire hedge fund counterparty portfolios were within the range of exposures banks have to individual large nonfinancial corporate borrowers. The use of collateral agreements has kept the credit exposure to hedge funds small, even as assets under management by hedge funds have experienced substantial growth.

4|3 Need for further improvement

While these improvements indicate progress on the part of banks, their work is not yet done. In fact, because of the dynamic nature of hedge funds and innovations in the financial markets, banks must continuously improve their counterparty credit risk management, and supervisors have identified several areas where the need for improvement is most compelling.

While management information systems have improved, the systems requirements for managing counterparty credit risk to hedge funds are demanding and complex.[17] In the case of market-risk exposure, there is a single calculation of value-at-risk for all of a firm's positions. In contrast, counterparty credit risk calculations must be made for many different counterparties,[18] often for many different time horizons. Measurements of counterparty credit risk also require complex computer simulations. The management of counterparty credit risk is also complicated by hedge funds' complex organizational structures, legal rights, collateral agreements, and frequent trading. It is important that banks develop the systems capability to regularly gather and analyze data across diverse internal systems to manage their counterparty credit risk to hedge funds. An ongoing concern is that banks may take inappropriate shortcuts or omit important elements of the IT system because it is so demanding. Therefore, supervisors must monitor the IT systems of supervised institutions to make sure they are up to date and capable of measuring and monitoring risk.

Another important element of managing counterparty credit risk is holding adequate capital for counterparty credit risk. International supervisors have updated the minimum capital to be held for this risk in the Basel II capital requirements.[19] The new accord has provided a menu of approaches to the capital requirements for counterparty credit risk, made these capital requirements more sensitive to counterparties' risk profiles, and added important incentives to mitigate counterparty credit risk through the use of collateral, collateral agreements, and netting agreements.

Banks also need to monitor the concentration of their counterparties' positions in various markets. In September 2006, Amaranth Advisors LLC ran into difficulties because it was not sufficiently diversified and because it dominated some of the markets in which it traded. Dealer banks often monitor the size of their own positions relative to the markets in which they trade; this practice should be extended to the positions of their counterparties as well.

Other supervisory concerns about counterparty credit risk management practices remain. First, supervisors are concerned about evidence that competition for hedge fund business among banks has led to diminished initial margin levels. They are particularly concerned when the reduction in initial margin does not seem to be justified by a reduction in risk. Second, they are concerned about whether banks are measuring their counterparty exposures accurately, given the complexity of

17 *Basel Committee on Banking Supervision (2005): "The application of Basel II to trading activities and the treatment of double default effects", July, describes the operational practices regarding the management of counterparty credit risk that supervisors expect banks to follow.*
18 *A single counterparty may have many different exposures associated with it, for example, if netting rights across some products are not secured. For this reason there are usually more exposures than counterparties.*
19 *Basel Committee on Banking Supervision (2005): "The application of Basel II to trading activities and the treatment of double default effects", July.*

transactions in which hedge funds participate. Third, they are concerned about the amount and quality of stress testing. The discipline of stress testing is critical because it requires firms to imagine and prepare for low-probability scenarios with which they may have no recent experience. Supervisors would like to see broader use of stress-testing at the level of each hedge fund counterparty and aggregated across hedge fund customers. Lastly, the amount of credit exposure to a hedge fund should reflect the quantity and quality of information about the fund, the extent to which exposure is mitigated through margin and other credit terms, and the capital the bank has allocated to support the exposure. Recent targeted supervisory reviews by the Federal Reserve, in conjunction with other national and international supervisors, have focused particular emphasis on these issues.

4|4 Market-liquidity risk

In addition to the *direct* counterparty and other credit risks hedge funds may pose to the supervised institutions at the core of the financial system, supervisors are also concerned about the *indirect* risks associated with a decline in asset-market liquidity resulting from the failure or winding down of one or more major hedge funds. In many markets, hedge funds are key liquidity providers and are generally considered to help disperse risk more widely.

A particular concern is that, in illiquid markets, hedge funds may be forced to sell positions to meet margin requirements, driving down market prices. In severe cases, the hedge fund may drive down the value of existing positions by more than they receive from the original sale, forcing further sales.[20] These "liquidity black holes" have diverse causes, and they have generated considerable academic interest.[21] When counterparties have concentrated positions, losses on these positions are more likely to lead to substantial losses in liquidity. Meanwhile, the size and dominance of hedge funds in some markets raise concerns about disorderly exits.

Because of such risks, supervisors focus on banks' ability to identify and mitigate the risks associated with a sharp decline in market liquidity. Banks and other dealers need to deepen their understanding of their own sensitivity to market shocks by strengthening their stress-testing and scenario-analysis capabilities, particularly with respect to scenarios that could generate simultaneous losses for their counterparties and their own market positions. Banks should be able to aggregate and stress-test by key risk factor across their portfolio of direct and counterparty exposures. They also need to develop a deeper understanding of the controls and practices that other leveraged counterparties utilize to manage market-liquidity risk and funding-liquidity risk.

4|5 Operational risk

Supervisors have also been concerned about systemic risks that may arise from weaknesses in the clearing and settlement infrastructure that supports hedge fund trading activities. As often happens in fast-growing markets, trading in a number of markets has exceeded firms' abilities to appropriately update their infrastructure and processes. In particular, the Federal Reserve Bank of New York (FRBNY) and the Financial Services Authority in the United Kingdom became aware of a number of problems in the clearing and settlement infrastructure for over-the-counter derivatives, particularly for credit derivatives, following routine horizontal counterparty credit risk management reviews. Subsequently, in July 2005 a private-sector group, the Counterparty Risk Management Policy Group II, issued a report noting (1) a growing backlog of unsigned trade confirmations and (2) an increasingly common practice among dealers of accepting assignments of trades by one counterparty without the prior consent of the other, despite requirements to document trades and to obtain prior consent.[22]

In September 2005, fourteen major US and foreign derivatives dealers met at the instigation of FRBNY and agreed to address these issues. The dealer group quickly recorded substantial progress. By September 2006, the fourteen dealers had nearly eliminated unauthorized assignments, reduced by 85 percent total credit derivative confirmations outstanding for more than 30 days, and raised the portion of credit derivative trades confirmed electronically from 47 percent to 82 percent. The

20 *Managed Funds Association: "MFA's 2005 sound practices for hedge fund managers", see pp. AI-13: "The liquidity crisis cycle".*
21 *Persaud (A.) (2003): "Liquidity black holes: understanding, quantifying and managing financial liquidity risk", London: Risk Books.*
22 *Counterparty Risk Management Policy Group II (2005): "Toward greater financial stability: a private sector perspective", July 27.*

group of dealers also worked with the International Swaps and Derivatives Association to draft an off-the-shelf protocol for settlement of credit default swaps via an auction process in the event of default –a protocol that is now ready to be used during the next credit event.

Another result of these meetings was the Depository Trust and Clearing Corporation's creation, in 2006, of an industry trade information warehouse and support infrastructure to standardize and automate processing of credit derivatives. To make the warehouse useful in a range of post-trade processes, such as payment calculations, portfolio reconciliations, collateral processing, and credit-event settlement, existing trades are being back-loaded into the warehouse database.

Much remains to be done. The dealer group, which is adding new members, met again in September 2006 at FRBNY and promised further work on automating processes and tackling backlogs in other derivative products, focusing especially on equity derivatives. Supervisors continue to monitor their progress.

Policy makers have addressed the systemic and financial stability concerns surrounding hedge funds by favoring an indirect approach. One key element of that approach focuses on ensuring the integrity of the risk management and capital adequacy of the regulated counterparties that extend financing to hedge funds. As hedge funds' largest creditors, these institutions, along with investors, are best positioned to monitor hedge fund risks given their clear financial incentives. Indeed, the President's Working Group on Financial Markets recently set forth some fundamental principles regarding private pools of capital. The philosophy behind these principles is to encourage and improve disclosure by pools and managers and to strengthen market and counterparty discipline, without discouraging innovation by requiring the disclosure of proprietary information.[23]

Although this approach has served us well, the globalization of the capital markets places even greater emphasis on the need for supervisors to coordinate on an international basis. The global reach of hedge funds under the current supervisory approach requires coordinated efforts to address various types of collective action issues. The FRBNY-led effort to clean up the processing of OTC derivatives is a case in which collective action has helped to resolve an industry-wide problem.

It can be difficult to determine when a supervisory collective-action problem exists. This is particularly true in the case of financial innovations that may or may not gain market acceptance. For this reason, supervisors have moved methodically in their approaches to credit-risk transfer and hedge funds. There is a strong desire to allow the benefits of these innovations to unfold but also to be vigilant in protecting against any potential systemic problems, either by taking action individually or collectively.[24] *Innovations by financial institutions have contributed significantly to the development of the credit risk transfer markets. Supervision of these markets has largely followed their development; supervisors have addressed and will continue to address concerns in the securitization and derivatives markets as they develop.*

The ability of institutional investors and banks to exercise effective market discipline requires that they obtain adequate information about the hedge funds with which they do business. The indirect approach to regulating hedge funds relies on these important players to seek information about a hedge fund's management, strategy, positions, and leverage while respecting the proprietary nature of the hedge fund's investment strategies. Where sufficient information is not forthcoming from a particular hedge fund, banks should tighten margin, collateral, and other credit terms. Investors need to ascertain whether the information provided is sufficient for them to make an investment allocation to that hedge fund.

The Amaranth incident illustrated the risks when counterparties do not sufficiently monitor the activities of a hedge fund with highly concentrated market positions. While the incident did not have systemic effects, it took place under benign market and economic conditions. Supervisors and market participants have no grounds for complacency. As the role of hedge funds continues to evolve, banking supervisors and central banks must continue to monitor counterparty credit risk management practices and systemic infrastructure issues and, periodically, to reevaluate the effectiveness of banks' management of counterparty credit risk.

23 *Steel (R. K.) (2007): "Remarks of under secretary for domestic finance Robert K. Steel on private pools of capital," February 27.*
24 *Ferguson (R.) (2006): "Financial regulation: seeking the middle way," Fourth Joint Central Bank Research Conference on Risk Management and Systemic Risk, Frankfurt, Germany, November.*

The evolution and regulation of hedge funds

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Hedge funds have attracted increased attention in recent years. In part, this is because investment in hedge funds is becoming "mainstream". A wider range of investors has sought exposure to these investment vehicles, and this has been associated with rapid growth in both the number of funds and the volume of assets under management.

In part, too, greater attention has been the result of worries that hedge funds could in some circumstances exert a destabilizing influence. With the growth in the market share of hedge funds, and their greater "visibility" in the market place, concerns have been expressed about the consequences of limited transparency and lack of regulation of the industry.

Despite the recent focus on hedge funds, their origins can be traced back more than fifty years. The first such fund is generally considered to have been established in the United States in 1949 by Alfred Winslow Jones. The term "hedge fund", which was coined only later, was applied because the investment style of the original funds was designed to be neutral to general market movements, by combining short and long positions. In this way, funds could pursue absolute returns, in varying market conditions. More recently, however, the term "hedge fund" has been applied to any privately offered, collective investment vehicle for "sophisticated" investors that is lightly regulated and employs leverage.

Since the 1950's, the number of hedge funds has grown steadily, as has the volume of assets under management. Precise statistics are not available, given the lack of reporting requirements, and difficulty in defining the population of institutions that should be covered. The most rapid growth, however, seems to have occurred in the period since about 1990, with an interruption in 1998-99 following the much-publicised near-failure of Long Term Capital Management (LTCM) (Chart 1).

Regulatory attention can be dated back some ten years, to the LTCM episode, and the Asian financial crisis that occurred at roughly the same time. The problems encountered by LTCM demonstrated both the size of some hedge funds, and their capacity, through their leveraged position-holding across a number of counterparties, to generate system-wide repercussions. The Asian crisis was thought by some to show that the market power of hedge funds could in some circumstances undermine official policies. Following these episodes, there was a spate of official reports on hedge fund activities and the issues involved in deciding whether and how to regulate them.

In this paper, I will begin by analyzing the characteristics that distinguish hedge fund from other investment vehicles. I will go on to consider recent trends in the industry and potential future developments. Then I will assess some of the regulatory concerns that have been expressed and conclude with some remarks on alternative regulatory approaches.

NB: The views expressed in this paper are in the author's personal capacity.

1| DEFINITION AND CHARACTERISTICS OF HEDGE FUNDS

A first question in any analytic or policy endeavour is that of definition. What exactly do we understand by the term "hedge fund"? There are, in fact, no universally accepted criteria for characterizing a particular institution as a hedge fund. Hedge funds are collective investment vehicles, but plenty of other institutions share that feature, such as investment and mutual funds. Hedge funds use leverage and derivative instruments to facilitate position taking, but so too do the proprietary trading desks of many large financial institutions.

The definition of a hedge fund is not simply a semantic question. If hedge funds constitute a separate and identifiable "asset class" then it would be logical to take account of this in asset allocation decisions. On the other hand, if they are simply an alternative way to gain exposure to risks and returns already inherent in other instruments, they would be considered in a different way. The large variety of investment "styles", which will be discussed in a moment, suggests that hedge funds should not be regarded as a single asset class, but rather as a specialized vehicle for gaining access to the risks and rewards of more fundamental asset classes.

Definitional issues also have implications for regulatory initiatives. To regulate, it is necessary to define the universe of institutions over which supervisory authority is to be exercised. And the definition needs to be logical and consistent, as well as robust to actions designed to avoid regulatory oversight.

Perhaps the easiest way of getting a handle on what constitutes a hedge fund is to consider some typical characteristics. Hedge funds generally have a limited pool of mainly sophisticated investors, such as high net worth individuals and, increasingly, pension funds and endowments. Indeed, in the United States, the Securities and Exchange Commission (SEC) has established requirements for the number and type of investors that a fund may have if it is to escape certain restrictions (for example, on short-selling, management charges and marketing techniques) placed on other investment vehicles.

Hedge funds are usually incorporated in offshore jurisdictions, though they are typically managed onshore. Offshore incorporation helps simplify the tax consequences of their trading activities. Most hedge funds require investors to commit their capital for fixed "lock-up" periods, which gives them more freedom to pursue their chosen investment strategy, and reduces the amount of capital they have to dedicate to liquidity risk.

Another distinguishing characteristic of many funds is that they try to exploit market imperfections. They can do this by combining short and long positions in assets whose relative prices appear to have diverged from fundamental relationships, or by exercising judgments about other types of pricing anomaly. To do this, they make use of market instruments and strategies, such as short-selling and the use of derivative products, which are not available to mutual funds.

Hedge funds use financial engineering to accentuate the position-taking power of their market views. They employ leverage by borrowing from banks and other financial institutions on the basis of assets placed as collateral. And they use derivative instruments to shed risks they do not want to take, thus concentrating their position-taking on markets and risks they feel they understand. Again, this use of leverage is not available to other collective investment vehicles.

Hedge funds do not typically release detailed information about their portfolios. Given the rapidity with which portfolios turn over, such information would not be all that meaningful anyway. However, they usually provide qualitative information about the investment "style" they intend to pursue. The variety of investment styles has tended to proliferate in recent years.

Hedge funds usually trade their portfolios actively. They also have a relatively "rich" fee structure, and performance related rewards, though these features are not directly related to the intensity of trading activity. The typical fund charge would be 2% of assets under management, plus 20% of any positive returns. Even higher fees are sometimes charged, particularly by managers of funds with attractive track records.

A final characteristic of hedge funds is the return objective. Most funds focus on absolute returns, rather

than returns relative to some market benchmark. They therefore typically use techniques to offset overall market movements. Such techniques include active use of short-selling and options.

2| RECENT TRENDS

One trend has already been commented on. It is the *growth in the number of funds and the volume of funds under management*. A consequence, and at the same time a cause, of this trend has been the increasing attraction of hedge funds for institutional investors. Endowments have been prominent among new investors in hedge funds. With growing competition to enhance yields, these investors have sought alternative investment vehicles to increase returns. The increased involvement of large institutional players has arguably improved governance and increased accountability. Institutional investors have both the resources and the obligation to exercise due diligence over the placement of their investments.

Another trend has been the *multiplication of investment styles* (Chart 2). Since most funds attempt to exploit imperfections in the market, fund managers have become increasingly specialized in the market segments they deal in. Originally, most hedge funds could be characterized as "long-short" funds, in other words, they derived returns from going long assets they judged to be undervalued, while shorting assets in the same class that were seen to be overvalued. But there are now a considerable group of "long-only" funds, which specialize in identifying assets likely to rise in value, without the "hedging" characteristic of shorting assets in the same class.

Certain funds are "event-driven" in the sense that they specialize in taking positions (long or short) on potential future events that they considered are not adequately reflected in existing prices. Other funds are "macro hedge funds" that take positions based on views of global macroeconomic variables. Still others specialize by sector, relying on their knowledge of particular industries to add value to their portfolios

A number of funds specialize in exploiting market anomalies. They seek out relative prices that appear to have diverged from historical norms for reasons that seem unjustified. They then take positions based on a reversion of price relationships to more normal patterns. (This, incidentally, was what led to the downfall of LTCM. The fund made a bet that the price divergence between "on the run" and "off the run" treasury securities would return from its extraordinarily large size to a more normal level. So it did, but not in time to save LTCM).

The huge increase in computing power has also done much to encourage this type of trading strategy. Programmatic trading enables instantaneous and widespread position taking based on perceived price anomalies. It also permits managers to manage risk exposure in real time. It should be recognized, however, that the effectiveness of computerized risk management depends crucially on the realism of the underlying models.

A third trend has been the *geographic spread of the hedge fund industry*. The United States is still home to the largest number of fund managers, but there are an increasing number of Europe-based managers, particularly in London, and hedge fund presence in Asia is also growing (Chart 3). It is interesting to note there are now more than fifty hedge funds in Brazil.

A trend that is even more recent in origin is *governance activism*. In the past few years, hedge funds have shown themselves willing to use their voting power to try and influence the behaviour of the institutions in which they invest. This was seen most prominently in the case of Deutsche Börse's bid for the London Stock Exchange. The position taken by hedge funds is widely considered to have been instrumental in the ultimate failure of that bid.

Another recent trend has been the growth of "*funds of funds*" (FoFs) (Chart 4). FoFs serve several purposes. They undertake due diligence on behalf of the ultimate investor, scrutinizing funds for investment styles, risk management capabilities, governance structures, etc. They enable investors to diversify risk, and gain access to a variety of investment styles without having to make multiple investments. And they facilitate the offering of hedge fund exposure to investors who may not be able to satisfy the high financial requirements (at least in the United States) of investing directly in hedge funds. By now some 35% of investments in the hedge fund sector is through FoFs. Of course, investment via FoFs adds another layer of fees, and complicates the analysis of overall leverage in the industry.

A last trend worth commenting on is also a consequence of the growing size of hedge funds. Hedge funds have acquired *increased competitive power* in their dealings with counterparties. Many hedge funds prefer to deal with a single "prime broker" and their size and importance to counterparty revenues allow them to extract significant concessions. Up to a point, this is a normal and even beneficial functioning of the market mechanism. However, if it were to lead to a situation in which some counterparties relaxed prudential standards in order to win hedge fund business, there could be cause for concern.

As hedge funds have become more mainstream, the boundaries between them and other types of collective investment vehicle have become blurred. Indeed, at the margin, it is becoming hard to distinguish between hedge funds and some other types of managed funds. The difference lies in the degree to which the techniques described earlier are used.

In addition, it has also become increasingly hard to distinguish between hedge funds and private equity investors. Private equity investors are typically characterized by taking a large stake in a company and using their influence to promote changes in company strategy to enhance market value. However, this is increasingly becoming a hedge fund investment strategy, and we are beginning to see hedge funds partnering with private investment firms or migrating to the "hybrid zone" between hedge fund and private equity investment strategies. Among other things this is being reflected in longer lock-up periods for investments, and fees being paid to managers later in the investment process.

3| Hedge Funds and market functioning

Despite concerns voiced in a number of quarters about the impact of hedge funds on market stability, it is important to recognize the potential beneficial impact of the funds on the markets in which they are active. In principle, the introduction of any new set of players into a financial market should add to the depth, breadth and liquidity of the market concerned. Hedge funds are sophisticated investors, often able to take a relatively long-term view. The nature of their investor base means that they are able to sustain contrarian positions, at least for a while, in the face of changes in general market perceptions. Their presence can therefore facilitate the absorption into prices of new information, and stabilize market prices in the face of transitory shocks.

The fact that hedge funds are not constrained in the instruments they use (short-selling, for example) means that they can help the price discovery process by using the full range of techniques to back their judgments. Their agility in adjusting their exposures helps ensure that all relevant information is fully and quickly reflected in market prices. In general, hedge funds can be seen as contributing to the "completeness" of markets.

Interestingly, it could be the case that, the more effective hedge funds are in correcting pricing anomalies, the fewer opportunities they will leave for profitable arbitrage. Effective hedge fund managers identify and exploit anomalies to their individual profit. Others notice and join in, which eventually (perhaps quite rapidly) corrects that anomaly. For example, the once highly profitable strategy of exploiting price inconsistencies between preferred stock and equity prices engendered the profitable rise and then eventual demise of a substantial number of funds set up to pursue this strategy.

4| Prospective future developments

Having in Section 2 considered recent trends in the hedge fund industry, it is natural to ask what the future holds. Will the rapid expansion of recent years continue? Will fees remain at present levels? Will funds diversify into new asset classes? Most importantly, will hedge funds constitute a source of stability in the market place, or do they have the potential to amplify risk and volatility?

In the broadest sense, hedge funds try to generate alpha (outperformance) by exploiting market imperfections. This activity, it has already been argued, is beneficial to market functioning and the price discovery process. It might seem logical that the larger the number and size of funds, the more they will improve the "completeness" of markets and the

more the potential for excess returns will be eroded. If this were to be the case, the investment returns of hedge funds would begin to revert to those generated by more conventional investment vehicles. As this process developed, it would presumably become harder for hedge funds to maintain their current fee structures.

It seems clear that there will be at least some tendency for compression of returns as the industry matures. For the time being, however, this tendency is being obscured by the ability of financial engineering to create new opportunities. New financial instruments and new markets (commodities are a significant new asset class and emissions trading may well follow) provide fertile new ground for innovative investments. Moreover, there continues to be a population of investors constrained by custom or regulation to invest only in defined instruments. Their existence seems likely to provide opportunities for alpha generation by those not so constrained.

What about returns within the industry? Will the growing number of funds and competitive pressures lead to a compression of fees? Once again, it would seem logical to expect such a development, though there are as yet few signs of it happening. Indeed, a noteworthy recent development has been the ability of hedge fund managers with strong reputations and track records to charge and obtain even higher fees.

Another interesting question is how the investor population is likely to change over time. Recent years have already seen the rise of institutional investors (pension funds and endowments) as investors in hedge funds. Other large investors, such as central banks and other official agencies are also beginning to experiment with taking positions in hedge funds. The next frontier seems likely to be an expansion into the retail investor universe. Indeed, this is already happening, as funds of funds improve the ability to tap retail sources of funds. In the United States, this has caused the SEC to express concern about increasing "retailization" of hedge funds, as discussed further below.

In addition to tapping a wider investment base, hedge funds are beginning to go to the public markets for equity. There were several such deals in 2006, and more are in prospect for the future. Public offerings enable hedge fund managers to monetize their franchises. A public quotation is also a very visible indication of the market's assessment of the long term value of an enterprise. This should have positive effects in lengthening horizons and promoting prudent behaviour among those managers whose firms are taken public. It is another sign of the maturing of the industry.

A big question surrounding all this is the future of regulation in the industry. Hedge funds have prospered under a relatively light regulatory regime. If they were to become constrained in similar ways to other investment vehicles, such as US mutual funds, it would clearly cramp the style of fund managers, and slow or even reverse the growth of the industry.

It is to the issue of regulation that we now turn. What is the nature of regulatory concerns, and what regulatory approaches can be used to address them?

5| REGULATORY CONCERNS

Regulatory concerns have been voiced increasingly frequently over the past few years. They have surrounded issues of:
- investor protection,
- systemic stability,
- market dynamics.

Traditionally, intermediaries and investment advisors that have sought funds from the public have been the subject of regulation on investor protection grounds. Hedge funds were largely created to limit the constraints such regulation imposed (and thus to permit more nimble investment strategies). This was done by limiting the investor pool to wealthy and (purportedly) sophisticated investors. Investors in the funds were high net worth individuals, or institutional investors, and could be presumed to have the sophistication and the resources to protect their own interests. More recently, however, hedge fund investing has been spreading to a broader range of investors, including, in the FoF context, groups that could be considered retail investors, and institutional investors managing pension funds. As a result, when certain hedge funds have got into difficulties, calls for formal regulation have mounted.

A second issue is whether the activities of hedge funds could adversely affect systemic stability. Hedge funds are not direct participants in the payments system, so

the reasons that justify supervision of banks do not apply in the same way. However, banks and other financial institutions are heavily involved in lending to hedge funds, and it could be argued that a hedge fund failure could have knock-on consequences for institutions closer to the heart of the financial system. It was concern over the systemic consequences of the potential failure of LTCM that led the New York Federal Reserve Bank to help broker a rescue of that fund. Such concerns presumably become the greater, the larger the share of overall financial system assets is represented by hedge funds.

In principle, of course, banks are protected in their lending to hedge funds by the collateral margin they require, and anyway carry capital to protect themselves against residual risk. However, concerns have been expressed that margins may have become unduly compressed by competitive pressures. Moreover, studies have revealed operational weaknesses (e.g. in the volume of unconfirmed trades) that could increase the vulnerabilities of hedge fund counterparties.

A third concern relates to market dynamics. Some observers have worried that the activities of hedge funds could contribute to price movements that drive prices away from their equilibrium values and create price instability. This could happen, ex ante, as a result of market abuse (collusive actions by market players), or through herd behaviour, as individual players respond similarly to market developments, even without collusion. It could also happen ex post, when the forced liquidation of a hedge fund, because of the leverage it employs, has a disproportionate impact on the markets in which it is invested. These concerns also find expression in the presumed "short-termism" of hedge funds. Critics of the funds have argued that they are interested only in short-term returns, which may be generated at the expense of the long term interests of the companies in whose securities they invest.

How much substance is there in these concerns? It has already been argued that the introduction in a market of additional players with different perspectives should, in principle, contribute to efficient pricing and to overall market stability. Still, it is possible to imagine circumstances in which the consequences would be less benign. One is when a combination of unexpected but not implausible market events (a "perfect storm") causes significant losses across leveraged investment strategies and the forced need to close market positions erodes market liquidity and asset prices more broadly. Such a broad-based liquidity erosion as that associated with LTCM's near collapse has not occurred since, presumably because leverage has been better controlled. But as the hedge fund industry has grown and more leverage is deployed in relation to the size of underlying markets, the recurrence of such events cannot be completely ruled out.

Another circumstance is when there is collusion between players to create market movements that temporarily drive market prices away from their equilibrium levels. These concerns were expressed at the time of the Asian crisis, when some observers contended that collusive activity by hedge funds had forced the abandonment of currency pegs that might otherwise have been sustainable. In more technical jargon, in conditions where multiple equilibria exist, powerful market players may have the capacity to profit from moving the system from a "good" equilibrium to a "bad" equilibrium.

In response to these concerns, the Financial Stability Forum conducted a study in 1999 to see whether there was evidence of such collusive activity during the Asian crisis. The conclusion of this study was that no evidence of such activity existed, but that in the event that collusion were to become a problem in the future, it should be dealt with by the existing rules governing market abuse.

Even in the absence of direct collusion, adverse market dynamics could result from "herding" behaviour by financial market players, and the procyclicality to which this can give rise. Some evidence suggests that market dynamics can give rise to a spiral of rising prices following the advent of positive news, while a downward spiral can result from an initial negative disturbance. The existence of herding behaviour could then accentuate this phenomenon.

6| REGULATORY APPROACHES

It seems unlikely that the concerns that have led some to favour regulation will completely go away. So this brief survey of hedge funds concludes by considering some of the regulatory approaches that have been suggested, both from the point of view of their desirability and their feasibility.

Regulatory approaches fall under three main headings: direct regulation of the funds (or their investment advisers); indirect regulation through the regulated counterparties with which they deal, and "regulation by the market", through greater disclosure and transparency.

Direct regulation could be aimed at either the liability or the asset side of the funds' balance sheets. On the liability side, there could be a continued and intensified attempt to limit investment in funds to individuals and institutions judged to have the sophistication and the resources to make the required investment decisions. This has been, de facto, the regulatory approach applied in the United States so far. Indeed the SEC recently proposed to raise the net worth requirement for US investors in hedge funds. The SEC also tried to regulate hedge funds investment advisers by having them register with the SEC. (This rule was overturned by the courts).

Limiting access to hedge funds has obvious investor protection appeal, but also drawbacks, both in principle and practice. As a matter of principle, it could be said it is unfair to restrict potentially lucrative investment opportunities only to already wealthy individuals. And in practice, it may be difficult to limit retail investors investing in hedge funds indirectly, through other collective investment vehicles. The growth of funds of funds that are open to less affluent investors could be argued to give retail investors both the opportunity to invest in hedge funds, and at the same time provide through diversification a desirable protection against large losses.

Coming to asset-side regulation, this could be based on a registration requirement of hedge funds investment advisers. (Recall that although most funds are incorporated offshore, their advisers are onshore). Registration with the Financial Services Authority (FSA) is already a requirement in the United Kingdom, and as just noted similar registration requirements were sought, unsuccessfully, by the SEC in the United States.

Registration would give supervisors the basic *vires* to assess hedge funds' activities, and to exercise "fit and proper" control over managers. Beyond that, regulation could presumably operate through some combination of portfolio constraints on regulated institutions, risk-based capital requirements, and supervisory control of operational systems. Once again, there is a balance to be struck between the presumed benefits of tighter regulation, and the risk of unintended negative consequences. The latter should not be lost sight of.

The introduction of portfolio constraints on hedge funds would limit their ability to contribute to market efficiency through their position-taking activity. And risk-based capital requirements would be exceptionally difficult for a regulator to define, given the complexity of the funds' risk management systems. Likewise, regulators would find it hard to monitor operational systems without a heavy investment of people and resources to, in essence, duplicate the activities of the regulated funds.

Beyond all this is the moral hazard dimension. The existence of a regulatory regime risks reducing the vigilance of the hedge fund counterparties that should themselves be the primary source of discipline. Moreover, when failures occur, as they are bound to do, unless the regulatory regime is so stifling as to be counterproductive, the supervisory authority will be exposed to public criticism for not having prevented it.

Indirect regulation would rely on the fact that almost everything hedge funds do is through regulated counterparties. It can be argued that the capacity of the funds to adversely affect systemic stability is a function of their relationships with other financial intermediaries, closer to the heart of the payments system. Provided the supervisors of these other institutions ensure that there are appropriate controls in their interaction with hedge funds, there should be no need for a separate oversight regime for the funds themselves. Such controls could include appropriate collateral and margin requirements, oversight of the robustness of operational systems to track exposures, and the adequacy of capital to cover residual risk. With these controls in place, losses from a hedge fund failure would be confined to the principals and the investors of the fund.

Indirect regulation of this type seems to be the most practical, and has indeed been recommended by most of the bodies that have reported on the subject. Still, it is worth noting that indirect regulation will not necessarily avoid all the potential negative consequences of distress in the hedge fund industry. Given the weight of the funds in traded and

over-the-counter markets, the possibility of the disorderly liquidation of positions by an important fund could have implications for broader market stability.

Partly in order to address this danger, some have recommended greater *transparency and disclosure* as a desirable approach to the regulation of the funds. Transparency, it is argued, would help discipline the risk-taking activities of funds, and provide markets with information about the build up of potentially unsustainable positions ("crowded trades").

Unfortunately, however, the beneficial potential of transparency is not likely to be matched in practice. In the first place, the rapidity with which positions at hedge funds can be, and are, adjusted, would limit the usefulness of data published with a lag. Second, the contribution of hedge funds to market efficiency depends on their ability to generate and use proprietary information. Any regulation that compelled them to share that information (or to reveal the positions taken on the basis of the information) would reduce the incentive to invest in information-gathering.

None of this means that the industry and the authorities should be indifferent to the future evolution of the hedge fund industry, and to potential threats that might emerge to financial stability. Hedge funds are likely to grow in importance in the coming period, just as they have grown in recent years. Vigilance over their activities is certainly warranted, both at the national level, and through international groupings such as the Financial Stability Forum. But it will be important in adopting particular regulatory measures, that the presumed direct benefits are not outweighed by the indirect negative consequences.

Chart 1a
Global hedge fund asset growth
(USD billions)

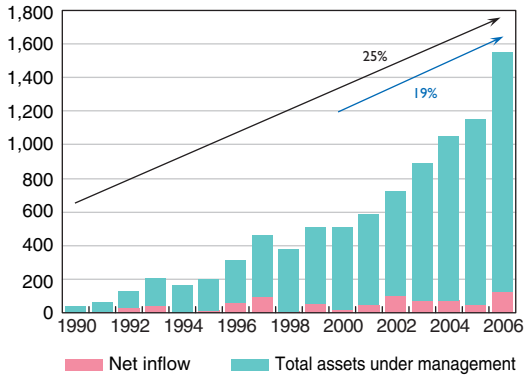
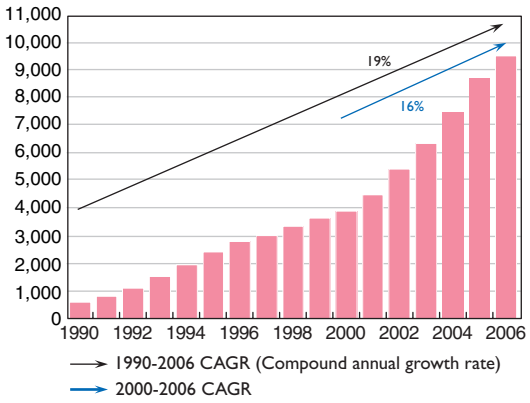
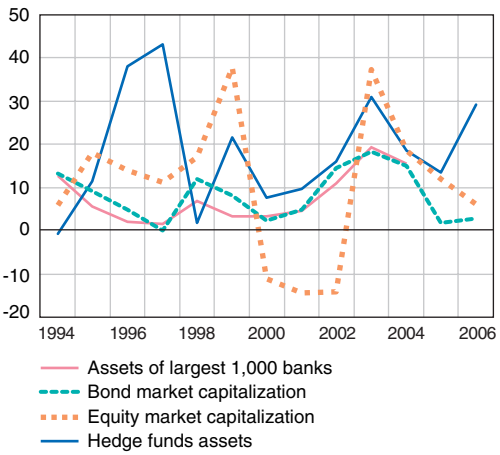


Chart 1b
Number of hedge funds



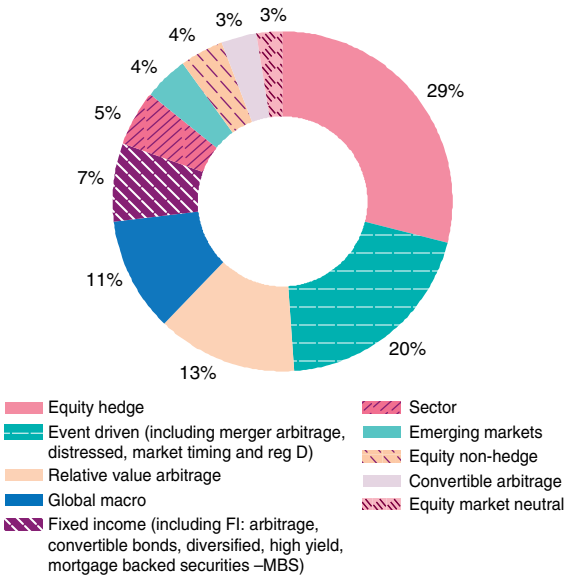
Source: Hedge Fund Research (HFR).

Chart 1c
Global assets
(% of growth rate)



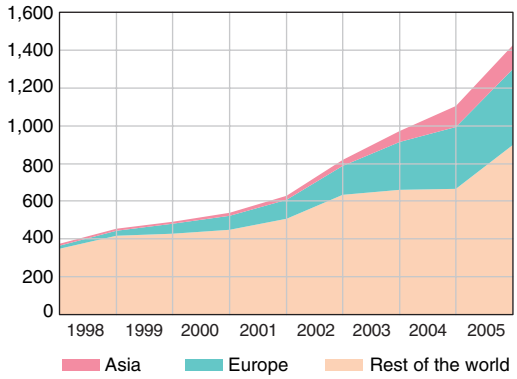
Sources: The Banker, Bank of Internationakl Settlements (BIS), World Federation of Exchanges, HFR.

Chart 2
Global hedge fund strategies by assets under management
Total: 1,427 billion dollars



Source: HFR.

Chart 3
Hedge fund assets under management by region
(USD billions)



Sources: Eurekahedge, EuroHedge, Factiva, HFR.

Chart 4a
Funds of funds assets under management growth
(USD billions)

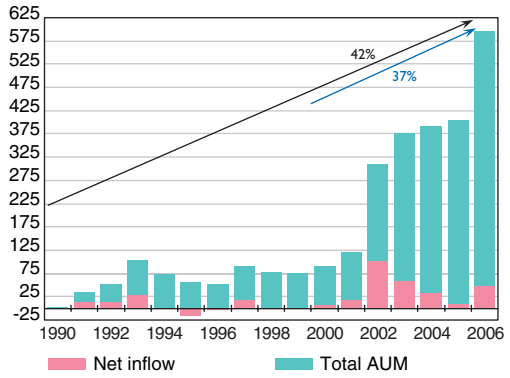
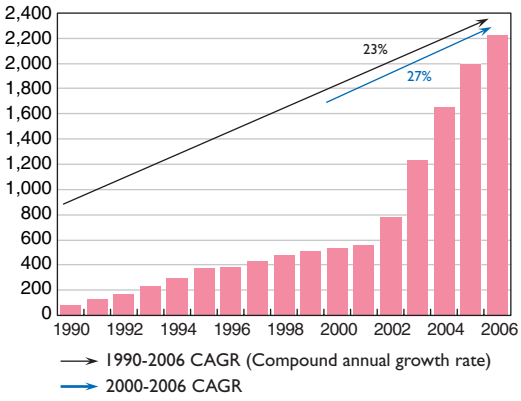
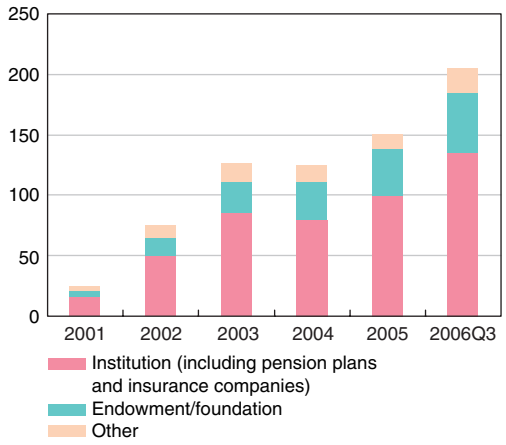


Chart 4b
Number of funds of funds



Source: HFR.

Chart 5
Funds of funds' institutional sources of capital
(USD billions)



Source: Goldman Sachs Prime Brokerage Survey (2006)

Regulating hedge funds

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Due to the ever-increasing amounts under management and their unregulated and opaque nature, hedge funds have emerged as a key concern for policymakers. While until now, hedge funds have been left essentially unregulated, we are seeing increasing calls for regulation for both microprudential and macroprudential reasons.

In our view, most calls for the regulation of hedge funds are based on a misperception of the effectiveness of financial regulations, perhaps coupled with a lack of understanding of the positive contribution of hedge funds to the financial system.

There are real concerns about consumer protection following from the expansion of the consumer base. However, it would be misguided to relax accreditation criteria. A more important issue is the investment of regulated institutions, in particular pension funds, in hedge funds. Since such institutions to enjoy direct or indirect government protection, the investment in hedge funds has to be regulated. However, such regulations are best implemented on the demand side by the pension fund regulator, rather than by directly regulating the hedge fund advisors themselves.

Hedge funds provide considerable benefits, not only to their investors and advisors, but more importantly to the economy at large by facilitating price discovery, market efficiency, diversification, and by being potentially able to put a floor under a crisis, a function not easily implemented by regulated institutions due to a minimum capital ratios, relative performance evaluation and other considerations.

It would however be imprudent to leave hedge fund advisors completely unregulated since the failure of a systematically important hedge fund has the potential to create such uncertainty as to impede trading and in a worst case scenario cause significant damage to the real economy.

These issues cannot be addressed by standard regulatory methodology such as disclosure and activity restrictions. Indeed, supervisors would be well advised to leave the hedge fund sector unregulated in their normal day-to-day activities. However, the regulator needs to have the power to resolve the informational uncertainty caused by the failure of a systematically important hedge funds. Prime brokers and other client banks would in such a scenario have a de facto or a de jure obligation to participate in the expedient removal of the uncertainty. To this end targeted consultation and contingency planning is essential.

NB: Danielsson is the corresponding author. Updated versions of the paper can be downloaded from www.riskresearch.org.

Hedge funds have emerged as a key concern to policymakers due to the ever-growing amounts under management coupled with concerns about their opaqueness. Consequently, the current status of hedge funds as one of the few largely unregulated entities[1] within the financial system is increasingly being challenged, and we expect to see some forms of hedge fund regulation in the near future. Unfortunately, most demands for the regulation of hedge funds are based on a misperception of both their threat to the economy and benefits to the financial system, as well as on overconfidence in the efficiency and accuracy of financial regulations.

Most calls for the regulation of hedge funds are based on misperceptions about the effectiveness of financial regulations, perhaps coupled with general mistrust of markets and an inflated belief in the effectiveness of government policy, perhaps by anchoring this belief in the success of regulation from experiences in unrelated sectors, such as traffic. Furthermore, calls for regulation seem to be strongest in countries where the hedge funds have gotten in the way of vested interests, such as in Germany.

The failure of large hedge funds, such as Amaranth, has been used to justify the need for regulations. However, the failure of Amaranth, one of the largest hedge fund failures of all times, may have proven just the opposite. It brought home the risk of investing in the hedge fund sector while the orderly resolution of its failure demonstrated that the system is able to cope with sizable failures and with substantial, illiquid and concentrated positions. Indeed, the case of Amaranth may indicate that further macro prudential regulations are not needed.

Hedge funds do however contribute to systemic risk whereby the failure of a systematically important hedge fund has the potential to create sufficient uncertainty in the markets for liquidity to dry up and for trading to cease with potentially costly consequences. It is this externality that any regulations would need to address.

At the same time, hedge funds do provide considerable benefits not only to their principals and investors, but more importantly to the economy at large. They make financial markets more effcient than they otherwise would be, and they are in principle able to trade during financial crises. This potentially enables them to provide a floor under prices, something which regulated institutions may not be able to, perhaps due to Basel type minimal capital ratios. In turn this might reduce return correlations in downturns and provide diversification benefits to the economy at large.

Existing regulations as applied to other financial institutions are not likely to be effective for regulating hedge funds. Activity restrictions, such as leverage or short-sale constraints, or disclosure will either negate the economic benefits contributed by hedge funds or would not be effective since they would not internalize the perceived externalities, others may be more dangerous still, offering only a veneer of protection, such as its registration requirements. On top of that, there always remains some risk that localized regulation causes hedge fund advisors to relocate to more favorable jurisdictions, removing regulatory oversight further.

As argued by Daníelsson *et al.* (2006), regulating hedge funds for reasons of consumer protection would be a mistake, where any regulatory system needs to recognize the benefits from hedge funds. Consequently they argue that any regulation of hedge funds should target the specific systemic concerns and not impede their day to day operations. The best way to achieve this goal is to have in place an effective resolution process to deal with the potential of systemic consequences from a hedge fund failure by means of a rapid unwinding process. The regulator furthermore needs to have a clear idea of the systemically important hedge funds, their prime brokers and main counterparties.

1| MICROPRUDENTIAL CONCERNS

Hedge funds have traditionally attracted investments from accredited investors, i.e., individuals who are sufficiently wealthy. Since such investors neither demand nor require government protection, hedge funds remained unregulated. In this context, we can view hedge funds as an extension of individual investors' investment activities. As long as hedge

1 *Hedge funds are of course not entirely unregulated since they are, among others, subjected to the regulations of the exchanges on which they trade.*

fund investments were limited to accredited investors and assets under management by hedge funds were relatively small, hedge funds remained under the radar.

However, in recent years the investor class of hedge funds has broadened considerably, raising concerns. First, accreditation requirements have relaxed over time and in some countries few if any limits exist on who can invest in hedge funds. Second, regulated institutions investing on behalf of third parties, in particular pension funds, are increasingly investing in hedge funds, further raising concerns.

Retail Investors. The traditional investor base of hedge funds consists of wealthy individuals while smaller retail investors have been limited to the regulated funds, such as mutual funds. Retail investors have traditionally been protected by regulations because it was felt that they lacked sophistication to make investment choices without adequate disclosure and limits on funds activities. In recent years the boundaries between the two investor groups has been breaking down, the accreditation requirements in the United States have until recently remained static in nominal terms, and some countries, such as Australia, do not impose restrictions on hedge fund investments. We now simultaneously see calls for increasing retailization of hedge funds and for some form of protection alongside it.

The arguments in favor of retailization are generally based on fairness. Why should only the wealthy be allowed to enjoy superior hedge fund returns? Indeed, it appears sometimes that certain supervisors have called for retailization, rather than the hedge fund advisors or the retail investors.

We however feel that retailization cannot be recommended. There are good reasons why mutual funds catering to retail investors are regulated, and subsequent to large investment losses by the general public we observe clamoring for increased regulation. Indeed, following the collapse of Amaranth there where some calls in that direction. In the long run we do not see unregulated hedge funds catering to retail investors as a viable concept. We are therefore heartened by the recent SEC decision to strengthen accreditation requirements to USD 2.5 million excluding the investor's home.

This does not mean that retail investors need to be entirely excluded from hedge fund investments. First, hedge funds advisors increasingly offer standard "regulated" products, such as long-only or 130-30 funds. Such funds may be regulated without the hedge fund advisor being regulated, yet offering access to talented investment professionals.

Second, hedge fund replicators, funds that mimic the return characteristics of hedge fund indices, have some promise in offering hedge fund like returns at lower costs and more transparency. Just as with structured products, it should be possible to regulate replicators *via* precise rules based term sheets to an extent deemed acceptable for retailization. While such products would be unlikely to generate much alpha, they potentially do provide the diversification benefits that seem to have become the primary incentive to invest in hedge funds in recent months.

Regulated institutions. Regulated institutions, in particular pension funds, are increasingly investing in hedge funds. This raises legitimate concerns, whether such investments are consistent with the mandate of pension funds, in particular the risk profile, and whether pension fund managers are sufficiently sophisticated to understand the investment choices. Indeed, since pension funds are regulated and generally are underwritten by the government, either explicitly or implicitly, these are legitimate concerns. If pension funds continue were to invest aggressively in hedge funds in the current regulatory environment, we feel it is inevitable that the hedge fund industry will be regulated following the next big loss.

However, that would be the wrong approach to regulation. The public concern is with pension funds not fulfilling their mandates, but not with hedge funds. Consequently, the regulations should be on the demand side not the supply side. The regulators for pension funds should specify the requirements for investments in hedge funds, such as disclosure, investment amounts and risk. Hedge fund advisors may then decide whether to agree to such a mandate.

2| MACROPRUDENTIAL CONCERNS

The main concerns about the hedge funds relate to macroprudential issues, in particular financial stability. These concerns were identified by Daníelsson *et al.* (2006).

2|1 Common concerns

Destabilization. Hedge funds have been accused of destabilizing individual markets or even entire countries, such as in the aftermath of the Asian crisis. This is sometimes known as the Mahatir Conjecture. However, the evidence following the Asian crisis indicates that it was the local corporations who were the first to move money out of their countries, and hedge funds, if anything, seemed to have supported the currencies.[2]

Leverage. Hedge funds are sometimes accused of amassing too much leverage. This was an accusation leveled at the LTCM in 1998. Considering that under Basel I regulated banks are allowed to 12 times leverage and that most hedge funds operate with much lower leverage than that, leverage concerns seemed to be broadly unfounded.[3] Furthermore, we only observe extreme levels of leverage at times of a fund going under, as capital is vanishing.

Counterparty risk. There are concerns that because of their opaque nature, counterparties may not have suffcient information about the counterparty risk arising from hedge fund exposures. This was a key concern in the LTCM crisis. However, as a consequence, prime brokers have monitored hedge fund positions carefully with a view to better understand and hedge such risk. In addition, hedge funds are marked-to-market and mostly need to provide appropriate collateral. While some concerns remain, for instance due to the endogenous value of collateral posted, it seems that even the counterparty risk of the largest of hedge funds should currently not pose a serious threat to their trading partners.

Herding. We expect the most sophisticated hedge funds to lead the curve in implementing new trading strategies and investing in new assets and markets. Indeed, since flexibility and costly technical sophistication is the *raisons d'être* for such hedge funds they can be expected to lead rather than follow others and herd. There is however concern that smaller and less sophisticated hedge funds may opt to follow copycat strategies and herd. Generally, however, hedge funds are less likely to herd than other investors, such as mutual funds, insurance companies, banks and pension funds for reasons such as the absence of relative and benchmarked compensation schedules and the absence of governmental bail-outs.

Market liquidity. Hedge funds have been accused of being a user rather than a provider of valuable liquidity. Indeed, if a hedge fund is a large seller of an asset, perhaps forced by marking-to-market, or amplified by some hedge fund styles that imply the pursuit of similar strategies such as convertible arbitrage, it may have a significant price impact. However, compared to the rest of the market, hedge funds are more likely to be willing to trade, and thus are more likely to supply liquidity than simply use it up. Indeed, the presence of hedge funds in credit derivatives has allowed banks to issue more credit instruments and price them more fairly.

Fraud. The opaque nature of hedge funds and the occasionally long lock-in periods may make it easier for hedge funds to commit fraud. However, there is little evidence of hedge funds committing disproportionately much fraud.[4] Overall, in the first half of this decade, the SEC brought 51 cases against hedge funds, charging them with defrauding investors of more than one billion. This is still a small fraction of overall hedge fund investments. Furthermore, theft is illegal and criminal law may be sufficient to deal with hedge fund fraud.

2 *See e.g. Choe* et al. *(1998); Fung and Hsieh (2000); Fung* et al. *(2000); Goetzmann* et al. *(2000).*
3 *Gupta and Liang (2004) find that less than 4% of live and 11% of dead hedge funds in their sample would have violated the Basel II capital adequacy requirements as of March 2003, with the under-capitalized funds relatively small.*
4 *CFTC estimates suggest that in the five years up to 2003 hedge funds accounted for around 2% of SEC and CFTC enforcement actions (Testimony of Patrick J McCarty, General Counsel, Commodity Futures Trading Commission, in SEC, 2003). Also, the case of the Bayou hedge fund fraud is well known, with losses up to half a billion dollars.*

2|2 The real concerns

The main systemic concerns about hedge funds relate to the potential for the failure of a systemically important —i.e. a sufficiently large, opaque, and sophisticated— fund (or group of funds). Such a failure threatens to create considerable uncertainty. In this case it is not solely the size of the fund that matters but rather the opaqueness of its positions and the information uncertainty it causes in the markets. This may cause trading to be severely curtailed and market prices to be poor indicators of value. This is exactly what happened following LTCM in 1998. In turn these distorted valuations might lead to further inefficient allocations, preventing assets to be held by the institutions having the highest marginal valuations due to poor liquidity. A crisis may even lead to credit events involving institutions that are not directly affected by the hedge funds' operations, but whose collateral may become damaged as a result. Such repercussions can therefore affect Main Street over and above Wall Street. In such a situation the hedge funds do not bear all the costs of such an event, which creates an externality that has to be addressed. The backlash could be on par with the policy mistakes following the stock market crash of 1929 and the Great Depression.

3| BENEFITS FROM HEDGE FUNDS

Hedge funds provide benefits to the financial system and the economy at large by making financial markets more efficient and provide liquidity in times of financial crisis. Daníelsson *et al.* (2006) outline these benefits.

Price discovery and the invisible hand. Hedge funds aid price discovery by employing considerable resources for market research. When hedge funds trade with their proprietary research information, they affect prices and volumes and thus reveal some of this information to the market, helping (perhaps otherwise under-researched) assets stay close to fundamental values. This in turn benefits the entire financial system, allow allocating trades to happen that otherwise would not take place. Furthermore, their trading activities increase competitive pressures on the spreads of market makers and other intermediaries.

Diversification. The regulated sector of the investment universe is generally limited by a range of regulations in what they can and cannot invest in. Consequently, out of the possible combinations of risk and return, the regulated sector can only provide products covering part of that range. Investors seeking different combinations of risk and return have either the option of managing the money themselves or delegating the investment decisions to somebody, i.e., a hedge fund.

Market clearing and liquidity. Daníelsson and Zigrand (2006) identify the specific implications of keeping some financial institutions, such as hedge funds, unregulated when the remainder of the financial system is subject to regulations, e.g., Basel style minimum capital. If the economy is hit by a liquidity induced financial shock, regulated financial institutions are required to get rid of more risky assets. If all market actors are regulated, then there is no counterparty at any price and the financial crisis episode is likely to become much deeper than than it otherwise would become.

4| POLICY OPTIONS I

The authorities have a range of options available when deciding how to best address the issue of regulating hedge funds. The key challenge is that standard financial regulatory methodology, developed with problems such as consumer protection and bank runs in mind, is not directly applicable to hedge funds.

Restrict or shut them down. The authorities always have the option of closing down the hedge fund industry in their respective jurisdiction, and indeed some authorities have expressed a desire to do exactly that. This however would be a mistake, as argued above. Furthermore, in countries where the calls for a heavy regulation of hedge funds are the loudest, such as Germany, the criticism of hedge funds seems to originate from them exposing weaknesses in corporate governance.

Furthermore, it is not clear how the authorities could restrict or close down the hedge fund sector given global anonymous markets. Not only is it not clear how such a restriction could be enforced offshore, it also raises concerns about economic discrimination.

If the regulated institutions and private individuals are able to conduct most type of investments, how can outsourcing be banned?

Among the envisaged restrictions most applicable to hedge funds are leverage constraints. But as argued above, most hedge funds hold leverage that is much lower than that, usually between one and two, and very high leverage ratios are observed only when a hedge fund is in serious trouble. Leverage furthermore is difficult to monitor accurately, let alone to compare across firms, time and products, and it also is not clear regulators want to be made responsible for this. Also, it is by-and-large in the interest of prime brokers to monitor leverage. Finally, uniform leverage constraints would impede the hedge funds' role of improving upon the efficiency of markets and may add to the procyclicality and instability of markets.

Laissez–faire. Not addressing the issue of the regulatory status of hedge funds is equally misguided. As discussed above, there are real systemic concerns from hedge funds since the full costs of such an event could be quite sizable and would not be borne by the hedge fund itself.

Disclosure. The second main regulatory tool is compulsory disclosure, both privately to the supervisor and publicly to clients. Perhaps the main impetus for regulating hedge funds today is focused on disclosure. In banking, disclosure is useful, e.g. by enabling regulators to monitor compliance with activity restrictions and provide protection for unsophisticated retail clients. Neither issue is relevant for hedge funds. Indeed, in most calls for disclosure it is not clear what the objective is. Furthermore, some hedge funds, and in particular those who arouse systemic concerns, operate at the highest end of the technology curve, frustrating attempts to obtain useful information by disclosure.

One option on disclosure is private disclosure to the supervisor of detailed position level information or output from the risk engines. A technically sophisticated hedge fund specializes in localized risk management, and will have a unique risk management system. By contrast, the supervisor specializes in global risk management and would not only need to understand the risk of an individual hedge fund but would in addition need to aggregate these risk across other similar funds, a task that would seem to be all but impossible today. With the enormous trading volume and frequent style changes, it is akin to trying to drink from a fire hose.

The alternative is public disclosure of aggregate performance or risk information to either investors[5] or the public at large. This however is again fraught with challenges, especially for the more sophisticated and systematically important funds. For example, even simple carry trades can provide a low volatility revenue stream for a considerable time, but then can go spectacularly wrong, such as the yen dollar carry in October 1998. Indeed, such strategies imply that volatility or value-at-risk can be seriously misleading as a measure of risk.

Reliance on prime brokers. Prime brokers provide banking services to hedge funds. Since prime brokers operate in the regulated part of the financial system it is sometimes proposed that they be used as a regulatory tool. This however misses the point about the relationship between prime brokers and hedge funds. It is true that the incentives of the prime brokers are to maintain the symbiotic relationship with the fund, and any potential problems with an individual hedge fund are likely to be discussed privately and resolved with the fund itself. But any prime broker viewed as an extension of the regulator would be viewed with suspicion by the hedge fund clients. Finally, regulatory arbitrage may induce prime brokers to relocate to unregulated financial centres, removing any sort of intelligent conversations between them and regulators.

Registration. In some jurisdictions hedge funds are required to register with authorities and there have been calls for registration requirements elsewhere, e.g. in the United States. While this has been struck down in courts, it is likely that the incoming Congress will give the SEC the power to require registration along with some disclosure. The benefits of blanket registration are generally hard to ascertain, but on the costs side it does induce moral hazard.

Targeted consultation. It is however essential for the authorities to have a clear view of the scope of the hedge fund sector, both operating within their jurisdiction, as well as globally. This requires the

5 *Hedge fund investors, such as funds-of-funds, bargain over the extent of voluntary disclosure along with issues such as fees and liquidity. If the bargaining power is on the investors side, the funds are likely to agree to more disclosure.*

authorities to be precise about what their information needs are. A good example of this is the FSA which maintains oversight of 31 of the largest hedge fund managers in Britain (50% of assets). Such thematic supervision covers a wide range of entities that have hedge fund mandates, and includes a regular survey of the main London prime brokers.

5| POLICY OPTIONS II

For the regulations to be effective and not too costly they need to focus directly on the externality meriting regulations, i.e., the potential failure of a systematically important fund or group of funds. Consequently, the object of the regulations is not to regulate the ongoing activities of an individual fund, but rather to address the failures. As discussed above, the systemic risk arising from hedge funds is liquidity and credit risk, including the endogenous and potentially pro-cyclical values of any collateral, induced by uncertainty about positions and how they get resolved.

Since the externalities cannot easily be prevented ex-ante without effectively shutting funds down, the best way this can be achieved is by having a robust resolution process in place in case a fund fails and the fund's positions need to be unwound. Client banks, prime brokers, and regulators may not be inclined to participate in such a process, or prefer to draw it out. The process therefore needs to be formalized, and there is little doubt in our minds that the regulators in the major financial centers then have the power to initiate such a process. While this may be viewed as accelerated bankruptcy process, the immediate key issue is rather to remove the uncertainty than to accurately resolve the final payoffs to the various counterparties. As with LTCM, Amaranth and others, sophisticated investment banks may be willing to take over parts of the affected hedge fund, after inspecting balance sheets and trading books. This is standard practice in banking. If no single bank has the required liquidity, such as with multiple failures, the monetary authorities might inject liquidity through a discount window. At the same time the supervisors do need to have contingency plans in place, and have an understanding of who the key players are. There also is a sense of urgency that might not exist in other crises. This is why targeted consultation is useful. Simulated crisis events, or stress tests, as performed by the Bank of England, the FSA, the Eurosystem Central Banks, and others, can be invaluable in planning for such contingencies.

Hedge funds have emerged as an integral part of the modern financial system, simultaneously making the financial system more efficient and inducing systemic risk. While the systemic risk needs to be addressed by supervisors, it is essential that it be done without negating the efficiency benefits provided by hedge funds. In this, rather than targeting the ongoing activities of hedge funds with traditional regulations such as activity restrictions and disclosures, it is sufficient and perhaps optimal to directly target the externality induced by hedge funds. The optimal regulatory regime for hedge funds directly targets this externality by having in place a robust resolution process in case a systemically important hedge fund or group of hedge funds trigger a systemic event.

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Hedge funds and financial stability

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Much has been achieved to date in containing the financial stability risks that hedge funds could pose, while avoiding unnecessary restrictions that would distort market forces and prevent hedge funds from continuing to play their role in today's markets. But in a continuously changing financial market environment, sustained attention is required by market participants and supervisory authorities to assess ongoing market developments and address any weaknesses in counterparty risk management practices and market discipline at an early stage.

Dealers in the aggregate appear to be fairly well protected at present against the direct counterparty credit risks from hedge fund defaults, but the robustness of margining practices to a major deterioration in market conditions and liquidity needs to be examined further. The broader financial effects, via a deterioration in market liquidity and prices, from a market shock affecting hedge funds and other leveraged institutions remain difficult to gauge. This highlights the importance of improved stress testing and scenario analysis practices. A critical challenge in this regard will be to ensure improved assessment and mitigation of tail risks by all key participants in the system, so that unrealistic expectations that risks can be transferred to others do not lead to moral hazard and wider risks to the financial system.

The financial stability issues posed by hedge funds and by highly leveraged institutions (HLIs) more generally have been of close interest to the Financial Stability Forum (FSF) ever since the FSF was created in 1999, in the wake of the LTCM and Asian crises. This interest has reflected the growing and constantly evolving role of hedge funds in the international financial system, which has kept them very relevant to the FSF's mandate to assess vulnerabilities, identify and oversee action needed to address them, and improve co-ordination and information exchange among the various authorities responsible for financial stability.

Indeed, the rapid growth of the hedge fund industry has been one of the most striking features of the changes in financial markets in recent years. Their numbers have doubled since 1999, and their funds under management have tripled. Although still small when compared to the asset holdings of traditional institutional investors, hedge funds as a class punch well above their weight. Reflecting their agility, their use of leverage, and their extremely active trading styles, hedge funds today account for a significant –and in some areas dominant– share of turnover in key financial markets.

Hedge funds provide liquidity and price discovery in many markets, and represent further avenues for the distribution of risk within the system. They have fostered innovation in market practice, and in so doing, helped usher along the development of the risk transfer markets that are central features of modern financial systems. Reflecting this, a growing share of the earnings of the traditional core intermediaries in the financial system –the major commercial banks and investment banks– now derives from servicing hedge funds, and the business model whereby these firms increasingly package and transfer risk for others to bear could hardly have developed so rapidly without hedge funds as active takers and traders of those risks.

The recent rapid growth of the hedge fund sector has occurred during a period of unusually benign macroeconomic and financial conditions. The sector may well have contributed to this environment as active absorbers of risk. But there are understandable questions about the risks that the growth of hedge funds and new instruments may pose if economic and market conditions were to become significantly less benign. One issue is the extent of direct risk that the leverage run by hedge funds could pose to lenders. Another relates to the impact of a financial shock on market liquidity and asset prices more generally. Here, an important question is whether more sophisticated risk management practices and the explosion in the trading of structured products have led participants to take on greater risk exposures than they might otherwise have, on the assumption that tail-event risks will be borne by, or can be transferred to, others in the event of market difficulties. If so, such "moral hazard risks" could impose significant externalities on other market participants.

This article briefly reviews the stability concerns associated with hedge funds and highly leveraged institutions over the years and the progress that has been made in addressing them.

1| THE FSF'S 2000 REPORT ON HLIS

One of the FSF's first projects following its creation in 1999, in the wake of the LTCM and Asian crises, was to assess the challenges posed by HLIs to financial stability and to achieve consensus on the supervisory and regulatory actions which would minimise their destabilising potential. Those challenges, as seen at the time, reflected two financial stability concerns brought to the fore by the near-collapse of LTCM and the Asian financial crisis. The first, associated with the LTCM episode, was how best to address the systemic risks arising from excessive leverage and the potential impact on markets and regulated firms of a sudden collapse of an unregulated HLI. The second was related to market dynamics issues associated with the potential for large concentrated positions seriously to amplify market pressures in small and medium-sized open economies.

This work, carried out by a Working Group on HLIs under Sir Howard Davies, the head of the UK FSA, resulted in the publication in 2000 of a report[1] which made 10 recommendations listed in the Appendix to this article. These recommendations brought together and complemented the recommendations and initiatives by a number of other organisations

1 http://www.fsforum.org/publications/publication_21_25.html

at around that time.[2] Although many changes have taken place in the hedge fund sector since then, the broad principles behind the recommendations in the FSF's 2000 report remain relevant and are therefore worth recalling.

The FSF's view was that the challenges to stability from hedge fund activity were best addressed though an approach that bolstered market discipline, including to avoid a build-up of leverage that could cause strains for counterparties and markets. To this end, many of the recommendations in 2000 aimed at improving counterparty risk management practices and the provision of information between market participants.

Among the recommendations, stronger risk management was called for both at hedge funds and at their counterparties. Naturally, improving risk management at the hedge funds' key counterparties –the major investment banks and commercial banks– is not a question of addressing their hedge fund exposures in isolation. It is inherently part of a wider programme of improving groupwide risk management and controls. At the same time, effective counterparty risk management practices by regulated institutions are a fundamental means of containing excessive hedge fund leverage. Effective risk management depends on reliable information. While the information that matters for counterparty risk management can and should be obtained in large part bilaterally, the report also recommended enhanced public disclosure of risk profiles, both by HLIs and more generally, so as to further strengthen market discipline and the stability of the overall system.

A lesson of past market cycles and crises is that risk management practices might be vulnerable to erosion by competitive pressures. The 2000 report therefore recommended sustained enhanced regulatory and supervisory oversight of HLI credit providers to monitor their adherence to newly established sound risk management procedures and to encourage the conduct of meaningful stress tests. The report also supported the proposal of the Basel Committee to develop a more risk-sensitive approach to capital adequacy regulation, and called for enhanced national market surveillance, to help to provide useful early warning signals about rising leverage and about speculative pressures and market responses to uncertainty about fundamentals.

The FSF followed up the implementation of the above recommendations in progress reports in 2001 and 2002. By the time of those reports, progress in strengthening counterparty risk management and regulatory oversight of HLI credit providers was found to have contributed to a reduction of leverage in the system. However, competitive pressures on credit standards remained a concern. The Forum encouraged further work on the measurement of credit providers' potential future exposures and in the conduct of comprehensive stress tests. It also called for further sharing of information internationally among supervisory and regulatory authorities on counterparty risk management practices in the HLI industry. Improvements – albeit inconsistent – had been made in the disclosure of information by HLIs to credit providers, with little progress on public disclosure. The FSF encouraged adoption of the recommendations of the Multidisciplinary Working Group on Enhanced Disclosure, which aimed at improved and more comparable risk-based public disclosure by all types of financial institutions, including hedge funds.[3]

One area where notable progress had been made was in prompting leading market participants to agree Good Practice Guidelines for Foreign Exchange Trading to help address concerns that large and concentrated HLI positions could have the potential to influence materially market dynamics in small and medium-sized open economies. Since the Asian financial crisis, concerns about the building of large, concentrated positions in small or medium-sized open economies have abated significantly.

2| MARKET CHANGES AND EVOLVING CONCERNS

In the period since the 2002 progress report, the hedge fund sector has expanded greatly and hedge funds have become an increasingly important source of diversification for investors and liquidity for markets. The increasing institutionalisation of their

2 *Including the US President's Working Group (1999), the Basel Committee on Banking Supervision (1999), the International Organisation of Securities Commissions (1999), and the Counterparty Risk Management Policy Group (1999).*
3 *See* http://www.fsforum.org/publications/publication_20_64.html.

investor base and sophistication of risk management and controls at the largest hedge funds have in some respects incorporated them more into the mainstream of financial markets. But hedge funds remain very diverse in their size, sophistication and strategies, and there are few generalisations that can be made about funds as a whole. Many improvements in market and supervisory practices have been made that help address stability concerns, but the increasing complexity of products and markets pose fresh challenges. Policymakers and the private sector therefore continue to face a variety of issues concerning this rapidly growing and innovative sector and, where appropriate, have taken initiatives to address them.

In particular, in recent years national supervisors have intensified their monitoring of counterparty relationships with hedge funds. Perhaps one of the most prominent examples of ongoing monitoring is the UK FSA's six-monthly survey of prime brokers to assess their exposure to hedge funds and gauge broader market risk profiles. The UK FSA also uses this information to identify the need for more direct dialogue with and surveillance of managers of the "higher impact" hedge funds in the UK market.

National supervisors in the major financial centres –working through the Joint Forum– have also reviewed stress testing practices at key financial institutions, including the nature and management of exposures to hedge funds and private equity funds. While risk management and stress testing practices have strengthened over recent years, the rapidly changing financial environment, the entrance of new market participants, and firms' changing business activities have highlighted the need for continued improvements. Supervisors have pointed to weaknesses in firm-wide aggregation of risk exposures, assessing the interaction of correlated risk factors under stress, and assessing market liquidity dynamics under stressful conditions.

In 2005, the Counterparty Risk Management Policy Group II (CRMPGII) issued a comprehensive update of its 1999 study of counterparty risk management recommendations. The report focused principally on risk management, risk monitoring and enhanced transparency, but it also covered recommendations to strengthen the infrastructure of the financial system. In addition, it addressed the operational and reputational challenges faced by market participants with regard to the management of complex financial instruments, notably credit derivatives.

Heightened market sensitivity to the latter issues proved helpful when in 2005 the Federal Reserve Bank of New York and the UK Financial Services Authority encouraged major firms and their counterparties to take concerted action to address confirmation backlogs in the credit derivatives markets and to end the assignment of trades without the consent of all parties. Good progress by major financial firms, together with other supervisors and regulators, has since been made in improving these and other aspects of the trading and settlement infrastructure for credit derivatives. The good cooperation between the private and public sectors provides a model for future work in other areas.

The increasing complexity of financial products, which in some cases can be highly structured and illiquid with valuations that need to be marked to model rather than directly observed from market prices, has also led to a greater focus on the quality of hedge fund measurement and disclosure of balance sheet valuations and risks. This has prompted IOSCO to develop for consultation with the industry principles for hedge fund managers in relation to areas such as valuations, risk management and operations.

Most recently, the US President's Working Group (PWG) released a set of principles and guidelines regarding private pools of capital. These aim to enhance market discipline and oversight, given the changes in the industry since the PWG's 1999 hedge funds report, by providing guidance to private pools of capital (including hedge funds), investors, counterparties, creditors, regulators and supervisors.

3| A LOOK AHEAD

Much has been achieved to date in containing the financial stability risks that hedge funds could pose, while avoiding unnecessary restrictions that would distort market forces and prevent hedge funds from continuing to play their valuable role in today's markets. But in a continuously changing financial market environment, sustained attention is required by market participants and supervisory authorities internationally to understand ongoing market developments and potential implications for

stability, and to address any identified weaknesses at an early stage. Going forward, financial authorities will therefore be continuing to take a close interest in this area, and to coordinate action internationally to promote financial stability, improve the functioning of markets, and reduce systemic risk.[4]

Systemic risk is the potential for financial distress to spread across financial institutions with possible effects on the real economy; it can be propagated either through defaults in interlocking counterparty credit exposures that affect core financial intermediaries, or through a steep decline in asset liquidity and asset prices. Being able to assess the degree of systemic risk that might arise from hedge funds therefore requires that supervisors have good information on major dealer firms' direct exposures (as prime brokers or otherwise) to hedge funds. It also involves evaluating the risk that hedge fund actions (perhaps through sudden changes in risk perceptions or forced liquidations of positions) might cause a sharp deterioration in market liquidity and prices.

The evidence from the work of supervisors in the key financial centres suggests that, after taking account of the use of collateral and margin, the current exposures of major dealers to hedge funds, as well as their potential future exposures as measured by risk models, are in aggregate modest. Dealers in the aggregate thus appear to be fairly well protected at present against the direct credit risks from hedge fund defaults. Nevertheless, competitive pressures for hedge fund business appear to have led to some cases of weakening in initial margining practices. The robustness of margining practices to a major deterioration in market conditions and liquidity –and the relationship between margin, other credit terms and the amount of capital allocated by dealers to hedge fund counterparties– needs to be examined further. Supervisors are working to better understand the remaining uncertainties in these areas.

Meanwhile, the broader financial effects, via a deterioration in market liquidity and prices, from a market shock affecting hedge funds and other leveraged institutions remain difficult to gauge. This is because the new products and markets that have developed in the benign market conditions of recent years remain untested and, more fundamentally, because it is very difficult to predict how market participants will react in any extremely stressful environment. This highlights the importance of improved stress testing and scenario analysis practices by market participants that provide a portfolio-wide measure of counterparty risk sensitivities under severe stress scenarios and that incorporate interactions between counterparty sensitivities and proprietary risk positions. And, as noted in the introduction, a critical challenge in this regard will be to ensure improved assessment and mitigation of tail risks by all key participants in the system, so that unrealistic expectations that risks can be transferred to others do not lead to moral hazard and wider risks to the financial system.

4 *The FSF is working on an update of its 2000 report, as requested by the G7 in February 2007.*

APPENDIX

Recommendations of the FSF Working Group on Highly Leveraged Institutions
5 April 2000

The Working Group recommended a package of responses, which it considered to be consistent, complementary and commensurate to the problems identified. A strong theme uniting most of these measures was the critical importance of promoting and sustaining adjustments in firm behaviour and enhancing market discipline. The first eight recommendations set forth below relate predominantly to systemic risk issues, while the last two have particular relevance to market dynamics issues.

• ***Stronger counterparty risk management***. Improved counterparty risk management is critical to addressing concerns about the accumulation of excessive leverage in the financial system. All financial institutions acting as counterparties to HLIs should review their counterparty risk management arrangements against the recommendations promulgated by the Basel Committee, IOSCO and Counterparty Risk Management Policy Group (CRMPG). These cover: firms' overall risk management framework; systems for counterparty credit assessment and on-going risk monitoring; exposure measurement methodologies; limit setting procedures; collateral, documentation and valuation policies and procedures; legal risks; and systems for reporting to senior management. Where those arrangements are inadequate, firms should not operate in highly risky and volatile instruments and markets, or with counterparties offering positions in such markets. Regulators and supervisors should reinforce this message.

• ***Stronger risk management by hedge funds***. Some hedge funds have prepared sound practices for risk management, internal controls, disclosure/transparency and documentation and have promoted increased informal dialogue with market authorities. That is encouraging. It is crucial that such practices permeate throughout the hedge fund community.

• ***Enhanced regulatory oversight of HLI credit providers***. Enhanced regulatory and supervisory oversight of credit providers is needed to ensure that sound practices are pursued and recent improvements in practices are locked in. Supervisors and regulators in all countries should take appropriate steps to determine the extent of institutions' compliance with the Sound Practices promulgated by the Basel Committee and IOSCO (in conjunction with the recommendations of the CRMPG) and take action where they identify deficiencies. That may involve: greater intensity of supervisory and regulatory oversight of regulated institutions which fall short of sound practices; requiring regulated institutions to provide periodic affirmations of their compliance with sound practices; greater use of the supervisory review process following 'Pillar II' of the Basel proposals[5] and restricting the ability of firms to carry on business with HLIs where they consider that firm's counterparty risk management practices to be deficient.

• ***Greater risk sensitivity in bank capital adequacy regulation***. The Working Group supports the objective of the Basel Committee consultative document to revise the Capital Accord. This should increase the degree of risk sensitivity in bank capital adequacy regulations.

5 *"A new capital adequacy framework". Consultative paper by the Basel Committee (June 1999).*

• **Sustaining industry progress.** There are important areas of counterparty risk management where further work is required, both at the industry level and in individual firms. These include refining measurements of potential future exposure, developing better stress testing, the development of liquidity risk measures, collateral management techniques and use of external valuation. The Working Group has encouraged the formation of a small group consisting of representatives of the Basel Committee and IOSCO to assess industry progress in these areas.

• ***Building a firmer market infrastructure***. The Working Group strongly commends further steps to improve documentation harmonisation across different products, collateral practices and valuation practices. National authorities should work to ensure that their bankruptcy laws allow certainty to market participants that positions can be closed and collateral realised in such an eventuality.

• ***Enhanced public disclosure by HLIs***. The Working Group firmly supports the objective of enhancing public disclosure by HLIs and endorses US efforts to achieve this through both regulation and legislation. It calls on all jurisdictions to consider the adequacy of their own disclosure requirements and introduce, where necessary, appropriate changes to legislation or regulations to ensure that major funds located in their jurisdictions are subject to complementary disclosure requirements. This recommendation should also apply to offshore centres, particularly those which currently host large unregulated hedge funds.

• ***Enhanced public disclosure practices generally***. The Multidisciplinary Working Group on Enhanced Disclosure endorsed by the Financial Stability Forum (FSF) provides an important opportunity for movement towards improved and more comparable risk-based public disclosure among all types of financial institutions, including hedge funds. The Working Group urges firms taking part in the study to take full advantage of the opportunity to engage in a forward-looking and practical discussion of how disclosure practices should be improved.

• ***Enhanced national surveillance of financial market activity***. Authorities should consider strengthening market surveillance at the national level with a view to identifying rising leverage and concerns relating to market dynamics and, where necessary, taking appropriate preventive measures. There are also improvements to market transparency which might be of value to market participants and the official sector alike. Particular areas that could be explored include enhancing existing foreign exchange and over-the-counter (OTC) derivatives markets data, for example by broadening currency breakdowns.

• ***Good practice guidelines for foreign exchange trading***. Leading foreign exchange market participants should review and, as necessary, revise existing market codes and guidelines and take the responsibility of articulating model guidelines of good trading practices in the light of concerns expressed about trading behaviour in foreign exchange and related markets. These could serve as a starting point for local adaptation in individual emerging market economies.

Hedge funds and systemic risk

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A hedge fund is a privately offered investment vehicle that pools the contributions of investors in order to invest in a variety of assets, such as securities, futures, options, bonds and currencies. Hedge funds have attracted growing attention from policy makers, financial market participants and the general public due to their rapid growth and substantial scale, their importance to banks as clients and the impact of their trading activity on global capital markets. Because of their rapid growth and the market disruptions caused by Long-Term Capital Management (LTCM) in 1998, some analysts believe that hedge funds pose systemic risks. However, this is unlikely. A thorough review of the avenues through which hedge funds could cause systemic problems indicates that, although a major disruption emanating from the hedge fund sector is possible, it would be difficult for the sector to be highly disruptive to financial markets. Post-LTCM, regulatory authorities have encouraged banks to monitor their hedge fund clients through constraints on their leverage. This has thus far proven effective, as the recent failure of Amaranth demonstrates. That failure, the largest yet, caused hardly a ripple in the wider financial markets.

Hedge funds support the robustness of markets in many ways. They provide attractive investment alternatives and improve economy-wide risk sharing. In addition, they promote financial market stability by assuming risks that other market participants are unwilling or unable to bear; by providing liquidity; and by placing trades that move mispriced assets toward their "fundamental" values. Of course, hedge funds could raise problems through their dominant role in some markets, active trading strategies, use of leverage and relative lack of transparency. Counterparties must therefore be cognizant of the risks they bear from hedge funds. Also, regulators must continue to promote better hedge fund risk management and transparency through their regulation of counterparties while remaining vigilant about potential systemic risks emanating from the sector. On balance, however, hedge funds enhance market stability and are unlikely to be the source of a systemic failure.

NB: The authors thank R. Sbaschnig for research support on this article.

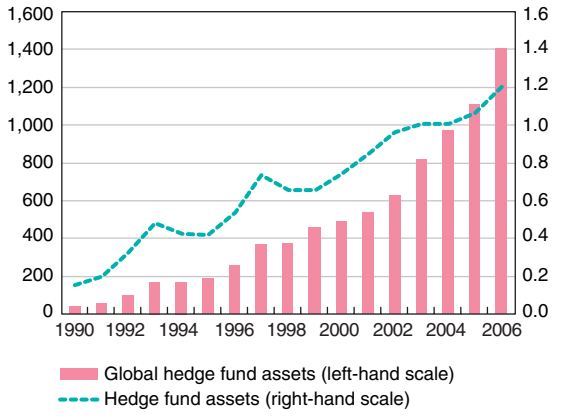
I SIZE OF HEDGE FUNDS

The hedge fund industry has grown rapidly in recent years. According to estimates by Hedge Fund Research (HFR), the industry grew from 610 funds managing USD 39 billion of assets in 1990 to 3,873 funds with USD 490 billion ten years later (Chart 1). As of the end of the third quarter of 2006, 9,228 funds managed some USD 1.4 trillion, representing annualized asset growth of 19% since 2000. More than USD 1 trillion of these assets are in the US, USD 325 billion are managed in Europe and USD 115 billion in Asia.[1]

As the industry has grown, so too have the number of extremely large funds. At year-end 2002, the largest hedge fund, Moore Capital, had USD 8 billion in assets. Just three years later, 31 funds managed this much in assets and Moore, whose assets had grown to USD 10.2 billion, was not even among the ten largest (Table 1). In recent years, the industry has become more concentrated. The asset share of the 100 largest hedge fund managers has risen from 54% in 2003 to 65% in 2005.[2]

Although their assets represent little more than 1% of the total debt and equity outstanding worldwide, hedge funds have a significant impact on financial markets. Because many hedge funds trade frequently and employ leverage, they account for about 30% of US equity trading volume.[3] One hedge fund, SAC Capital, is reported to account for as much as 3% of NYSE average daily volume and 1% of NASDAQ daily volume.[4] In a survey of the main London banks that provide prime brokerage services to hedge funds, the Financial Services Authority found that the funds' average leverage is 2.4:1 (GBP 2.4 in assets per GBP 1 of capital).[5] Hedge funds dominate some markets. For example, they account for about 70% of the long value in the convertibles market.[6]

Chart 1
Hedge fund assets have been growing rapidly
(USD billions) *(as a % of global debt and equity outstanding)*



Sources: Hedge Fund Research, World Federation of Exchanges (FIBV), Bank for International Settlements (BIS) and Swiss Re Economic Research & Consulting.

Table 1
The ten largest hedge fund managers
Year-end 2005
(assets in USD billions)

Fund manager	Location	Assets
Goldman Sachs Asset Management	New York, NY	21.0
Bridgewater Associates	Westport, CT	20.9
D.E. Shaw Group	New York, NY	19.9
Farallon Capital Management	San Francisco, CA	16.4
ESL Investments	Greenwich, CT	15.0
Barclays Global Investors	London, UK	14.3
Och-Ziff Capital Management Group	New York, NY	14.3
Man Investments	London, UK	12.7
Tudor Investment Group	Greenwich, CT	12.7
Caxton Associates	New York, NY	12.5

Source: Rose-Smith (I.) (2006): "The hedge fund 100", Institutional Investor's Alpha, June.

1 *Data from Hedge Fund Intelligence, quoted in Mallaby (S.) (2007): "Hands off hedge funds", Foreign Affairs, January/February.*
2 *Rose-Smith (I.) (2006): "The hedge fund 100",* Institutional Investor's Alpha, *June.*
3 *US Securities & Exchange Commission, "Testimony concerning the regulation of hedge funds".*
4 *Vickers (M.) (2003): "The most powerful trader on Wall Street you've never heard of",* Business Week, *July 21.*
5 *Speech by Waters (D.), Director, Asset Management Sector Leader and Director of Retail Policy, Financial Services Authority (FSA), October 19, 2006.*
6 *Feng (J.), Greenwich Associates (2004): "Hedge fund strategies drive market direction in US and Euro converts", August 5.*

2| TYPES OF HEDGE FUNDS

The investment styles of hedge funds vary widely. The major strategies fall into three general categories.

• ***Market trend/directional strategies*** take positions based on market or security trends.

– ***Macro funds*** make directional bets based on macroeconomic fundamentals in the equities, interest rates, currency and commodities markets.

– ***Long/short funds*** buy securities they believe to be underpriced and sell securities they deem overpriced. Unlike mutual funds, these funds commonly employ leverage, take short positions and use derivatives. Some of these funds are market-neutral (i.e. beta = 0); most are net long.

• ***Event-driven strategies*** seek to exploit mispricing caused by discrete events.

– ***Distressed securities funds*** attempt to exploit mispricing of securities involved in, or at risk of, bankruptcy or reorganization.

– ***Risk/merger arbitrage funds*** seek to profit from trading the stocks of companies involved in mergers, takeovers, or buyouts.

• ***Arbitrage strategies*** seek to exploit small pricing inefficiencies between closely-related securities.

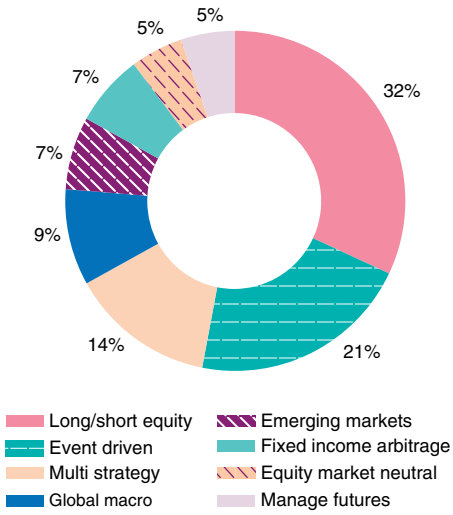
– ***Convertible arbitrage funds*** generally take long positions in a company's convertible debt, preferred stock, or warrants while shorting the company's common stock.

– ***Fixed-income arbitrage funds*** seek to exploit small pricing inefficiencies in similar fixed income instruments.

– ***Statistical arbitrage funds*** uses econometric and/or mathematical models to try to find pricing inefficiencies.[7]

More than half of hedge fund assets are invested in long/short equity and event driven strategies (Chart 2). The risk profiles of hedge funds vary widely. Many employ variations or combinations of basic strategies.

Chart 2
Long/short equity funds are the biggest category
Percentage of total hedge fund assets by strategy – (as at June 2006)



Note: These categories follow Technical Analysts Society Singapore's (TASS) definitions and do not exactly match the above categories.

Sources: TASS Research, "Commentary on TASS Asset Flows", second quarter 2006; Swiss Re Economic Research & Consulting.

3| BENEFITS OF HEDGE FUNDS

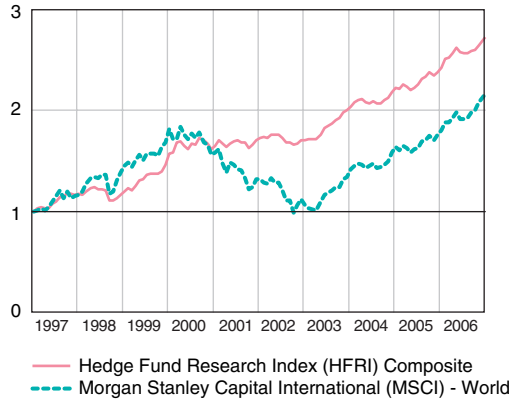
The benefits that hedge funds offer investors are well known. Less well understood are the ways that hedge funds improve risk sharing and financial market stability.

3|1 Benefits to investors

A well diversified portfolio of hedge funds appears to have the potential to earn attractive returns with less risk than equities. In the decade through year-end 2006, the HFR Fund-Weighted Composite Index generated a higher annual return than the MSCI-World Equity Index (10.6% versus 8.1%) with half of the risk (Chart 3).[8] Moreover, the "beta" of the HFR with respect to the MSCI-W was 0.4, which means that each percentage point change in returns

7 *Definitions based on US Securities and Exchange Commission (SEC) (2003): "Implications on the growth of hedge funds", Staff Report, p. 35-36, September.*
8 *The standard deviation of monthly returns was 2.1% for the HFR Composite and 4.2% for the MSCI-W.*

Chart 3
Cumulative returns to hedge funds and global equities
January 1997-December 2006
(December 1996 = 1.0)



Sources: Hedge Fund Research, MSCI Barra.

to the MSCI-W was typically associated with a 0.4% change in the HFR composite's returns. A low beta such as this suggests that allocating some of a portfolio to hedge funds in lieu of stocks can potentially reduce the volatility of portfolio returns.

In assessing these benefits, a few caveats are in order. First, unlike equity indices such as the MSCI-W and the S&P 500, for which vehicles exist enabling investors to track their returns, there is no way for investors to replicate the performance of hedge fund indices, since many of the funds in these indices are closed to new investors. Second, there is considerable evidence that hedge fund indices substantially overstate the returns and understate the risk of hedge funds.[9] Finally, hedge funds are far less liquid than equities.

3|2 Risk sharing

Smoothly functioning institutions that facilitate risk sharing, such as equity, derivatives and insurance markets, allow risks to be shifted to the parties most willing and best equipped to bear them. This helps an economy to function more efficiently.

Hedge funds have become an important source of risk capital. In the fledgling market for insurance-linked securities such as catastrophe bonds and life bonds, hedge funds have become increasingly active investors. Some funds have been launched to invest exclusively in insurance risk. Over time, hedge funds will become an increasingly important financing source for insurers, complementing reinsurance in areas such as peak catastrophe risks, for which industry capital is insufficient. On a larger scale, hedge funds absorb credit risks from other financial institutions, notably banks, thereby distributing these exposures across a broader range of investors holding diversified portfolios.

3|3 Financial market stability

The improved risk sharing that hedge funds facilitate can enhance market stability. By assuming some of the escalating volume of credit and catastrophe risks in the marketplace alongside banks and insurers, hedge funds join other institutions in serving as shock absorbers, potentially limiting the spread of damage from recessions, credit crises and natural catastrophes.

Hedge funds can help improve market stability in tumultuous times in other ways as well. When liquidity dries up and other market participants avoid trading a particular security, hedge funds often enter the fray, in areas such as distressed debt. Increased trading contributes to market liquidity, which causes a reduction in the risk premia associated with financial assets. This ultimately means a lower cost of capital.

When the market price of a currency or security deviates sharply from its "fundamental" value, hedge funds seek opportunities to arbitrage the difference, thereby fostering the return of asset prices to their "fundamental" values. Hedge funds are uniquely able to act in this way because their investors are generally subject to "lock-ups", which require them to keep their investments with the fund for a set period. Hedge funds also have bank lines of credit that they can access when a compelling investment opportunity arises.

9 *This is because of biases in the data sets on which hedge fund indices are based, such as survivorship bias, backfill bias and self–selection bias. See, for example, Malkiel (B.) and Saha (A.) (2005): "Hedge funds: risk and return",* Financial Analysts Journal, *November/December, p. 80-88. For evidence that reported hedge fund returns understate the correlation of funds with equity markets, see Asness (C.), Krail (R.) and Liew (J.) (2001): "Do hedge funds hedge?",* The Journal of Portfolio Management, *p. 6-19, Fall.*

4| SYSTEMIC RISK ISSUES

Hedge funds, like other financial institutions, pose two types of risk to investors and the financial community at large: *systemic* and *non-systemic*. Systemic risk refers to the risk that one financial institution's failure to meet its financial obligations will cause other institutions to fail to meet theirs as well. In extreme cases, a financial crisis could ensue, destabilizing capital markets and the real economy. Other risks are known as non-systemic.

4|1 Non-systemic risk

Many of the risks to which a hedge fund is exposed are specific to that fund. Risks such as operational risk and the risk of fraud directly affect a hedge fund's investors and the banks lending to the fund. Regulators in many countries, especially the US and UK, have taken the approach that since the funds are restricted to large, sophisticated investors, it is these investors' responsibility and not the government's to perform due diligence on the funds in which they invest. Moreover, fraudulent operators are subject to prosecution under existing laws.

In recent years, there have been numerous instances where hedge funds have lost hundreds of millions, or billions, of dollars (Table 2). Of 21 episodes reported in various public sources, two fund categories – fixed income arbitrage and global macro – together accounted for 47% of the reported incidents and 63% of assets lost (Charts 4), well above their 16%

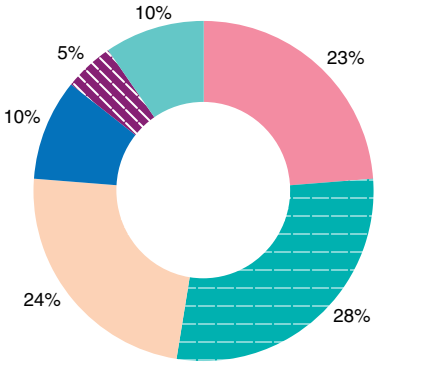
Table 2
Selected hedge fund disasters and large losses
(Estimated loss in USD millions)

Fund	Strategy	Year	Estimated loss	What went wrong?
Amaranth	Multistrategy	2006	~6,400	Excessive exposure to energy prices
Long-Term Capital Management	Fixed-income arbitrage	1998	3,600	Excess leverage during Russian default crisis
Tiger Management	Macro	2000	2,600	Bad bet on yen lost USD 2 billion
Soros Fund	Macro	2000	2,000 -5,000	Major losses on Internet and technology stocks
Fenchurch Capital	Fixed-income arbitrage	1995	1,264	Failed shift from US - only to European markets
Princeton Economics Inter'l	Macro	1999	950	Market losses, fraud
Vairocana Ltd.	Fixed-income arbitrage	1994	700	Market losses, bet on falling rates
Lipper	Convertible arbitrage	2001	700	Market losses, fraud
Askin Capital Management	Fixed-income arbitrage (mortgage-backed)	1994	660	Failed hedge, market losses, margin calls
Lancer	Long/short equity	2003	600	Fraud
Beacon	Fixed income arbitrage	2002	500	Losses on mortgage derivatives, failed to mark to market
Manhattan Investment Fund	Long/short equity	1999	400	Fraud
MotherRock	Energy Fund	2006	230	Loss from natural gas market
Global Systems Fund	Macro	1997	125	Wiped out by collapse of Thai baht
Argonaut Capital Management	Macro	1994	110	Market losses
Maricopa Investment	Long/short equity	2000	59	Market losses, fraud
Cambridge Partners	Long/short equity	2000	45	Fraud
HL Gestion/Volter	Managed futures	2000	40	Market losses, regulatory intervention
Ashbury Capital Partners	Long/short equity	2001	40	Fraud
ETJ Partners	Relative value	2001	21	Market losses, fraud
Ballybunion Capital	Long/short equity	2000	7	Fraud

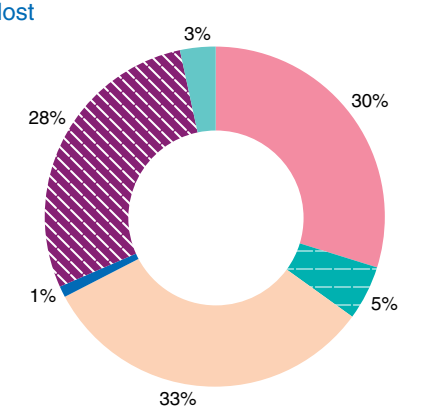
Sources: Alexander Ineichen, UBS Warburg (2001): "The Myth of hedge funds: are hedge funds the fireflies ahead of the storm?", Journal of Global Financial Markets, 2(4),p. 34-46; Jeff Joseph Rydex Capital, "Investing in a hedge fund of funds: what really matters," Senior Consultant, 7(8), p.1; Berkshire Asset Management winter, "Hedge Funds", July 2003; New York Times, September 2006; Swiss Re Economic Research & Consulting.

combined share of assets (Chart 2). This is consistent with findings that these two strategies have among the highest attrition rates in the hedge fund universe.[10] Forty-three percent of the 21 cases were fraud-related.

Charts 4
Distribution of large-scale hedge fund losses across strategies
Number of incidents



Assets lost



Source: Table 2.

4|2 Systemic risk

Systemic risk has traditionally been more of a concern to regulators than non-systemic risk.

As hedge funds have become more significant financial market participants, policymakers have raised concerns that they may contribute to systemic risk. One way this might occur is if a failing hedge fund causes the collapse of a large financial institution with direct exposure to it. This could, in turn, cause further financial system disruption. During the collapse of LTCM in the autumn of 1998, 17 counterparties, mostly large banks, would collectively have lost between USD 3 and 5 billion had LTCM not been bailed out by a group of its counterparties. Many of the counterparties had direct exposure to LTCM, mostly arising from over-the-counter (OTC) derivatives.[11]

The LTCM crisis illustrates why market turmoil can be averted even when a fund with extensive counterparty risk exposures fails. First, counterparties should recognize that they are at risk and act in their self-interest by interceding, as occurred in the LTCM episode. Second, banks' risk management procedures with regard to individual exposures might prove highly effective, as was the case during the LTCM crisis. The replacement value of instruments net of collateral was a small percentage of banks' overall trading portfolio, though it would have significantly reduced their surplus capital. Banks' risk management was, however, lacking in one regard: in assessing the risk of lending to LTCM, the banks relied too heavily on the reputations of the fund's partners but lacked a clear picture of the fund's overall risk profile.[12]

Aside from causing the failure of a major counterparty, a failing hedge fund can disrupt the financial markets indirectly. Timothy Geithner, President of the Federal Reserve Bank of New York,

10 *Chan (N.)* et al*: "Systemic risk and hedge funds", forthcoming in M. Carey and R. Stulz, eds., "The risks of financial institutions and the financial sector".*
11 *Petit (J.P.), Exane Economics Research, 23 June 2004, p. 9. LTCM had total trading assets of USD 125 billion, and notional off-balance sheet positions of over US 1 trillion. US commercial banks only had loans outstanding to LTCM of USD 170 million and equity investments of USD 900 million, according to Meyer (L.), Testimony before the US House of Representatives, 24 March 1999.*
12 *Basel Committee on Banking Supervision (1999): "Banks' interactions with highly leveraged institutions", January.*

characterizes the common dynamic of past financial crises as:

• the confluence of a sharp increase in risk perception, and the subsequent actions taken by financial institutions and investors to limit their exposure to future losses. As asset prices declined and volatility increased in response to increased concern about risk, firms moved to call margin, to reduce positions and to hedge against further losses. These individual actions had the aggregate effect of inducing even larger price declines and further heightening perceptions of risk, ultimately propagating and amplifying the effects of the initial shock.[13]

In the wake of LTCM, the Basle Committee found that the potential to disrupt markets indirectly was of greater concern than the possibility of having a direct impact on financial institutions.

The Committee identified several reasons why hedge funds pose a risk to financial markets:

• because of their use of leverage, hedge funds might exacerbate market movements if they are forced to sell securities to meet margin calls;

• forced selling might be additionally exacerbated by that fact that hedge funds often take similar positions and often invest in more illiquid securities;

• the disruption could be further aggravated if broker-dealers making margin calls front-run the hedge funds;

• many hedge funds are short-lived. Their historical attrition rate has been about 10% per year.[14] This short time horizon may lead to increased risk-taking since investment strategies will be focused on short-term gains.

These factors combined to cause substantial financial market disruption in the autumn of 1998 during the downfall of LTCM. Unlike the case of LTCM, however, other large-scale hedge fund losses have had little or no systemic impacts.

Amaranth, a highly regarded USD 9 billion multi-strategy fund, recently lost 65% of its assets in less than two weeks. The fund lost 35% of its value during the week of 11 September 2006 employing a highly leveraged natural gas spread strategy. Amaranth tried unsuccessfully to sell its positions to other financial institutions over the week-end of 16-17 September. On Wednesday, 20 September, it sold its positions to JP Morgan Chase and Citadel Investment Group at a USD 1.4 billion discount from the prior day's market-to-market values.[15]

The losses, though unnerving for market participants, posed little systemic risk because they occurred in a relatively small and isolated market. LTCM's problems, by contrast, played out in the US Treasuries market. Amaranth and LTCM were both undermined when pursuing strategies that could conceivably have been profitable under certain scenarios. In each case, the failure was one of risk management. The trades were undertaken at such a large scale that when the markets moved against them, the funds were unable to exit their positions without moving the markets. A greater sensitivity to this liquidity risk, as well as a more thorough analysis of extreme scenarios, could have helped prevent these debacles. Amaranth demonstrates that a hedge fund can experience large-scale failure without causing systemic risk.

The Tiger and Soros funds offer further examples of large-scale losses with no systemic impact. The Tiger funds, which earned a 32% annualized return after fees from 1980 to 1998, ran into problems with a yen trade that lost USD 2 billion in 1998. Tiger suffered further losses due to a bear market in value stocks. As investors rushed to buy Internet, technology and telecom stocks in the late 1990s, Tiger's old economy holdings languished. Fund manager Julian Robertson announced the liquidation of the funds on 30 March 2000. The Soros funds, meanwhile, suffered the opposite fate. The funds reportedly lost billions of dollars in March and April of 2000 by joining the "New Age" bubble at precisely the wrong time.[16]

13 *"Hedge funds and derivatives and their implications for the financial system", remarks at the 2006 Distinguished Lecture, sponsored by the Hong Kong Monetary Authority and the Hong Kong Association of Banks.*
14 *Chan* et al.
15 *Till (H.), "EDHEC comments on the Amaranth case: early lessons from the debacle",* Working Paper, *EDHEC Business School.*
16 *Robertson (J.), letter to investors, 30 March 2000. "Millionaire speculator Soros exiting risk business", New York Times web edition, 28 April 2000.*

4|3 Causes for comfort about systemic risk

Although hedge funds can and do fail, sometimes spectacularly, these failures have generally not entailed systemic risk. There are other causes for comfort as well.

Market practices have improved since the LTCM crisis. The banking system is cushioned by more risk-adjusted capital. In the US, for instance, tier-one risk-based capital ratios have stabilized at about 8.5%, well above the 6.5% levels that prevailed in the early 1990s.[17]

Hedge fund risk management has improved through the efforts of bank supervisors, banks and securities firms; the involvement of institutional investors; and the institutionalization of hedge funds.

• Bank supervisors have promoted best practices in risk management among the banks that lend money to hedge funds. The banks have in turn promoted better risk management at the funds.

• After the LTCM episode, risk managers at banks and securities houses formed the Counterparty Risk Management Policy Group, which developed recommendations and diligently implemented them.

• As institutional investors have increased their allocations to hedge funds, the question of hedge fund risk management has come increasingly to the fore. A recent survey of hedge fund investors found that sound risk management is now among their chief concerns.[18]

• The emergence of larger, more "institutional", hedge funds has better aligned the interests of hedge fund managers with their investors.

There is some evidence that the role of hedge funds in financial crises has been exaggerated. Many funds use no leverage, and most use very little. According to a August 2005 report by service provider Van Hedge Fund Advisors, approximately 20% of hedge funds used no leverage while 50% used leverage (borrowed money) of less than 1-to-1 (including short positions as leverage).

In many cases of market disruption, such as the Mexican and Asian currency crises, hedge funds were not a leading cause of problems. Research on the role that hedge funds and foreign investors played in Malaysian currency markets and the Korea stock market during these countries' crises found no support for the theory that hedge funds were a major cause of these debacles.[19] Similarly, the International Monetary Fund (IMF) found no evidence of hedge funds abnormally profiting from the Brazilian (1999), Turkish (2001), and Argentine (2001) currency crises.[20] Rather than driving these currencies downwards, funds were engaged in negative feedback trading (*i.e.* buying on dips), which might actually have improved market liquidity and stability.

Finally, though market participants should not grow complacent, the absence of major systemic crises in the US since 1998 is an encouraging sign that risk management has improved. During that time, the US financial infrastructure has weathered challenges including a major bear market and operations failures due to 9/11 without major systemic fallout.

4|4 Three causes for concern

Mechanisms through which hedge funds can create systemic risk include style convergence, multiple layers of leverage and proprietary trading activities by banks.

One major concern is the possibility of many hedge funds with similar models and trading styles disrupting markets by trading in a similar fashion, leading them to start selling at the same time after some trigger. Fung and Hsieh (2000) found evidence of "style convergence", through which funds can arrive at similar trades, possibly for different reasons.[21]

17 *Geithner, op cit.*
18 *Deutsche Bank (2007): "2006 Alterative investment survey", January.*
19 *Fox (J.) (1998): "Did foreign investors cause Asian market problem?" NBER Digest, October.*
20 *International Monetary Fund (2004): "Hedge funds and recent emerging market currency crises",* Global Financial Stability Report, *p. 146-148, April.*
21 *Fung (W.) and Hsieh (D.) (2000): "Measuring the market impact of hedge funds",* Journal of Empirical Finance, *7, p. 1-36.*

The impact of this herding could be amplified by the layers of leverage employed. Of particular concern is the practice of investors borrowing to invest in funds of funds or other hedge fund vehicles, funds of funds then borrowing to invest in hedge funds and hedge funds then borrowing and using derivatives and other instruments to leverage themselves.[22] This practice could make funds vulnerable to large-scale losses. This use of leverage is particularly problematic in that banks might aggravate financial market distress by withdrawing liquidity during difficult periods.[23] Thus, multiple hedge fund failures could cause a cascade of margin calls, destabilizing markets.

Non-linear, option-like models can explain much of hedge funds' returns. Using this method, it was found that hedge funds have a significant amount of systematic risk, that equity funds exhibited significant positive beta exposure to equity markets with return distributions resembling short-put positions, and that the analysis was consistent with the popular view that hedge funds are "short volatility".[24] Selling volatility can be an extremely risky strategy with potentially large negative returns even with a dynamically-hedged delta-neutral position.[25] Also, IMF research found that even "market neutral" or "relative value" trading strategies, which are long some securities and short others in the same asset class, can experience a sharp increase in risk at times of extreme returns and often have correlations with other asset classes. This higher risk can occur even when holding a large number of "uncorrelated positions," a common hedge fund risk management technique, because these positions can suddenly become correlated during periods of market stress.[26]

Proprietary trading desks at major banks, which engage in trading strategies similar to those of hedge funds, are growing in size and importance. In each year from 2003 to 2005, NYSE member firms earned more revenues from trading than from equity commissions. In the first nine months of 2006, they earned twice as much revenues from trading as from equity commissions.[27]

5| Potential benefits and risks for insurers

Some insurers have found hedge funds to be worthwhile investments. At year-end 2006, insurers had an estimated USD 40 billion invested in hedge funds.[28] Conversely, hedge funds have invested in insurance risk. These investments lead to a broader spread of risk.

Insurers have several types of exposure to hedge fund failure. These include counterparty risk, credit risk, fiduciary liability insurance risk, and directors and officers insurance risk to corporations with pension funds significantly invested in hedge funds. Some insurers have exposure to broker-dealers, whose large proprietary trading and prime brokerage operations are subject to hedge fund-type risk.

6| Regulatory outlook

Many regulators in the US and other major markets believe that regulating hedge funds indirectly through their sources of funds is the best way to monitor hedge fund activity and its impact on financial markets. Securities and banking regulators oversee the relationships of hedge funds with the commercial banks and broker-dealers that lend to and transact with hedge funds. Banks must regularly assess the creditworthiness of their hedge fund borrowers and counterparties. Brokers must actively monitor the positions of hedge funds and manage their exposure to them. Regulators have reached no international consensus on the need for further oversight. Whereas many US and British regulators

22 *Bank of England (2004): "The financial stability conjecture and outlook",* Financial Stability Review, *June, p. 53.*
23 *Warwick (B.) (2004): "At the margins: leveraged level of funds of funds has some concerned", MAR/Strategies, March, p. 9.*
24 *Agarwal (V.) and Naik (N.) (2002): "Risks and portfolio decisions involving hedge funds",* Working Paper, *July 17.*
25 *A delta-neutral position has zero exposure to small changes in the underlying asset price. Nandi (S.) and Waggoner (D.), "The risks and rewards of selling volatility",* Federal Reserve Bank of Atlanta Economic Review, *First Quarter 2001, p. 31-39.*
26 *Richards (A.) (1999): "Idiosyncratic risk: an empirical analysis, with implications for the risk of relative-value trading strategies," IMF* Working Paper, *No. 99/148, November. Research suggests that hedge funds avoided the worst of the recent stock market downturn because they were able to time their investments by selling tech stocks before, during, and after the stock market started to collapse. Source: Brunnermeier (M.) and Nagel (S.) (2002): "Arbitrage at its limits: hedge funds and the technology bubble,"* Working Paper, *August.*
27 *Fernandez (F.A.) (2006): "US securities industry 3Q'06 results",* SIFMA Research Report, *13 December, p.46.*
28 *The Deutsche Bank survey states that insurers account for 3% of hedge fund investments which, as noted above, total about USD 1.4 trillion.*

are reluctant to create new hedge fund regulations, officials in many European countries seek fuller disclosure or a ratings system for the funds.[29]

In December 2004, the SEC adopted a rule requiring hedge funds to register as investment advisors, thereby allowing regulators to examine hedge funds' accounts and records. The reasons it cited for the rule were the growth of the hedge fund industry, an increase in the number of fraud cases and a growing number of hedge funds investors with no previous experience investing in the funds. In June 2006, the US Court of Appeals for the District of Columbia Circuit vacated and remanded the rule. It is uncertain how much impact a registration requirement would have. Hedge funds could move offshore to avoid registering. Moreover, because of its resource limitations, the Commission might find it difficult to closely monitor the industry.

• Hedge funds have grown rapidly, from USD 39 billion in assets in 1990 to USD 1.4 trillion in assets at the end of the third quarter of 2006.

• Because many hedge funds trade rapidly and employ leverage, their activities have a disproportionately large impact on capital markets.

• Hedge funds provide benefits to investors and improve risk sharing and financial market stability.

• Regulators have generally taken the position that the sophisticated investors who buy hedge fund shares can fend for themselves. Fraudulent fund manager behavior is, however, prosecutable.

• The risk of hedge funds causing the downfall of a large financial institution is low.

• Due to the changing nature of funds' exposure to asset markets, it is difficult to know when a hedge fund's distress might cause a shock. Of the numerous large-scale hedge fund losses that have occurred, few have posed systemic risks.

• In recent years, hedge fund risk management has improved due to the efforts of regulators, banks and securities firms; the preferences of institutional investors; and the institutionalization of hedge funds.

• Hedge funds could cause financial market disruption due to the use of similar trading strategies, layers of leverage and proprietary trading by banks.

• In many instances, hedge funds provide liquidity and stability to financial markets, propping up the prices of assets whose values have declined sharply.

• On balance, hedge funds likely reduce systemic risk.

29 *Scannell (K.)* et al *(2007): "No consensus on regulating hedge funds",* Wall Street Journal*, 5 January, p. C1.*

Hedge fund replication strategies: implications for investors and regulators

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Over the past decade, academic research has identified a number of replication strategies capable of capturing between 40% to 80% of the average return of many popular hedge fund strategies. Investors are beginning to take notice of these replication strategies, especially because of their rule based, transparent features and the fact that they can be executed at low cost. Armed with this alternative way of accessing passive hedge fund returns, investors can effectively structure incentive fee contracts to reward skill-based returns (i.e., alternative alpha) differently from passive index-liked returns (i.e., alternative beta). This can raise the barrier to entry for new funds to the industry in that hedge fund managers must demonstrate skill in order to participate in profit sharing. This should reduce the risk of herding by hedge fund managers who may otherwise be enticed by incentive fee contracts that rewards them for taking popular factor bets.

The hedge fund industry has grown rapidly over the past ten years. Asset under management increased from under USD 100 billion in 1995 to nearly USD 1 trillion by mid 2006, according to Tremont Capital Management (2006). US pension plans and university endowments have steadily increased their allocation to hedge funds. According to National Association of College and University Business Officers (NACUBO), endowments in the US invested 17% of their assets in hedge funds in 2005, up from 5% in 1999. Pensions & Investments found that the largest 200 US defined benefit plans increased their allocation to hedge funds from 0.1% in 2000 to 0.8% in 2005.

A decline in performance, however, has accompanied this rapid growth of hedge funds. Chart 1 displays the rolling 4-year average of annual returns. The return of the average hedge fund is the solid line, and the return of funds-of-hedge funds ("FoFs") the broken line. Both started with double digit returns in the mid 1990s, and dropped to single digits in the current decade. However, it is possible that risk exposures of hedge funds have also declined in respond to the response rising dominance of institutional investors replacing family offices and private individuals as the primary source of investor capital. Therefore, it is important to investigate whether risk-adjusted return, or alpha, has declined. The key question is: In the search for alpha, have all the low-hanging fruits been picked? In order to answer this question, one must first acknowledge that the search for alpha properly begins with the identification of betas. Section two of this paper traces the historical attempts to quantify the systematic risk factors inherent in hedge fund strategies –the separation of hedge fund alphas from betas.

Armed with these results, Fung *et al.* (2006) estimated the alpha of funds-of-hedge funds ("FoFs") from the merged TASS, HFR, and CISDM databases using the seven-factor model from Fung and Hsieh (2004b).[1] Separating the sample of FoFs into *have-alpha* and *beta-only* funds, Fung *et al* (2006) find that the average FoF does not deliver statistically significant alpha, and about 21 percent of the total sample of FoFs have positive alpha over the sample period 1995 to 2003. Even for the have-alpha FoFs, alpha has declined in the recent period (April 2000 to December 2004) relative to earlier periods. More recent results indicate that for the 2004-2005 period, only 5 percent of FoFs delivered alpha to their investors. This decline coincides with the large inflow of money into the hedge fund industry and is consistent with the prediction of Berk and Green (2004) that large capital inflows to funds will drive down the net-of-fee excess returns to zero so that in equilibrium there should be no excess return to investors.

Although the Fung *et al.* (2006) findings confirm some long-held suspicion of hedge fund industry professionals, this begs the question as to: *Why do investors not simply withdraw from hedge funds?* Unlike the mutual fund industry, there is no consistent negative alpha in net-of-fee returns in hedge funds. This is consistent with the view that hedge fund managers are able to find alpha (before fees), but the alpha is consumed by fees, as Berk and Green (2004) predicts. It is this combination of high fees and declining risk-adjusted performance in the industry that drives the quest for passive, rule-based hedge fund products or "HF Clones" –a low cost alternative to conventional hedge fund investing. Section three of this paper examines the potential applications of HF Clones. Concluding remarks and conjectures on this auspicious development in the hedge fund industry are presented in section four.

1| THE ORIGIN OF RULE-BASED REPLICATION STRATEGIES

The origin of passive rule-based replication strategies can be traced back to the first academic study on the risk and return of hedge funds. Fung and Hsieh (1997) used principal components to analyze hedge funds, and found that the first five components accounted for nearly 45% of the cross-sectional variation in hedge funds. Using self-described strategies of hedge funds,[2] these five components were identified as two "trend following" strategies, "value", "global/macro", and "distressed securities".

1 *Here the choice of FoF returns as the empirical subject stems from the observation made in Fung and Hsieh (2002c) in which they advanced the proposition that FoF returns represent a source of data on diversified portfolios of hedge funds with minimal measurement errors.*

2 *The Fung and Hsieh (1997) work pre-dated the emergence of electronically available hedge fund data bases. The, somewhat, crude qualitative classification scheme they used was derived from manual inspection of hedge fund documents. Subsequent work by Brown and Goetzmann (2003) reached broadly similar conclusions.*

In an attempt to model the risk and returns of these strategies, Fung and Hsieh (1997) noted that any investment fund's return is a function of *where* it trades (asset class), *how* it trades (strategy), and *how much* it trades (leverage). Performance attribution, risk management, and replication of the systematic part of the strategy's return can be achieved if one can link returns of a fund to returns of rule-based trading strategies. For mutual funds, performance attribution turns out to be a comparatively straight-forward exercise. The typical mutual fund employs relatively static, long-only, strategies, and seldom uses leverage. Thus, indices of standard asset class returns are eminently suitable benchmarks for mutual funds, as shown in Sharpe (1992), but they can be woefully inadequate for hedge funds.

When it comes to hedge funds, the search for alpha is complicated by the dynamic use of long and short positions. This in turn generates nonlinear returns that require customized benchmarks –see for example Glosten and Jagannathan (1994). Fung and Hsieh (1997) explored this issue in their extension of the Sharpe (1992) model on mutual fund styles to hedge funds. They proposed to model hedge fund styles using linear combinations of rule-based trading strategies, some of which can be highly nonlinear in the returns of underlying assets. In the ensuing decade, the development of a number of these rule-based trading strategies have allowed researchers to model a diversified portfolio of hedge funds, such as indices of hedge funds and FoFs. This resulted in Fung and Hsieh (2003) coining the term "alternative beta" to describe the exposure of hedge funds to these rule-based trading strategies, analogous to the traditional "beta" concept that measure the exposure of mutual funds to standard asset benchmarks. Similarly, the term "alternative alpha" refers to the incremental return over and above the return based on alternative beta exposure.

At this point, a minor digression on two parallel but related concepts helps to put the ensuing developments in the proper context. Embodied in this simple idea are two important separation properties. First, there is the familiar alpha-beta separation in attributing hedge fund performance. The second, less obvious, concept is the separation of strategy-driven nonlinearity in observed returns from the nonlinearity caused by dynamic asset allocation. Empirically, it is a challenge to untangle these two sources of return nonlinearity given the opaqueness of hedge fund operations. While the first separation property pertains mainly to ex-post performance evaluation models, the second separation property is critical to successful replication of a diversified portfolio of hedge fund strategies. We begin by tracing the development path of the first separation property –separating hedge fund alphas from betas.

A path to uncover betas from a hedge fund's total returns was first proposed in Fung and Hsieh (2001) in which they advanced the concept of *primitive trading strategies* (PTS) designed to capture the essence of dynamic trading strategies using passive, rule-based algorithms. The simplest way to think about a PTS is to begin with the insight in Merton (1981) that the payoff of a perfect market timer should be identical to the payoff from owning a call option on the market. This reduces the problem of designing complex, and often unobservable, trading rules to a simple option position. In the terminology put forward by Fung and Hsieh (2001), this simple option-based characterization of market-timing strategies can be referred to as the PTS used by market timers –the *how they trade* part of the dynamic trading strategy model in Fung and Hsieh (1997). Isolating the PTS part of the strategy helps to highlight the skill required to apply the strategy to the appropriate security (the *where they trade* part of the dynamic trading strategy model) as well as the leverage decision –all of which contribute to the overall success of a given strategy.

In this context, the Merton market timing PTS can be expressed as a dynamic linear combination of the underlying asset and the riskfree rate depending on the delta position of the option. Standard option theory tells us that the weighting scheme of the risky and riskfree assets in turn depends on the familiar factors that drive option prices such as volatility and time to expiration, along with the price of the underlying security. Before turning to the more general problem of dynamically combining different PTSs to represent a diversified portfolio of evolving hedge fund styles, we briefly review the library of reported research on PTS.

1|1 Examples of PTS– the fundamental building blocks of HF Clones

TREND FOLLOWERS AND MANAGED FUTURES

Fung and Hsieh (2001) used lookback straddles to replicate the returns of trend followers. The majority of commodity trading advisers (CTAs), or managed futures funds, follow a strategy called "trend following". These funds tend to use mechanical rules, such as moving averages of asset prices, to capture "trends" in markets. While it may be easy to identify a trend ex-post, it is difficult to do so ex-ante. To circumvent this problem, Fung and Hsieh (2001) used an extension of the elegant insight of Merton (1981). Unlike the market timer in Merton (1981) who can only go long the market, the trend follower in Fung and Hsieh (2001) can go long or short. In that case, the perfect trend follower should buy at the low and sell at the high, which is exactly the payoff of a lookback straddle.

A lookback straddle consists of a lookback call option and a lookback put option. The lookback call option allows the owner to buy an asset at the lowest price over the life of the option. The lookback put option allows the owner to sell an asset at the highest price of the life of the option. The lookback straddle therefore allows the owner to buy at the low and sell at the high. Based on the method described in Goldman *et al* (1979), Fung and Hsieh (2001) was able to replicate the payout of lookback straddles using exchange traded options from 26 markets. They demonstrated that the portfolios of lookback straddles can replicate the returns of trend followers much better than the typical long-only commodity benchmarks.

Picking up from when the Fung and Hsieh (2001) sample ended in 1997, Chart 2 provides a static out-of-sample verification of their results spanning the January 1998 to June 2006 period. The graph shows that lookback straddles do mimic many of the peaks and troughs in the return pattern of trend followers. This empirical regularity persisted despite the fact that the capital allocated to each market (weights) were held constant at the 1997 level where the Fung and Hsieh (2001) study ended. The first row in Table 1 illustrates a more realistic replication strategy that allows for time-varying weights. Using a rolling 24-month regression to estimate the portfolio weights (time-varying alternative betas), we can construct a replication portfolio that delivers 41 basis points per month, from 1998 to the end of 2006. This is slightly more than two-thirds of the actual managed futures return of 62 bp per month.

MERGER ARBITRAGE

Mitchell and Pulvino (2001) created a passive trading strategy that mimics the activities of merger arbitrageurs. Despite placing a number of restrictions on their replicating strategy –such as position limits to insure diversification– Mitchell and Pulvino (2001) showed simulated returns that are very similar to those of merger arbitrage funds.

Unfortunately, the return of the passive merger arbitrage strategy in Mitchell and Pulvino (2001) ended in 1998. However, there is a US mutual fund, called the Merger Fund, that describes in its prospectus an investment strategy similar to the one in Mitchell and Pulvino (2001). Chart 3 shows the higher correlation between the return of the Merger Fund and the HFR Merger Arbitrage Index. To create a passive, replicating portfolio to Merger Arbitrage hedge funds, we use a 24-month rolling regression of the Merger Arbitrage Index on the Merger Fund to estimate the portfolio weight (time-varying alternative beta) of the Merger Fund, with the rest of the portfolio invested in cash. The second row in Table 1 shows that this replication strategy generates an average of 44 bp per month from 1998 to 2006 which represents two-thirds of the average return of the Merger Arbitrage Index of 66 bp per month.

FIXED INCOME HEDGE FUNDS

Fung and Hsieh (2002) showed that the typical fixed income hedge fund is exposed to increases in credit spreads. Chart 4 updates their analysis, graphing the negative relation between monthly returns of the HFR Fixed Income Index and the change in the credit spread, as proxied by the yield difference between Moody's Baa corporate bonds and the 10-year constant maturity interest rate, provided by the Board of Governors of the Federal Reserve System.

The third row in Table 1 reports the result of a simple replication strategy –long Baa corporate bonds and short 10 year treasuries. The size (time-varying

alternative beta) of this dollar-neutral position is determined by a 24-month rolling regression of the returns of fixed income hedge funds on this long/short portfolio. This replication strategy leads to a return of 33 bp per month from 1998 until 2006, nearly 60% of the return of 57 bp per month of fixed income hedge funds.

Duarte *et al* (2005) analyzed several additional passive fixed income strategies. These include trading strategies using the swap spread, the yield-curve spread, mortgage spread, among others. The swap spread trade bets on the movement in the difference between the swap rate and the yield of a treasury security with the same maturity. The yield-curve spread trade bets on relative movements between the yields of treasury securities with different maturities. The mortgage spread trade bets on the movement in the difference between mortgage yields and the yield of treasury securities with comparable maturities. Duarte *et al* (2005) showed that these strategies can also explain the returns of fixed income hedge funds.

OTHER PASSIVE HEDGE FUND STRATEGIES-EQUITY LONG/SHORT, CONVERTIBLE ARBITRAGE AND EMERGING MARKETS

Agarwal and Naik (2004) studied the general equity hedge funds, while Fung and Hsieh (2006a) focused on the subset of long-short equity hedge funds. Both articles showed that equity hedge funds tend to have positive exposure to US stock market plus an exposure to the relative performance between small cap and large cap stocks. The simulated returns from a portfolio replicating these exposures are reported in the fourth row of Table 1. The time-varying alternative beta of this portfolio is determined by a 24-month rolling regression. Between 1998 and 2006, this replication strategy delivers 38 bp per month, nearly 40% of the average return of 99 bp per month of long-short equity hedge funds.

Agarwal *et al* (2006) created a passive convertible arbitrage strategy using US and Japanese convertible bonds, which they label as a buy-and-hedge strategy. As the description suggests, this replicating strategy calls for the purchase of a portfolio of convertible bonds and simultaneously hedging the equity, interest rate and credit risk of the portfolio following pre-specified rules. The authors show that the buy-and-hedge strategy can generate 81% of the average return of convertible arbitrage hedge funds, as reported in the fifth row of Table 1.

Fung and Hsieh (2006b) showed that emerging market hedge funds have strong exposure to the IFC Emerging Market Index. The resulting replication strategy, in the sixth row of Table 1, can deliver more than 60% of the return of Emerging Market Hedge funds. Finally, distressed securities hedge fund have strong exposure to the CSFB High Yield Bond Index. Their replication strategy (in the seventh row of Table 1) can generate about 40% of the returns of distressed securities hedge funds.

1|2 Replicating the alternative beta return of diversified hedge fund portfolios

In an early application of PTS to classify hedge fund styles, Fung and Hsieh (2002) put forward the concept of Asset-Based Style ("ABS") factors. ABS factors were intended to link qualitatively constructed hedge fund styles commonly found in hedge fund data bases to market prices. By recognizing the PTS implicit in the relevant trading strategies used in each qualitatively defined hedge fund style, ABS factors can be expressed as static, linear combinations of PTS which captures the passive component of different hedge fund styles. From this one can express the total return from a given qualitatively defined hedge fund style as:

$$\{\text{Alternative}\}\ \text{alpha} + \sum(\{\text{Alternative}\}\ \text{beta(s)} * \text{ABS factor(s)})$$

thereby giving birth to the concept of alternative alphas and alternative betas in Fung and Hsieh (2003). Here three seemingly disparate concepts can be linked –the total return of qualitatively defined hedge fund styles, their alpha, and their beta with respect to the strategy's passive component expressed in market prices. From here, it was all but a small step to construct synthetic versions of hedge fund strategies, or HF Clones using ABS factors.

However, developments in the hedge fund industry over the past few years have accentuated the need to properly model the second separation property-return nonlinearity emanating from

dynamic allocation of risk capital across strategies as distinct from the nonlinear return properties of the strategies themselves. Responding to the unrelenting capital inflow into the industry over different economic cycles, it is natural to find hedge fund managers exhibiting dynamic exposures to factor bets (beta bets). This phenomenon naturally arises from the hedge fund managers' desire to diversify their income stream– thereby motivating the growth of multi-strategy hedge funds employing a wide range of strategies (from 0.5 percent to 12–14 percent of total capacity).

As different strategies are introduced into the portfolio mix, different risk factors will emerge and evolve over time in response to changes in the market environment. This evolving trend has reached a point at which qualitative hedge fund style classifications have to be broaden to such an extent that linking qualitative style returns to static combinations of strategies is no longer a meaningful exercise. Consequently, a more explicit link between hedge fund portfolio returns and its underlying PTS that admits time-varying alternative betas needs to be established.

A SIMPLE RISK FACTOR MODEL FOR DIVERSIFIED PORTFOLIOS OF HEDGE HUNDS

Over the past decade a library of passive hedge fund strategies capable of replicating the majority of popular hedge fund strategies. For example, four of the five popular styles in Fung and Hsieh (1997) –trend following, value, and distressed securities– have replication strategies. Another way to check the coverage of available replicating strategies is to look at the share of hedge fund assets allocated across different styles. According to Tremont Capital Management (2006), 73% of hedge fund assets in 2005 are allocated to long-short equity, distressed securities, merger arbitrage, fixed income arbitrage, emerging markets, convertible arbitrage, and managed futures. In addition, as a strategy matures its idiosyncratic features are often eroded away by competition leaving behind a systematic strategy core. Put differently, over time hedge fund strategies regress towards its systemic risk factors and their returns become primary beta returns. Putting these two observations together, it would be reasonable to conjecture that 75% of hedge fund strategies are amenable to cloning.

Drawing from the past decade's research on replicating different hedge fund styles and the tendency for aging strategies to be accepted as beta-like risk factors, Fung and Hsieh (2004) proposed a simplified seven-factor model for replicating diversified portfolios of hedge funds. Two equity factors (the market, and small cap-large cap) come from equity hedge funds. Two bond factors (change in the ten-year constant maturity rate, and change in the spread spread) come from fixed income hedge funds. Three lookback straddles come from managed futures. Fung and Hsieh (2006b) show that these seven factors explain up to 85% of the return variation of the average hedge fund, through 2004.

Table 2 updates the regressions in Fung and Hsieh (2006b) that estimated the alternative alpha and alternative beta of various hedge fund indices. For example, the first column provides the excess return regression of the HFR fund-of-fund index against the 7 factors. The alternative alpha is estimated to be 6 bp per month, not statistically different from zero. Standard errors were calculated using the Newey-West (1987) covariance estimator with 6 lags. There is statistically significant exposure to 6 risk factors. Using a 24-month rolling regression to estimate the exposure of Global/Macro funds to the seven risk factors, Fung and Hsieh (2006b) can replicate 64% of their returns (see the eighth row of Table 1). The same method can replicate 60% of the average returns of funds-of-funds (see the ninth row of Table 1).

MODELING THE EFFECT OF STYLE DRIFT AND THE LIFE CYCLE OF STRATEGIES

There are three opposing forces affecting the way in which diversified portfolios of hedge funds can be replicated. On the one hand, individual hedge fund manager's desire to diversify their business is likely to lead to a decline of niche hedge funds in favor of multi-strategy mega funds. In time, this will make PTS harder to construct as niche strategies are increasing being subsumed into broad-based hedge fund offerings. This makes replicating strategies harder to construct. On the other hand, as hedge fund strategies mature, the systematic shell that is left behind can easily be replicated by rule-based models. Finally new strategies will be given birth with new attendant risk factors. All these development trends imply

time-varying betas and dynamic emergence of risk factors.

Empirical results reported in Fung and Hsieh (2004) and Fung *et al* (2006) point to structural shifts in the way diversified portfolios of hedge funds are exposed to the underlying risk factors. Thus far, these shifts tend to correspond to major market dislocations such as the LTCM crisis and the burst of the Dotcom bubble which all have profound effect on the way the market prices risk. Recent work by Agarwal *et al* (2006) and Fung and Hsieh (2006a) uncovered non-price variables that impact hedge fund strategy returns. Agarwal *et al* (2006) showed that the issuance pattern of convertible bonds can affect the profitability of convertible arbitrage. Fung and Hsieh (2006a) reported results where Long/Short Equity hedge fund managers profit is affected by the level of stock market activities. All of these point to the importance of incorporating variables exogenous to hedge fund returns in order to capture environmental shifts that can affect the structure of replicating hedge fund portfolios.

2| POTENTIAL APPLICATIONS OF HEDGE FUND CLONING TECHNOLOGY

The advantage of identifying PTS goes beyond the fact that their component risk factors are readily observable (transparent) but that they are also investable (liquid). The immediate application is clear. For investors, alpha buyers now have a way to measure the quality of their hedge fund investment. Beta buyers (investors who prefer leveraged factor bets) can assess whether their capital is exposed to the desired risk; and both can evaluate whether the fees they paid are appropriate. For counterparties, measuring the exposure to key risk factors offers a market-price-driven metric that aggregates hedge fund risk in capital-at-risk calculations. For regulators, it provides a barometer to gauge potential convergence of systemic risk exposures from hedge funds, proprietary desks, and conventional money managers.

PAYING THE RIGHT PRICE FOR TALENT

Since the early days of AW Jones, circa 1949, numerous innovative trading strategies have been created and applied successfully by hedge fund managers. The diversity of approaches and performance characteristics have caught the attention of investors. Despite the differences in risk taken by hedge fund managers to generate profit for their investors, their compensation structures remained remarkably similar across a broad range of investment styles. There is practically a "one-size fits all" formula where hedge fund managers are paid a fixed fee proportional to the capital they manage and participates in the trading profits they generate without any reference to risk. One plausible explanation is that, unlike conventional long-only strategies, the absence of suitable benchmarks –against which the manager's skill, alpha, can be separated from passive beta bets– makes it difficult to establish suitable performance hurdles that properly reflect the passive component of hedge fund returns. The arrival of HF clones could have a profound influence on how hedge fund managers are compensated. Armed with this alternative way of accessing passive hedge fund returns, investors can point to investable performance benchmarks that separate alpha returns from passive beta bets. Incentive fee contract can now be structured to reward skill, or alpha, differently from passive index-like returns.

The existence of these index-like hedge fund products can also act as catalysts to improve the price discovery process in the hedge fund industry –more efficient fee structure with equitable risk-return sharing between investors and managers. This is in fact a healthy development for the hedge fund industry, one where alpha producers with limited capacity can be sufficiently compensated for their skills and beta-only products will regress to being index-like alternatives at lower fees.

REDUCING THE RISK OF HERDING AND SMOOTHING THE FLOW OF CAPITAL

Brown and Goetzmann (2003) pointed out the impact of incentive fees on managers' risk taking behavior. An incentive fee contract which does not carry a hurdle that reflects the return of passive factor exposures

encourages managers to herd. Betting on factors that are currently in vogue rewards a manager for simply being a free rider betting alongside the crowd. Using HF Clones to construct performance benchmarks mitigates this problem. By the same token, using low-cost HF Clones as performance benchmarks can also act as a barrier to entry to new hedge funds. The bottom line is unless there is alternative alpha (skill-based returns), profit participation by hedge fund managers does not begin. In turn this should slow down the rush to become hedge fund managers and reduce the high attrition rate of the hedge fund industry.

The success of low-cost synthetic hedge funds will inevitably lead to an improvement in the return quality (better performance at lower fees) of the surviving hedge funds. However to replicate these better performing hedge funds, some of which will exhibit skill-based alternative alpha, it will require new technological innovations that are likely to come at ever increasing price tags and replication risk.

In the meantime, low-cost transparent synthetic hedge funds that offer exposures to specific PTSs are likely to become the index-like vehicle of choice for delivering the returns of maturing hedge fund strategies. Efficiently priced, dynamically managed combinations of these investable PTSs will challenge inefficient portfolio products such as some over-priced investable hedge fund indexes and funds-of-hedge funds.

Finally, synthetic hedge funds that are liquid and transparent can go a long way toward alleviating regulators' concerns –perhaps we are witnessing the "invisible hand" at work in a maturing, competitive hedge fund industry.

A tool kit of passive, rule-based, replication strategies has been developed over the last ten years. It now covers roughly 75% of capital invested in hedge funds. This tool kit allows investors to benchmark many of the popular hedge fund strategies. It provides long histories for risk assessment. Funds that employ these replication strategies can have the transparency and liquidity sought by many investors. In addition, aggregate bet sizes can be monitored by regulators for over crowded situations, to develop measures to prevent systemic risk.

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Table 1
Average monthly performance of actual and replication strategies
1998-2006
(%)

Hedge fund strategy	Actual return	Replication return
Managed futures	0.62	0.41
Merger arbitrage	0.66	0.44
Fixed income	0.57	0.33
Long-short equity	0.99	0.38
Convertible arbitrage[a)]	0.94	0.76
Emerging market	1.00	0.63
Distressed securities	0.92	0.37
Global macro	0.73	0.46
Funds-of-funds	0.58	0.35

a) 1998-2003

Table 2
Alternative alpha and alternative beta of hedge fund indices
April 2000-December 2005

Index	HFR Eq Wt FoF	HFR Eq Wt Composite	CSFB Asset Wt Composite	MSCI Eq Wt Composite
Constant	0.0003	**0.0019**	**0.0024**	**0.0031**
SNP-RF	**0.1575**	**0.3031**	**0.1755**	**0.1632**
RUT-SNP	**0.1528**	**0.2178**	**0.1688**	**0.1680**
BD10-RF	**0.1217**	**0.1066**	**0.1649**	**0.1288**
BAA-BD10	**0.1766**	**0.1700**	0.1015	0.0734
PTFSBD-RF	-0.0030	0.0009	-0.0038	0.0030
PTFSFX-RF	**0.0098**	**0.0090**	**0.0117**	**0.0155**
PTFSCOM-RF	**0.0197**	**0.0185**	**0.0182**	**0.0144**
Rsq	0.67	0.87	0.63	0.73
Durbin-Watson	1.49	1.66	1.55	1.59

Bold coefficients are statistically significant at the 1% significance level, based on Newey-West standard errors using 6 lags.

Chart 1
Rolling 4-year average of returns for hedge funds and funds-of-funds
(%)

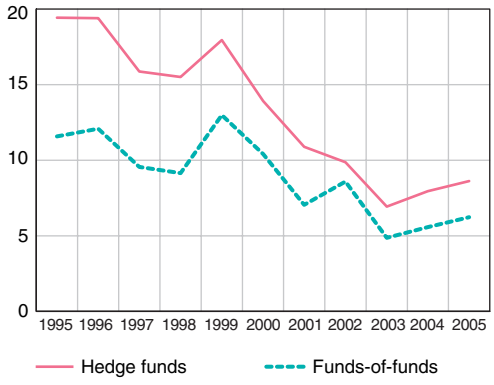


Chart 2
Average return of trend followers: actual and predicted
(%)

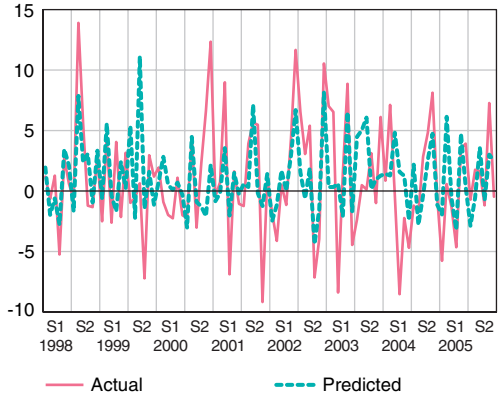


Chart 3
Average return of merger arbitrage hedge funds vs the merger fund
(%)

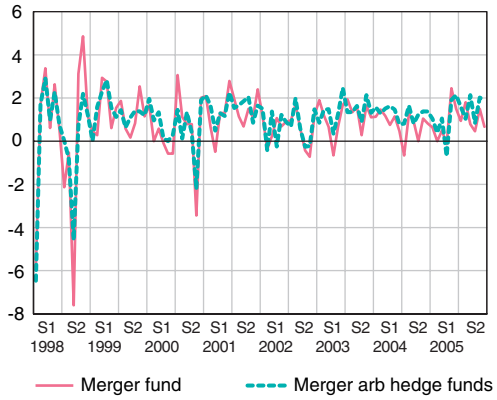
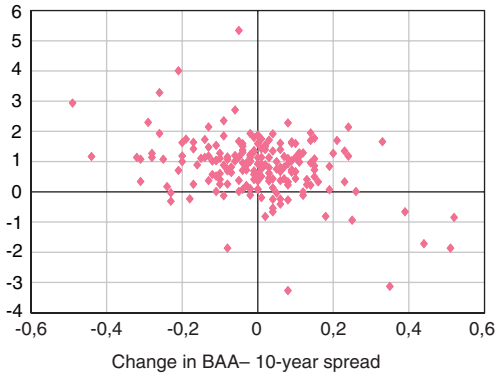


Chart 4
Change in credit spread vs fixed income hedge funds
1990-2005
(fixed income hedge fund monthly return, %)



Hedge funds and prime broker dealers: steps towards a "best practice proposal"

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*Vice-Chairman Elect**
Governing Board, Swiss National Bank

The rapidly growing hedge fund industry has brought substantial benefits to financial markets. At the same time, hedge funds can in some circumstances give rise to a number of potential risks. Not unlike in the period following the Asian crisis and the collapse of Long-Term Capital Management, governments, regulators, and central banks have been called upon to assess whether additional regulatory initiatives are required to mitigate these risks.

There are three potential regulatory objectives that can be invoked. They are investor protection, market integrity protection and financial system protection. The link between hedge funds and the stability of the financial system relates to the possibility that large losses in one or several hedge funds get transmitted to one or several large internationally active banks.

This paper discusses the benefits and the risks of hedge funds. It outlines the steps towards a best practice proposal aimed at strengthening the credit relationship between prime broker dealers and hedge funds. The objective of such an internationally endorsed standard would be to minimize the risks of the credit links between prime broker dealers and hedge funds being unwound in a disorderly fashion in times of extended market stress. The basic elements of the proposal are:

• Prime broker dealers should ensure that they have a complete risk metric of each of the largest hedge funds they are exposed to.

• Prime broker dealers should ensure that they invest sufficient resources in collateral risk management systems to complement their market risk management systems.

• Prime broker dealers should permanently monitor variation margins, traditional initial margins and portfolio risk based or VaR-based initial margins. In addition, they should conduct rigorous periodical stress-testing.

• On the basis of a wide range of stress test scenarios which are routinely updated, global margin call simulations across all exposures should be conducted between the prime broker dealers and the largest hedge funds on a regular basis.

• Prime broker dealers and their most important hedge fund clients should take advantage of benign market conditions to work out clear terms to determine margin call procedures for different simulated scenarios assuming extended adverse market conditions.

• The underlying liquidity profile of hedge funds should be an important element in conducting stress tests and margin call simulations as well as in determining margin call procedures under adverse market conditions.

NB: The author thanks Daniel Heller, Head of Financial Stability and Oversight of the Swiss National Bank, for his contribution to this article.

* *In effect as of May 1, 2007.*

Despite extraordinary growth in the last ten years, the hedge fund industry remains small in comparison to the global markets for equity and debt securities. The industry's rapid expansion and a number of prominent cases of shareholder activism partly related to hedge funds have triggered public policy discussions in a number of countries. Not unlike the period following the Asian crisis and the collapse of Long-Term Capital Management, governments, regulators and central banks have been called upon to assess whether additional regulatory initiatives are required to address a number of potential risks associated with hedge funds. The question of hedge fund regulation is currently on the agenda of the G7.

Notwithstanding renewed public scrutiny, it is widely accepted that hedge funds and other private investment vehicles have been a source of innovation in the global asset management industry and have brought substantial benefits to financial markets. The fact that hedge funds are only lightly regulated has likely enhanced their ability to devise innovative and unconstrained ways to seek profits from their investment strategies. When assessing the need for additional regulatory measures, public authorities must therefore carefully consider the trade-off between the need for regulation to mitigate risks and the risk that unnecessary regulation will stifle innovation.

This paper outlines the steps towards a "best practice proposal" aimed at strengthening the credit relationship between prime broker dealers and hedge funds. The specific objective of such a standard would be to minimize the risks of the credit links between prime brokers and hedge funds being unwound in a disorderly fashion in times of extended market stress. This "best practice proposal" is therefore anchored in the prudential regulatory domain and is aimed at promoting financial stability.

In the first section, the paper seeks to identify a number of key characteristics of hedge funds and discusses the recent growth and performance of the industry. The second section addresses the benefits that hedge funds bring to financial markets. The third section briefly considers three objectives for potential additional regulation of hedge funds. Focusing on the financial system protection objective, the fourth section outlines the channels through which hedge funds can undermine financial stability. The final section outlines a potential "best practice proposal" to mitigate the risks of a disorderly unwinding of credit relationships between prime broker dealers and hedge funds under extended stressful markets conditions.

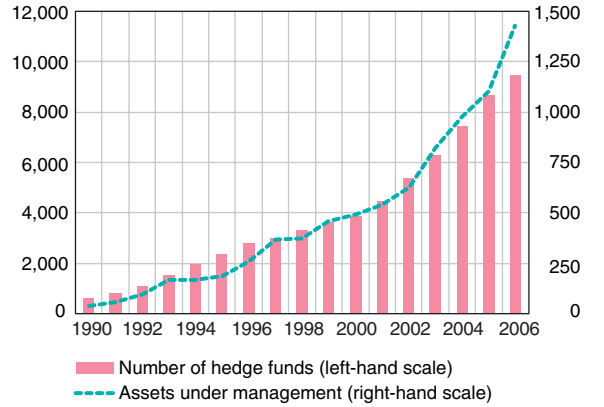
1| THE HEDGE FUND INDUSTRY

The definition of hedge funds has remained surprisingly elusive. As the industry stands today, the word "hedge" has little definitional value.[1] Nonetheless, a number of common characteristics can be and have been identified.[2] Hedge funds are best understood as potentially leveraged private investment vehicles deploying a wide range of largely unconstrained investment strategies with the aim of achieving superior absolute rates of return (alpha). To achieve this aim, hedge funds make extensive use of derivative instruments and seek investment opportunities in traditional as well as non-traditional market segments such as commodities, films or stock exchanges.

The investment managers of hedge funds typically invest a share of their personal wealth –often in the form of deferred compensation– in their own hedge fund vehicles, which helps to align their incentives with the interests of the external investors. Most hedge funds have substantial minimum investment requirements. Typical investors in hedge funds are wealthy individuals and, increasingly, endowments, family offices and more traditional institutional investors. Most hedge funds have a dual fee structure. The investor pays a management fee of 1% to 5%. In addition, hedge funds usually charge incentive fees on any capital gains, in some cases above a pre-defined threshold such as the Treasury bill rate. Industry wide, the performance fees typically vary between 20% and 30%, but in exceptional cases can be as high as 50%. Alternatively, some fund managers charge all expenses of the management company to the fund. An increasing number of managers impose investment lock-in periods of one to three years on their clients. During these lock-in periods principal, and in many cases profits, cannot be withdrawn. From the investors' point of view, liquidity is further constrained by the fact that redemption orders can take three to six months to be executed.

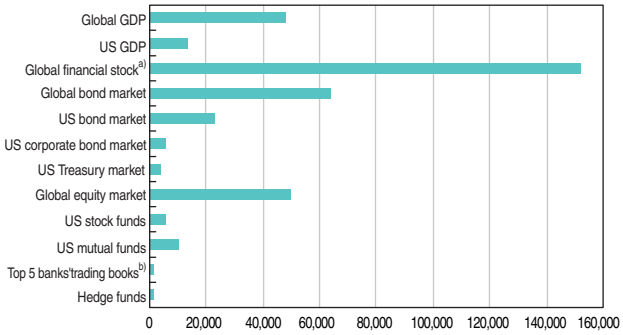
1 *Alfred Winslow Jones is credited for the creation of the first hedge fund in 1949. His strategy consisted in combining long positions in undervalued stocks and short positions in overvalued stocks, in an attempt to minimize the influence of the overall stock market moves. To magnify his portfolio's return, Jones added leverage (See L'Habitant, 2002)*
2 *See Hildebrand (2005b), McCarthy (2006) and Crockett (2007).*

Chart 1
Number of hedge funds and assets under management
(number) *(USD billions)*



Source: HFR Industry Report

Chart 2
Size of hedge fund industry in perspective
(Q4, 2006)
(USD billions)



a) Bonds, Equities and Bank Assets (2005).
b) UBS, Credit Suisse, Deutsche Bank, Barclay, BNP (Annual Reports 2005).
Sources: BIS, HFR, ICI, IMF, SIFMA, WFE

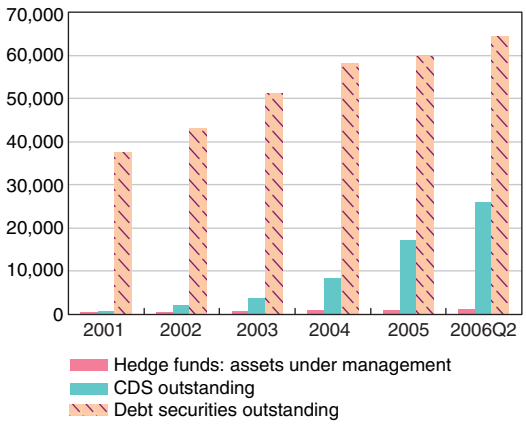
The hedge fund industry can look back at several years of impressive growth. The numbers are by now well known. In 1990, about 500 hedge funds managed assets of some USD 40 billion. As Chart 1 illustrates, in 2006, there were approximately 9,500 hedge funds with about USD 1,400 billion worth of assets under management. The significant pool of capital managed by proprietary trading desks of global investment banks is normally not included in these and similar statistics. Though typically not formally structured around hedge fund vehicles, the trading of these assets closely mirrors the investment activities of hedge funds. Moreover, the compensation schemes for investment banks' proprietary desks increasingly resemble those used by hedge funds.

While the growth trajectory of the hedge fund industry is impressive, the size of the industry remains small compared to the global markets for equities or debt securities. Chart 2 illustrates this by comparing the size of the hedge fund industry to the total global financial stock in 2005 as well as its various subcomponents. For example, the hedge fund industry is much smaller than the mutual fund industry. It is also smaller than the size of the sum of the five largest trading books of large internationally active banks.

Chart 3 shows the development of the hedge fund industry since 2001, compared to the development of the outstanding amount of debt securities and outstanding credit default swaps (CDS). The growth in these markets has been much more substantial than the growth of the hedge fund industry. Even if one applies a relatively aggressive average leverage ratio of 5 to the entire hedge fund industry, its total size remains small compared to the more than USD 60,000 billion debt securities outstanding and the USD 25,000 billion in credit default swaps outstanding.

Two additional points are worth noting when examining the recent growth of the hedge fund industry. The distribution of hedge funds by size is heavily skewed towards small funds. According to recent data of the UK Financial Services Authority (FSA), there are close to 450 European hedge fund managers that manage less than USD 50 million while there are only a handful of European managers with assets in excess of USD 5 billion.[3] Three trends are discernable

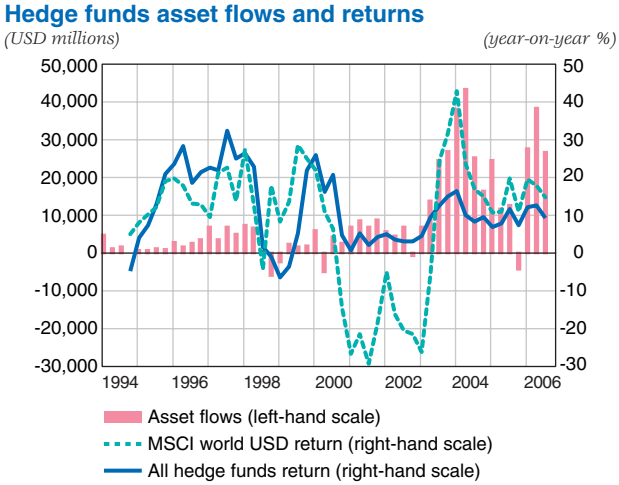
Chart 3
Development of hedge funds, credit default swaps (CDS) and debt securities
(USD billions)



Sources: BIS, HFR, ISDA

3 *See McCarthy (2006).*

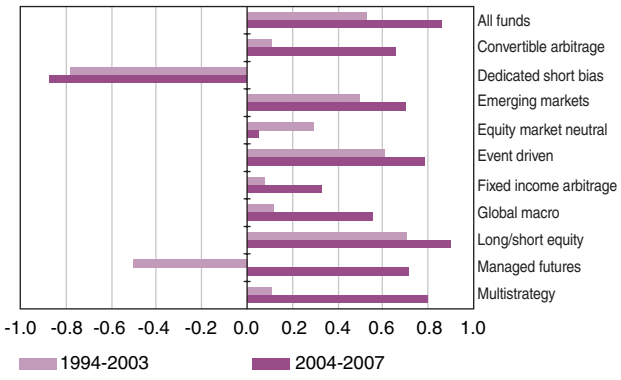
Chart 4
Hedge funds asset flows and returns



Source: CSFB Tremont

when analyzing recent hedge fund performance figures. First, as chart 4 illustrates, the historically high relative rates of return, particularly during the global equity bear market from 2001 to 2003, have apparently contributed to the strong inflows of the last four years. Second, a more recent decline in relative performance appears to be associated with the rapid acceleration of inflows, leading to an apparent reduction in profit opportunities.[4] Third, as chart 5 shows, the correlations between investment returns and the MSCI world returns have increased substantially across virtually all hedge fund strategies in recent years compared to the period from 1994 to 2003.[5] This would suggest that, regardless of the hedge fund strategies pursued, an important share of the recent investment returns have been generated through direct or indirect exposure to the equity markets.

Chart 5
Correlations between investment style returns and MSCI world returns



Source: CSFB Tremont

2| THE BENEFITS OF HEDGE FUNDS

Global financial markets have benefited from the growth of the hedge fund industry. Unconstrained by the structures of traditional investment guidelines and supported by rapidly evolving financial and technological developments, hedge funds have been and continue to be an important source of financial market innovation. Through their flexible investment approaches in financial markets and their extensive use of innovative financial instruments, they have contributed to improved price discovery in financial markets. A more efficient price discovery mechanism renders financial markets more efficient in allocating capital. This is particularly welcome in market segments that are dominated by a few large commercial and investment banks such as the credit derivative market.[6] Risk can be intermediated to a much greater extent than before. Every imaginable kind of risk is now routinely deconstructed, reassembled and then transferred to those who are willing to bear these risks at the lowest cost. Ultimately, this means greater diversification opportunities for investors. Hedge funds and other private investment vehicles have also played a positive role in fostering the process of rendering previously illiquid assets liquid and thus tradable.

The hedge fund industry also serves as a catalyst for change and innovation in the traditional asset management industry. The traditional asset management business remains constrained by investment guidelines and typically does not employ leverage. Nonetheless, traditional asset managers have clearly become much more innovative in recent years. The competitive pressure emanating from the hedge fund industry has promoted this process. Complex and innovative financial instruments are now routinely used by traditional asset managers to respond as flexibly and as efficiently as possible to changing market conditions. Hedge funds, together with the financial and technological innovation

4 *See Hildebrand (2005b, pp. 45).*
5 *This paper does not discuss the different investment strategies prevalent in the hedge fund industry. For a detailed discussion, see some of the other contributions to this volume as well as Hildebrand (2005b).*
6 *According to the last Fitch: "Global credit derivatives survey", (September 2006), the 10 top banking counterparties represent about 85% of the total amount of sold and bought outstanding positions. With regard to trading volumes, the survey indicates that hedge funds represent at least 20 to 30% of the total volume.*

they have fostered, have been important forces in reshaping the traditional asset management industry. In the process, they have helped render markets more liquid, more efficient, and more flexible thus making them more resilient to shocks.

3| POTENTIAL REGULATORY OBJECTIVES

Notwithstanding these important benefits, hedge funds can in some circumstances be a destabilizing force and give rise to a number of risks. These risks are often cited when calls are made for additional regulation. In principle, there are three potential regulatory objectives that can be invoked when reflecting on the need for additional regulation of hedge funds. They are investor protection, market integrity protection and financial system protection.[7]

Investor protection is, for the most part, not a crucial issue with regard to hedge funds. The bulk of the investments in individual hedge funds stem from wealthy individuals or professional asset managers who require no investor protection. Nonetheless, consumer protection issues are likely to become more pertinent as retail investors become an important investor class through funds of funds vehicles, as public pension funds begin to invest in the hedge fund industry and as individual hedge funds begin to open up to retail investors.[8] A number of different regulatory approaches to these problems are likely to emerge. The pragmatic approach endorsed by the 2007 report of the President's Working Group on Financial Markets is to restrict investments in individual hedge funds to wealthy individuals or professional wealth managers. An alternative would be to require hedge funds to spell out in a detailed and understandable way the risks associated with investments in individual hedge funds. Finally, on the funds of funds side, regulators could and, in some cases, already do require minimal diversification standards for funds of funds that market themselves to certain investor classes such as retail investors or public pension funds.

The market integrity objective has recently received increased attention, not least due to the report and the recommendations published by the Counterparty Risk Management Policy Group II (CRMPG II) in the summer of 2005.[9] The market integrity problems identified by the CRMPG II have important ramification for the hedge fund industry. But, as Callum McCarthy has noted, "there is no evidence... that these problems of market integrity, which present real issues across markets, are concentrated within the hedge fund sector".[10] Potential market integrity problems such as insider information, insufficiently robust trading technologies, mis-valuation of profits and losses or incomplete documentation of trades are important issues that need to be addressed across all segments of the financial markets. Clearly, there are close links between market integrity protection and financial system protection. Indeed, the report of the CRMPG II is explicitly "directed at initiatives that will further reduce the risks of systemic financial shocks and limit their damage when, rarely but inevitably, such shocks occur".[11]

For central banks, financial system protection is the most important regulatory objective. There are potential hedge fund specific risks to financial stability even though in practice, it is often difficult to distinguish potential systemic risks that arise from the activities of hedge funds from those of other important actors in the financial markets.[12]

4| HEDGE FUNDS AND SYSTEMIC RISK

Hedge funds can and extensively do use leverage as an instrument to manage their risk and extract profits from financial markets. As mentioned earlier, the use of leverage is one of the defining

7 *See McCarthy (2006) who effectively uses the same categories although he refers to prudential issues, consumer protection and market integrity.*
8 *Funds of funds are investment pools which make allocation to a number of hedge funds, thereby seeking to benefit from diversification. They are typically operated by private banks, asset management firms or institutional asset managers. The managers of these funds of funds negotiate with the individual hedge funds on the size of investment and fee structure. These fees are passed on to clients, in addition to a management fee for the fund of funds itself.*
9 *See Counterparty Risk Management Group (2005).*
10 *See McCarthy (2006).*
11 *See Counterparty Risk Management Group (2005, pp. iii).*
12 *See McCarthy (2006).*

characteristics of hedge funds. The most basic form of leverage pertains to financial intermediaries (typically globally active investment banks) extending credit facilities to hedge funds to allow them to invest funds in excess of their own capital base.[13] A more complex form of leverage employed by hedge funds is instrument leverage. This type of leverage is embedded in the use of a wide range of complex financial instruments. At times, such instruments contain substantial leverage.[14] The amount of instrument leverage employed by hedge funds depends on overall market conditions and on the trading strategies pursued by a particular hedge fund. Leverage is not just a risk ratio selected by hedge fund managers. Ultimately, hedge funds are constrained in the amount of leverage they can employ in their trading strategies by the amount of exposure creditors and counterparties are willing to accept. The exposures chosen by creditors and counterparties are, in turn, influenced by the capital and supervisory framework that applies to them and the discipline imposed on them by the market.[15]

The mere fact that hedge funds employ leverage does not in and of itself imply that they represent a risk to financial stability. Indeed, leverage, if properly employed, can be a very effective risk management tool. Ultimately, what matters is the extent to which leverage impacts the total value-at-risk of a particular market exposure.[16] The link between hedge funds and the stability of the financial system relates to the possibility that large losses in one or several hedge funds get transmitted to one or several large internationally active banks. In an extreme case, this dynamic could be sufficiently strong to threaten the solvency of one or several large banks and undermine the stability of the financial system. In reality, it is not just the size of potential hedge fund losses that will determine whether a large bank and, ultimately, the stability of the financial system might be adversely affected. The type of markets where the losses occur, the strength of the hedge fund's underlying capital base, the degree of concentration of the losses and the liquidity of the positions generating the losses will all be crucial in determining the ultimate impact of the losses. This explains why the recent losses of the hedge fund Amaranth, though very large in size, had no adverse impact on the stability of the financial system.

The primary potential transmission channel of systemic risk is through counterparty credit risk exposure. Prime broker dealers (typically large internationally active banks) provide leverage and issue credit lines to hedge funds. Through their margin requirements and collateral risk management, they also determine the amount of instrument leverage employed by hedge funds. A linked transmission channel is through negative effects on market prices and liquidity. In the event of extended stressful market conditions, prime broker dealers will likely demand additional collateral or, alternatively, force hedge funds to liquidate market positions to stop their own risk profile from deteriorating. Such a process can further increase market volatility and further depress market prices. In the event of extreme or "fat tail" scenarios, such a self-reinforcing dynamic can lead to rapid reduction in market liquidity. As Tim Geithner (2006) states: "firms' (i.e. the prime brokers') incentives to minimize their own exposure can amplify the initial shock and impose on others the negative externality of a broader disruption to market liquidity". The report of the CRMPG II also points out that credit and market risk can become blurred as the decline of creditworthiness and the collapse of asset prices feed upon one another. It states: "Position liquidations which –while perfectly reasonable a the micro level– add to macro pressures on asset prices which in turn trigger the initial evaporation of market liquidity for one or more classes of assets".[17]

13 *See Garbaravičius and Dierick (2005), Hildebrand (2005a) and Geithner (2006).*
14 *According to data collected by the Bank for International Settlements (BIS) the value of futures, swaps and options on interest rates, foreign exchange and equity indices has been growing at an annual rate of 20% per annum since 1995.*
15 *See Geithner (2006).*
16 *According to the FSA's survey of prime broker dealers, the average leverage calculated as the long market position of hedge funds divided by their net equity was around 2 to 2.5 (see McCarthy, 2006). An alternative measure developed by the Bank for International Settlements indicates that the leverage of hedge funds has decreased from 4 to 2 over the last 5 years, with a peak of 8 in 2004. This alternative measure captures the sensitivity of hedge funds returns to changes in the major risk factors. It should therefore provide a more comprehensive picture of the risk profile of hedge funds, including the embedded leverage (for methodological details, see Bank for International Settlements, 2005).*
17 *See Counterparty Risk Management Group (2005, pp. 7).*

5| TOWARDS AN INTERNATIONAL "BEST PRACTICE PROPOSAL"

Based on everything we know, hedge funds bring substantial benefits to financial markets. But they also constitute a potential source of systemic risk. To be more precise, "hedge funds can become the transmission mechanism of systemic risk because they borrow from and trade with regulated financial institutions, such as prime brokers and investment banks".[18] Any financial regulatory authority with statutory responsibilities to promote financial stability therefore has an obligation to think about possible measures to mitigate systemic risk emanating from the activities of hedge funds or other private investment vehicles with similar characteristics. Still, the threshold for justifying additional regulatory measures should be set high. Ill-considered regulatory initiatives will achieve little and risk being counterproductive. Any additional regulatory initiative to address potential threats to financial stability emanating from the hedge fund industry should be rooted in three fundamental regulatory principles. First, the focus should be on the activities of the largest hedge funds. In principle, they are the ones that could generate sufficiently large losses to threaten the solvency of a large bank.[19] Second, potential regulatory initiatives should address the relationships of these funds with the most important global banks acting as prime broker dealers. Third, the main objective of any potential new regulatory initiative should be to reduce the risk of a sudden liquidation wave.

These principles imply that the most sensible regulatory response to the potential systemic risks emanating from the activities of hedge funds would be an internationally endorsed effort to agree on a best practice proposal that would govern the relationship between prime broker dealers and hedge fund. This would help to enhance market discipline. The international dimension must be emphasized here. A best practice proposal that is not internationally adhered to inevitably runs the risk of being without teeth or distorting competition. Moreover, as the recent President's Working Group Report made clear, because the most important key creditors and counterparties to hedge funds and other private investment pools are active in many different jurisdictions throughout the world, international policy collaboration is essential if positive results are to be achieved.[20]

The specific aim of an internationally endorsed "best practice proposal" should be to minimize the risks of the credit links between prime broker dealers and hedge funds being unwound in a disorderly fashion in a market environment characterized by extended stress. Why this specific emphasis on mitigating the risk of disorderly unwinding of credit links between hedge funds and prime broker dealers in times of stress? An important new element since the late 1990s is the tremendous innovation in complex structured financial instruments. Financial innovation has made markets more liquid, more flexible and in many ways more resilient. On the other hand, new categories of complex financial products have also rendered the credit relationship between prime broker dealers and hedge funds more challenging. Many of these new products are traded on an over-the-counter (OTC) basis and have to be marked to model rather than to market. Another feature of OTC products is that they generate a potential future credit exposure which depends on the volatility of the underlying asset. This potential future exposure is a multiple of the current credit exposure and should be adequately covered by initial margins.[21] Moreover, many of the new highly complex structured products have yet to be tested in market environments of heightened and extended stress. It is important to remember that much of the modelling underlying the pricing of complex structured financial products is impacted favourably by the sustained low volatility environment that has characterized global markets until very recently. In addition, the recent protracted period of abundant liquidity and low volatility has likely contributed to an increase in the exposure of hedge funds and other market participants to riskier and less liquid assets. As a result, the mismatch between the average liquidity of the underlying portfolios of hedge funds and the liquidity offered to investors of hedge funds is likely to have increased. A potentially heightened

18 *See Fung and Hsieh (2006, pp. 27).*
19 *See McCarthy (2006, pp. 4).*
20 *See The President's Working Group (2007, pp. 5).*
21 *See Geithner (2006)*

liquidity mismatch is a further reason to focus future regulatory initiatives on measures to mitigate the risks of disorderly unwinding of the credit relationship between hedge funds and prime broker dealers.

The following paragraphs are an attempt to identify the potential key elements of such best practice proposal.

• Prime broker dealers should ensure that they have a complete risk metric of each of the largest hedge funds they are exposed to. This does not mean they require information on specific trading positions. But they need to be able to assess the aggregate risk exposure of their largest hedge fund clients vis-à-vis the entire prime broker dealer community. For example, a prime broker dealer should be aware of the margining terms agreed by its largest hedge fund clients with other important creditors or prime broker dealers. A recent survey by the FSA in the United Kingdom has concluded that only 21 of 152 hedge funds had more than one prime broker.[22] While this is a comforting statistic, the largest and systematically most important hedge funds are likely to continue to deal with several prime brokers, not least to ensure anonymity and avoid front-running when executing their trading strategies.

• Prime broker dealers should ensure that they invest sufficient resources in collateral risk management systems to complement their market risk management systems. The quality of margin statements should be a priority, particularly with regard to margins for options or other more complicated derivatives. In a time of crisis, weak collateral management systems are a potential source of margin uncertainty and future margin call disputes between prime broker dealers and hedge fund.

• Prime broker dealers should permanently monitor variation margins, traditional initial margins and portfolio risk-based or VaR-based initial margins. In addition, rigorous periodical stress-testing should be conducted. VaR-based initial margins, in particular, should be stress-tested regularly, i.e. they should be compared to the potential credit exposure that could materialize in stress situations. Volatility has declined significantly until most recently. As a result, so have margin levels in VaR-based systems. Stress test scenarios should be updated accordingly. They should include large simultaneous shocks to market and volatility levels.

• On the basis of a wide range of stress test scenarios which are routinely updated, global margin call simulations across all exposures should be conducted between the prime broker dealers and the largest hedge funds on a regular basis. Ideally, such margin call simulations should also be conducted on an aggregate basis. This would allow a particular prime broker dealer to get a sense of the impact of simultaneous margin calls by all prime broker dealers exposed to one or several hedge funds.

• Prime broker dealers and their most important hedge fund clients should take advantage of benign market conditions to work out clear terms to determine margin call procedures for different simulated scenarios assuming extended adverse market conditions. This will enhance predictability in the credit relationship between prime broker dealers and their largest hedge fund clients. Such predictability mitigates the risk of disorderly unwinding of the credit links. Moreover, subject to the underlying liquidity profile of a particular hedge fund, such margin call procedure agreements should have as long a time horizon as possible. This would further reduce the risk of cyclical market volatility triggering disorderly unwinding of positions.

• The underlying liquidity profile of hedge funds should be an important element in conducting stress test and margin call simulation as well as in determining margin call procedures under adverse market conditions. To be more precise, the match or mismatch between the liquidity of a portfolio of a hedge fund and the liquidity the hedge fund offers to its clients should be an important factor in determining the specific margin arrangements between a prime broker dealer and a hedge fund.

22 *See McCarthy (2006, pp. 4).*

A best practice standard along these lines would have many advantages. It would tackle a coordination problem between the largest hedge funds and the most important prime brokers. It would promote financial stability by addressing what is arguably the most likely potential systemic threat emanating from the hedge fund industry: namely the risk that in a market environment characterized by extended stress, insufficiently prudent counterparty risk management could lead to credit losses of the prime broker dealers and a pro-cyclical liquidation wave of hedge fund positions against the backdrop of diminishing liquidity and potentially rapidly declining market prices. In an extreme case, such events could conceivably jeopardize the solvency of a large internationally active bank, thus potentially undermining the stability of the global financial system.

A well-designed "best practice proposal" would strengthen market discipline and avoid misallocating scarce regulatory resources. Moreover, it would not require any direct regulatory interference with regard to market pricing and would therefore be market-friendly. If specified appropriately and adopted universally, it could have a constructive effect on the risk appetite of the most important prime broker dealers. Finally, it would be consistent with the recent demand by the President's Working Group that the most important "creditors and counterparties must commit resources and maintain appropriate policies, procedures, and protocols to define, implement, and continually enhance best risk management practices. Those policies, procedures, and protocols should address how the quality of information from a private pool of capital should affect margin, collateral, and other credit terms and other aspects of counterparty risk management".[23]

Clearly much work remains to be done to make such a "best practice proposal" operational and productive in the sense of enhancing financial stability. In principle, a proposal along these lines would not require formal regulation. It could be implemented by the industry as a "best practice standard". Ongoing monitoring of the standard could then be conducted by national financial supervisory agencies. Initially, regulators need to gain a better understanding of how collateral and margin practices are evolving in light of the ongoing and rapid product innovation in the credit markets and the heightened competition surrounding the relationship between prime broker dealers and the most important representatives of the hedge fund industry. This fact-finding exercise can only be conducted effectively in concert between the regulatory authorities of the most prominent financial centres, senior hedge fund managers and representatives and risk management experts from the most important global financial institutions. The Federal Reserve Bank of New York, the SEC and the UK FSA have recently initiated such a process. In cooperation with other supervisory authorities, they are conducting periodic surveys of the exposures of most important prime broker dealers to hedge funds. Such a cooperative framework could form the basis for moving towards a "best practice proposal".

23 *See The President's Working Group (2007, pp. 3).*

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Transparency requirements and hedge funds

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Regulation of any financial institution or asset class should reflect the regulatory objectives which are relevant to the institution or asset class. This paper identifies the relevant regulatory objectives in respect of hedge funds as market confidence and financial stability, market integrity and consumer protection. Against these objectives, the paper examines what information should – and should not – be provided by hedge fund managers to:

- *investors*
- *creditors and counterparties*
- *the general public*
- *regulators*

It also describes the work carried out by the Financial Services Authority (FSA), in the context of its market confidence and financial stability objective, to survey large dealers' exposure to hedge funds and the risk-based supervision of UK hedge fund managers carried out by the FSA in the United Kingdom.

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Much of the recent debate about hedge funds has circled around the contention that greater transparency is needed for hedge funds – the importance of appropriate transparency has been highlighted by recent events on Wall Street. Unfortunately, there has been less discussion of what "greater transparency" implies: what information should be required; from whom should the information be sought; and to whom should it be made available. This paper seeks to bring definition to the debate about transparency for hedge funds by advancing answers to these questions.

It should be an uncontentious precept that transparency –the availability of information– is not an end in itself, but a means of achieving some other goal. In relation to hedge funds, we believe three main regulatory issues arise, which determine the context for what transparency should achieve. The three regulatory issues are:

• **market confidence and financial stability**: the risk that failure of one or more hedge funds would trigger a systemic risk to financial markets, and hence a risk to financial stability;

• **market integrity**: the risk that hedge fund managers do not observe the correct standards of market conduct;

• **consumer protection**: the risk that investors will be treated unfairly.

We recognise, of course, that there are wider political issues associated with hedge funds, but choose to treat these as beyond the scope of regulators. We also recognise that hedge funds fall within the scope of wider transparency requirements of a general nature, such as the major shareholding notification requirements of the Transparency Directive, applicable to all investors. We take it as axiomatic that any applicable general requirements of this nature will apply to hedge funds.

Against this background, this paper examines what information should be sought by:

- investors
- creditors and counterparties
- the general public
- regulators

1| TRANSPARENCY FOR INVESTORS

The Financial Services Authority (FSA) has a statutory objective of ensuring appropriate consumer protection. This embraces consumer protection for those who invest in hedge funds. In particular, we wish to ensure that investors in hedge funds receive information which enables them to make informed investment decisions, and that conflicts of interest within hedge fund managers are managed adequately. The information which we believe to be useful for investors is described below.

1|1 Offering memorandum

The offering memorandum for a hedge fund should provide information on the following areas:

• *fees*: in common with other asset managers, hedge fund managers should set out clearly the basis on which they will charge fees. This should cover not only the basic structure (the classic "2 per cent + 20 per cent"), but should be explicit in defining the various parameters on which the management and performance fees are calculated: hurdle rates, allowable expenses and equalisation structure are examples. The body responsible for calculating the fees against these parameters should be defined;

• *redemption policy*: it is clearly important that investors should be told the terms under which they can redeem funds, and what limitations apply to redemption. A particular concern, discussed in greater detail below, is that the existence of any preferential redemption rights should also be disclosed;

• *investment strategy*: hedge fund managers should define the investment strategy they intend to pursue, and the extent of any discretion for the manager to vary those policies. A feature of the development of hedge funds has been the extent to which particular strategies are being defined: "long/short equity", "global macro", "event driven" etc.

1|2 Regular investor reporting

Most hedge fund managers communicate with investors through monthly or quarterly newsletters. Whilst these newsletters vary in content depending on such factors as the fund's strategy, they usually contain items such as performance commentary, sector or geographic exposure breakdown and the managers' view on the outlook for the fund. They may also contain information on the largest holdings of the fund and risk information, such as risk metrics.

1|3 Rating agencies and databases

There are other institutions that can help investors in performing due diligence of hedge funds and hedge fund managers. A number of market providers are currently rating or proposing to rate hedge funds or their managers. In addition, there is a developing industry in funds of hedge funds that are essentially providing a fund selection and due diligence service for potential investors.

It is important, however, to recognise that the most probable contribution of rating agencies in relation to hedge funds will be in assessing the fund manager's processes –valuation, audit, risk management– rather than performing the traditional task of a rating agency, namely assessing the likelihood of default. The FSA's discussions with rating agencies suggest that hedge fund managers, and their administrative processes, rather than the probability of default of the hedge fund itself, will be the centre of rating agency interest.

Commercial databases provide a further useful source of information on topics such as fund performance, manager information, and assets under management, fees, prime brokers and auditors.

1|4 Where investor disclosure should be improved

Although investor disclosure has increased over recent years, we consider there are four areas where transparency should be improved.

Adequate disclosure of procedures for valuation of complex/illiquid instruments

The difficulty of valuing positions in illiquid assets and markets, or in circumstances where no independent, objectively verifiable, screen prices are available is a general problem across financial markets, including hedge funds. Valuation errors can lead to investor detriment and in extreme cases fraud can result from deliberately misleading valuations. The FSA has investor protection and, in the extreme cases, financial crime concerns in this area. As a result, the FSA has been at the forefront of work among regulators on the issue of valuations and strongly supports the work of International Organization of Securities Commissions (IOSCO) on this issue. The FSA has completed thematic work in this area and has submitted its views on good practice to IOSCO. Details are available on the FSA's website. In short, hedge fund managers should set out the basis on which their funds are valued. This should start by establishing whether there is an independent valuation of the fund, but there is a need to go substantially beyond this, to cover policies and procedures such as the separation of duties between portfolio managers and back offices; the reconciliation of values between hedge fund manager, prime broker and administrator; price sources; and procedures for dispute settlement.

The issue of valuations clearly occurs within hedge funds, but should be recognised as a general problem in the wider financial industry. The issue should be considered wherever it occurs, not simply or principally in the context of hedge funds.

Making investors aware of side letters with "material" terms

There has been a practice among some hedge fund managers to grant material preferential terms to some (typically large) investors. Such material terms may, for example, grant preferred investors better investment liquidity terms or enhanced transparency. Such preferential treatment has typically been conferred through the use of side letters, which have often not been disclosed to

other investors. These preferred terms are likely to be to the detriment of other investors in the hedge funds. The FSA regards this lack of transparency as unacceptable and expects the existence of side letters with material terms to be disclosed, so that all investors are made aware of their position, whether preferred or otherwise.

The FSA has worked constructively with hedge fund managers and the Alternative Investment Management Association to agree both what constitutes a material term and appropriate notification methods to ensure that all investors are aware of the presence of side letters with material terms in the funds they invest in. We are currently conducting thematic work to establish conformity with the FSA's principles.

Disclosure of operational risk

Some hedge fund managers commission external reviews of their systems and controls. We see advantage when such a review occurs in its being made available to investors.

Disclosure of fund risk policies

The FSA has worked to raise the standards of risk disclosure to investors, by requiring hedge fund managers to document adequately the risk policies they adopt. We believe this should be disclosed to investors.

2| Transparency for creditors and counterparties

The FSA, in relation to its responsibilities for financial stability, has paid particular attention to the creditors and counterparties of hedge funds, concentrating on the prime brokers who provide hedge funds with financial and operational gearing. We have taken this approach not, as some believe, because the brokers are subject to regulation and hedge fund managers are free of regulation. In the United Kingdom, both brokers and hedge fund managers are subject to regulation. Rather the FSA's approach is based on the belief that information about the prime brokers' exposure to and knowledge of their hedge fund manager clients is the most useful information for our purposes.

The FSA carries out a six monthly survey of the large dealers' exposures to hedge funds across the range of their business. We examine the prime brokerage exposure and counterparty credit exposures to hedge funds of some 15 financial institutions. The information gathered from these major counterparties to hedge funds covers more than the immediate prime broker business. It also includes (where relevant) exposures in relation to repos, FX, credit derivative and energy derivative business. Where possible, we check this information against the exposure (of the group of which the prime broker is a member) to the hedge fund. The data requirements are broadly to identify credit exposure to hedge funds and to examine the relationship between prime broker and hedge fund manager. The data is both in aggregate and top 10 fund data format. For the prime brokerage business, the top 10 fund data is compiled on the basis of cash balance and margin requirement; this generates more detailed data on 154 funds and 180 individual exposures. From this, we assess factors such as net equity, long/short market value and excess collateral. This helps us gauge the risk appetite of both the hedge funds and prime brokers covered by the survey, identify any outliers for further supervisory work, identify hedge funds of growing importance, and assess the ability of the dealers to manage, across their business units, their counterparty exposure. The results of our survey are fed back to the firms through the London Investment Bankers Association.

The latest survey for which we have data was carried out in October 2006. The points we would draw from it are:

- hedge funds to which these broker/dealers are exposed are continuing to grow strongly, with assets under management in total (on an equity basis) now USD 660 billion;

- according to the data in our survey, the prime brokerage market share is dominated by three prime brokers;

- aggregate leverage in prime brokerage (calculated as long market positions divided by net equity) decreased slightly between April 2006 and October 2006 from

1.86 times to 1.66 times. By way of comparison, Long-Term Capital Management (LTCM) routinely operated on a long leverage of 25 times, and, as it approached crisis, more than 50 times;

• average excess collateral increased slightly from 86% to 91% between April and October 2006;

• contrary to the view that funds divide and rule between many broker dealers, from our October 2006 survey, only 20 of the 154 funds within the prime brokerage survey were identified more than once. It follows that many funds' prime brokers may have full daily transparency of positions and should be able to do their own risk modelling;

• 5 of 180 individual exposures within prime brokerage were on margin call, representing only 0.3 per cent of total individual exposures.

The survey has highlighted elements which we believe merit further enquiry, notably collateral practices and margin calculations, which we are looking at in a joint exercise with the Federal Reserve Bank of New York and the SEC. We are also trying to extend the database we have from UK to global information. Our measurements are mostly, but not exclusively, of UK exposure: where we have global data they are consistent with the UK data.

Prime brokers assess hedge fund exposures on a daily basis using proprietary systems and methods in order to calculate initial and variation margin. The prime brokers monitor daily mark to market valuation changes; calculate initial margins for new positions; assess risk exposures to the fund by applying stress tests based on various market scenarios; and assess performance, performance volatility and net asset value (measured against their potential exposure and stress test exposures). Prime brokers can only assess their individual exposure to funds, based on the portfolio they are prime brokering and lending against. They cannot observe the same hedge funds' exposures to other prime brokers, which is a potential weakness in their ability to assess fund concentration risk across an entire portfolio. Typically, prime brokers are the calculation agent for margin and collateral purposes, so funds must meet the exposure mitigation requirements assessed by the prime broker.

Non-prime brokerage trading activities with hedge funds (over-the-counter derivatives, repo, FX) also require that firms implement daily monitoring of risk exposures in order to calculate collateral coverage for unsecured counterparty credit exposures, and to calculate initial and variation margins for trades where the firm is offering financing. Firms try and set margin so that potential exposures are reduced to zero. Firms offer margin based on a transparent rules-based method depending on the underlying product, its liquidity and term (and based on internal guidance on fund credit ratings). Some of the larger funds will accept VaR-based margining, stress test-based margining, and portfolio margining (which has portfolio diversification benefits for funds), but have to accept the firms' volatility inputs and VaR models. Small funds will typically receive rules-based margining.

When practising due diligence on hedge funds to determine their creditworthiness, lenders give a variety of weightings to different factors. Factor weightings in the rating model generally give fund transparency a lower weighting than quantitative factors such as: leverage, strategy, net asset value (NAV), volatility of returns, diversification, investor base, redemptions, performance and liquidity (unencumbered cash, gates and margin lock-ups).

Both the FSA and the industry are seeking to improve practices of disclosure and margining. The FSA is looking to ensure that creditors and prime brokers have the systems, controls and processes to control their credit exposures to hedge funds as well as other counterparties. The FSA supervises this area with a combination of its prime brokerage survey and the "close and continuous" relationship the FSA has with the large investment banks.

3| FUND HOLDING TRANSPARENCY TO THE PUBLIC

There are some who argue that hedge funds should disclose publicly their holdings – either in equities and corporate bonds for reasons associated with the influence they might exercise over companies, or their more general positions. The FSA is strongly

opposed to a general requirement for hedge funds (or other asset managers or proprietary traders) to disclose positions, either to regulators or to the general public. We know of no convincing explanation which has been advanced as to what use any regulatory organisation would in practice put repeated reports on positions, and believe that the gathering of information by regulators which is not used is bad practice. It encourages investors and commentators to believe that some security is being achieved when none is; and it exposes the regulatory organisation to justified criticism. And we also oppose the disclosure of positions to the public as a whole (whether by hedge funds or by others) as likely to prove damaging rather than supportive of financial stability.

The position in respect of disclosure of equity holdings which we advocate is quite simply the same requirements for hedge funds as for other investors. Once an investor acquires a certain percentage of an issuers' equity they are bound by the Major Shareholder Notification of the Transparency Directive (TD). The FSA believes that the transparency provided by the Major Shareholder Notification regime maintains market confidence and price efficiency as the management of both the issuer and investors are able to take more informed decisions, including decisions on the value of the securities, based on the identity of and amounts held by substantial shareholders.

The TD was implemented on the 20 January 2007 and has broadly harmonised across Europe the requirements to disclose information regarding issuers whose securities are admitted to trading on a regulated market. It has been designed to enhance transparency on EU capital markets by requiring regulated market issuers to produce periodic financial reports and shareholders in such companies to disclose major holdings. The TD also deals with the mechanisms through which this information is to be disseminated to the public and stored. The directive is a minimum harmonisation directive which allows the home Member State of regulated market issuers to impose more stringent requirements than those set out in the directive while restricting the host Member State to the minimum TD requirements.

The most relevant part of the directive in relation to hedge fund transparency is the Major Shareholder Notification regime. The FSA consulted on its implementation of the TD in March 2006. On the Major Shareholder Notification requirements, respondents were offered the option of keeping the broad parameters of the current UK regime which were super-equivalent to the directive or reverting to the TD minimum requirements. Respondents overwhelmingly supported retaining the UK super-equivalent position, arguing on balance that greater transparency for issuers, investors and the market as a whole outweighed the costs of making a far greater number of disclosures under the UK regime and so this is how the FSA has implemented the directive.

One issue, particularly relevant but not unique to hedge funds managers, is the disclosure of derivative positions, as well as those of actual physical holdings of shares. The FSA has powers to extend the Major Shareholder Notification regime beyond the current disclosure of "ownership" of equity positions to require the disclosure of "economic interests" in shares through derivatives such as contracts for differences (CFDs). We have not introduced such rules alongside the rules implementing the TD. We have discussed with market participants and asked more generally for views. Respondents indicated that they would welcome an FSA initiative to investigate this disclosure issue further. However, there is no consensus as to the need for such disclosure or how in practice a disclosure regime might work.

We have identified three potential market failures that might arise as a consequence of the non-disclosure of economic interests:

• *Inefficient pricing in the equity market as a result of information asymmetries*. In the situation where some investors have superior information on ownership structure than others, they may be able to trade on the basis of this information advantage to the detriment of the less-informed investors. This presumes that information on ownership information (*e.g.* identity and structure) is of value to investors when making their decisions to trade. This assumption underpins existing major shareholder notifications, and it is reasonable to consider whether information on significant CFD positions may also be of value;

• *The risk of stealth takeovers by predatory investors using CFDs to bypass the Major Shareholder Notification Rules*. With a view to a takeover, potential acquirers could target a firm by entering into a CFD with a bank. The bank could then buy the target's equity as a hedge.

The acquirer could then close the CFD position, buy the equity which the bank is holding and thus acquire a large stake in the company – therefore surprising both the issuer and the market. The bank may have strong incentives to sell the equity to the acquirer if the acquirer wants it because a large equity position may be difficult to unwind and the acquirer may be a willing buyer able to offer a good price.

• *Weakened market confidence as a consequence of the lack of transparency as to the identity of investors with an undisclosed interest in a company*. This means investors may be deterred from participating in the market if they feel uncertain as to the players or hidden activities.

We are currently unclear on the extent or significance of these market failures or to the potential costs and benefits of a disclosure regime. We have been provided with anecdotal evidence of disquiet about the present position but it has been more difficult to identify clear cut empirical evidence which support the arguments cited. And, against the concern for more disclosure, such a disclosure regime of economic interests would be complex in nature, not easy to interpret and expensive to administer.

The Takeover Panel introduced new rules in 2005 requiring disclosure of dealings in derivatives and options (including CFDs) during offer periods only. Arguably, these may be the circumstances when increased CFD disclosure is most relevant. There is therefore an argument that the Takeover Panel's rules have already addressed the problems of any possible market failures resulting from stake building in derivative interests, and as such any further regulatory intervention would be unnecessary and overly burdensome.

Before we make a decision as to what policy line to follow, we intend to undertake further analysis of the effect of disclosure of CFDs on the market. We will explore the nature and scale of any market failure that exists at present and the cost/benefits and practicalities of differing CFD disclosure regimes and models.

Transparency is not an end in itself, but should be pursued when it contributes to achieving other purposes – financial stability, investor protection or improved market conduct. This article has attempted to identify what information is already available; what further information should be made available, and to whom; and what information should not be required.

Risks and return of banking activities related to hedge funds

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There are approximately 10,000 hedge funds worldwide, managing assets of over USD 1.5 trillion. Investment banking activities are more and more intertwined with hedge funds, as hedge funds obtain financing from banks through prime brokerage and are clients or counterparties of banks for all sorts of products. The development of hedge funds has therefore created many opportunities for investment banks.

Bank benefit from hedge funds activities directly to the extent that hedge funds are their clients. All capital market activities benefit from it, from brokerage and research to derivatives. Prime brokerage has become a growing source of income. Banks have a very important business of providing derivatives and products, from vanilla products to more complex, customized and exotic products. Hedge funds are also possible underlyings for derivatives. Many banks, including Société Générale, have developed a business of writing options on hedge funds as well as providing leverage to funds of funds.

Investment banks are not only making profits by transacting with hedge funds. They also benefit indirectly through more trading: on certain specific specialized market, like structured complex derivatives, there would be no market at all without the availability of hedge funds that are willing to take the risks.

Together, as two intertwined partners, hedge funds and investment banks have extended the reach and efficiency of capital markets. The benefits that this system brings to the economy as a whole is widely recognized.

Not only do hedge funds provide important benefits for the economy in general but their risks are manageable.

The risks for investors are overplayed. Whatever the risk measure, hedge funds are clearly less risky than equities. As regards operational risks, the market itself is able to generate protection solutions. Academic research has shown that operational risks can be dealt in the most extensive way by using managed account platforms, such as the Lyxor platform.

The risks for banks are under control and the move toward "risk-based margining" has improved very much their risk management. Banks in general invest a lot of resources in monitoring hedge funds qualitatively through due-diligences. They also put different types of limits in order to cover different aspects of risks:

.../...

nominal limits, stress test limits, limits on delta, limits on vega, expected tail loss limits. Moreover, they regulate their capital requirements using not only Value at Risk, the usual tool used by banks to allocate capital to market risks, but also stress tests losses based on the worst possible scenarios. These very sophisticated models are quite convincing. There is no reason to believe that they will not work in practice under stress conditions.

There are also general consideration about a systemic risk that would be something else than banking risks, but it has no real argument to back it up.

Hedge funds are first of all the result of a significant improvement of asset management techniques. These improvements are here to stay, whatever the regulatory environment will become, since these techniques will be more and more part of the mainstream asset management world. Hedge funds are more and more institutionalized. They will eventually merge with "classical" asset management, while some forms of compromises between hedge funds and classical asset management, such as absolute return funds or 130-30 funds, are becoming more common. Hedge funds are just a nice new development of capital markets that, like all past capital market developments, will be irreversible and will contribute to a more efficient financial system.

There are approximately 10,000 hedge funds worldwide, managing assets of over USD 1.5 trillion. The hedge funds industry is expected to reach USD 2 trillion of assets under management ("AUM") by the end of 2008, with a planned annual rate of growth of about 16%.

Anecdotal evidence as much as data suggest that investment banking activities are more and more intertwined with hedge funds. A rough and conservative estimate is that more than 25% of investment banking revenues come from hedge funds.[1]

Hedge funds and investment banks have always been intimate partners. Many hedge fund managers are ex-bank traders. Both businesses belong to the same technical culture, a culture of derivatives and risks management.

The development of hedge funds has thus created many opportunities for investment banks. It has also had a very stimulating effect on asset management, capital markets and the economy in general.

1| HEDGE FUNDS ARE AN ASSET MANAGEMENT REVOLUTION

1|1 Short selling and leverage

It is said that the term "hedged fund" dates back to a fund founded by Alfred Winslow Jones in 1949. This fund was to sell short some stocks while buying others, thus some of the market risk was hedged. Borrowing securities and selling them, i.e. shorting securities, is undoubtedly a main characteristics of hedge funds, the distinctive feature that makes them different from traditional funds.

With short selling come completely new risk parameters and boundaries. Long-only funds can characterize their risks as direct exposure to a certain category of assets. This is not true any more for funds that have short positions as well as long ones. There is no simple anchor anymore. With borrowing comes leverage and the right level of leverage has to be determined. The resulting

1 *"European Wholesale Banks – Hedge fund and investment banks", CSFB research, 09/03/05, pp.1*

degree of risk depends on a deliberate choice of the manager, subject to ratifications and limitations by the leverage providers, and among them, first of all, by the prime broker.

Short selling and leverage, and also the fact that they can use less liquid instruments, make hedge funds more flexible in terms of investment options or strategies than traditional collective investments. Hedge funds encompass a wide range of different investment objectives, strategies, styles, techniques and assets, offering a wide spectrum of risk/return profiles.

Because of this flexibility, hedge funds have embedded over time a whole set of sociological and market characteristics that also makes them very distinct from traditional asset management.

1|2 A specific structure of competence and fees

Shorting securities have allowed different benchmarks from the one of the traditional long-only funds and have created a strong appeal for new ideas, new methods and new people.

This entrepreneurial spirit has led to a structure of fees where performance fees are the main source of income for the manager. The industry standard is 2% of AUM and a 20% performance fee. It is said that this standard has been created by the first hedge fund manager, A.W. Jones. His reasoning was that "when Venetian merchants returned from a successful voyage, they took 20% from their patrons".

This fee structure has caused wealth creation to the tune of close to USD 40 billion a year. This has allowed asset managers to become mature companies, and to compete with traditional asset management companies and investment banks for the most talented human resources.

The hedge fund universe has been filled with talented managers that have been able promote new ideas, raise the stakes, take higher views and in the end undoubtedly provide some consistent return, independent of classical benchmarks. In all fields of asset management, whether it is quantitative or fundamental, they brought new techniques and they improved the degree of professionalism of the industry.

This new sociological structure has in the end become one of the characteristics of hedge funds, to the point where it is debatable whether shorting securities is still the main characteristics of hedge funds, as is exemplified by the new concept, a bit provocative, of "long-only" hedge funds.

"Classical" asset management has indeed reacted and is now striving to assimilate and incorporate this sociological structure. It is now itself following an enormous transformation to counter pure hedge funds. In the end, it seems that the two worlds are coming closer and closer. This raises an issue for regulators: does it make sense to discuss specifically about hedge funds when they are only a part of the asset management world? Wouldn't it be more relevant to discuss about asset management in general? There is however one significant difference: most hedge funds are not regulated or lightly regulated.

1|3 Unregulated funds

Hedge funds happen to be lightly regulated because classical asset management regulations were not allowing short selling and leverage.

Hedge funds have thus been created out of the bound of regulation, in some off-shore jurisdiction or using some legal structure like US partnerships. Since they were not regulated, they have been chasing initially investing population that was allowed to purchase them, mostly high net worth individuals and some institutions.

Alternative management industry still accounts for only 5% of the traditional asset management. However, hedge funds have seen their client base move from family offices and individual investors to financial institutions such as pension funds and insurance companies. Financial institutions were 2% of the investors in 2000, 38% in 2005 and will probably reach 50% in 2008. This will double the size of the alternative industry in the 3 to 5 coming years.

This tends to "institutionalize" hedge funds, with an immediate consequence: a search for more transparency, control, reporting and financial robustness and a potential change in the risk profile with a lower volatility (and potentially return) required by such investors. Hedge funds now compete head on with "classical" asset management.

As a reaction, asset management regulations are now going to be more and more flexible and allow "classical" asset management to use the same techniques as hedge funds. In general, regulators do not oppose for a long time the use of new techniques. They rather tend to accommodate them because they want the best techniques to benefit the broader public.

Already the new European UCITS Directive published in 2002 accepts short positions through derivatives. New regulations, for example the European recommendation on derivatives[2] goes further and allows leverage in UCITS without any limit, provided that the VaR of the fund stays below unspecified limits.

Regulators tend also to favor more free marketing of hedge funds, as is clear in the new European Commission white paper on asset management, which proposes a European private placement regime for the marketing of hedge funds.[3]

While both worlds move towards each other, we see emerging, at the same time, new concepts that are sorts of compromise between hedge funds and classical asset management, such as "absolute return". Absolute return funds, like hedge funds, are not benchmarked, but they use leverage and short selling "moderately". In the United States, we are seeing for example classical asset managers promoting "130-30" funds, funds that are long 130% and short 30%, managed either by "classical" asset managers or by hedge funds.

Another interesting development is the increasing number of big banks and insurers that are taking stakes or acquire hedge fund firms. This is the recognition of HFs as a definitive pillar of an asset management activity.

The universe of hedge funds and capital markets, on one side, and classical asset management on the other side, will eventually merge into the same regulatory and cultural framework. For now, it is however still reasonable to sideline the hedge fund universe as characterized by short selling, leverage, light regulation or no regulation, and a specific culture based on entrepreneurship, innovation and result-based performance.

This universe is a great opportunity for capital markets, the economy and banks in particular. It is also a source of multiple risks.

2| HEDGE FUNDS ARE A SOURCE OF OPPORTUNITIES FOR CAPITAL MARKETS, THE ECONOMY AND THE BANKS

2|1 Hedge fund provide capital at risk for capital markets

Since hedge funds are more flexible than classical asset management, they should be able to perform better their economic functions. As long as market theory assumes that investors play a positive role in the economy by contributing to allocating capital resources in an efficient way, we should expect hedge funds to do it also, and better.

In the words of the European Expert Group on hedge funds:[4] "hedge funds improve the functioning of financial markets. They provide markets with liquidity and have a significant stabilizing influence by spreading risks across a broad range of investors. Indeed, hedge funds often take alternative market views (contrarian trading strategies), can leverage their positions and generally change their portfolio composition much more frequently than traditional funds. Hedge funds also tend to be active in newer developing markets, often creating sufficient liquidity to allow mainstream managers to follow

2 *Corrigendum to Commission recommendation 2004/383/EC of 27 April 2004 on the use of financial derivative instruments for undertakings for collective investment in transferable securities (UCITS) (OJ L 144, 30.4.2004)* - http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32004H0383R(01):EN:HTML

3 *White paper on enhancing the single market framework for investment funds* – http://ec.europa.eu/internal_market/securities/docs/ucits/whitepaper/whitepaper_en.pdf

4 *Report of the Alternative Expert Group (July 2006)* – http://ec.europa.eu/internal_market/securities/docs/ucits/reports/hedgefunds_en.pdf

(e.g. credit derivatives markets, over-the-counter markets and syndicated bank loans). Hedge funds increase market efficiency through the arbitrage of price differences between similar securities across markets or by providing price discovery".

2|2 Hedge funds are a source of business for banks

Bank benefit from such activities directly to the extent that hedge funds are their clients. All capital market activities benefit from it, from brokerage and research to derivatives.

According to some research,[5] hedge funds generate, for major investment banks, 40% of total equities trading, 20% of total fixed income trading revenues and 80% of all trading in distressed debt markets. Greenwich associates (2006) reports that hedge funds now account for more than 50% of all trading on the US fixed income markets.

In 2005, hedge funds generated USD 25.8 billion for major investment banks. Of which:

- USD 17 billion (65%) attributable to execution (sales & trading) activity,
- USD 8.8 billion (35%) attributable to prime brokerage:
  - USD 1.2 billion of Clearance & Custody,
  - USD 3.4 billion of Trading & Execution within the prime brokerage department,
  - USD 4.2 billion of Financing (USD 3.3 billion of Securities lending and USD 0.9 billion of Margin lending).

Investment banking activity with hedge funds in 2005 constituted roughly 25% of revenue across the industry, up from 15% in 2004, which represented USD 25 billion. These amounts will continue to grow as hedge funds AUM continue to grow steadily.

EXECUTION ACTIVITIES AND OTC DERIVATIVES

Hedge funds are believed to have paid record fees for brokerage services in 2005, equating to USD 7.5 billion, up 32 percent from 2003.[6]

Banks have also a very important business of OTC derivatives with hedge funds. They provide derivatives and products, from vanilla products to more complex, customized and exotic products.

Investment banks are not only increasing profit from transacting with hedge funds. They also benefit indirectly through more trading: on certain specific specialized market, like structured complex derivatives, there would be no market at all without the availability of hedge funds that are willing to take the risks.

As ultimate risk takers, hedge funds frequently take a layer of risk that most institutions are reluctant to consider. They provide the missing link in a complex transaction or, more simply, takes the risks that others, including banks, are not willing to take or cannot take above certain limits. In short, they provide a hedge for banks themselves. This has opened a specific bank business of selling bank risks to hedge funds or other institutions, named "alternative risk transfer (ART)".

Hedge fund managers expertise, experience and appetite for high returns provides them with an incentive to invest in the riskiest component of an issue, such as CDO equity tranches, high yield bonds or distressed stocks, or complex and exotic market risk, such as correlation or volatility skew. Other investors, like most institutional investors, naturally avoid these areas due to regulation or a lack of knowledge. By allowing investment banks to place or to transfer risks, hedge funds give banks more space to continue developing business with corporate, institutional and even retail clients.

Hedge funds may also hedge other institutions, like insurance companies. Every step made by the regulators, notably through IFRS and Solvency 2, to increase the risks awareness and sensitivity of insurance companies, will lead to an added demand for

5 *ABN-AMRO Research 2006, Bernstein Research*
6 *Sanford C. Bernstein analyst Brad Hintz estimates, quoted in "The money makers",* www.thestandard.com, *28/11/05*

hedge funds to take those risks. As mentions a research from Edhec Research Centre:[7] "Solvency 2 should integrate the issue of asset-liability adequacy in the level of capital required, which should lead to (…) more structured and sophisticated interest rate products and a transfer of some of the risks of mass insurance and large insurance risks towards the financial market". With Solvency 2, regulators are pushing the risks of insurance companies towards unregulated investors willing to take the risks: hedge funds.

PRIME BROKERAGE

Prime brokerage has become a growing source of income. Start-up services, capital introduction, credit intermediation, risk management, straight through processing (STP), futures and options clearing, research, contracts for difference and swaps are among the more sophisticated components of packages offered by prime brokers. It is estimated that global prime brokerage revenues will rise by over 60% to USD 15 billion by 2010.[8]

Many investment banks are also widening their services to hedge funds, as recently exemplified by Fortis' acquisition of Hedge Fund Services (HFS), the largest fund administrator in the British Virgin Islands (March 2006).

Prime brokerage service is however becoming a commoditized business with declining margins. This decline is offset by new revenue opportunities and more industrial operational efficiency. Revenue mix is changing, from predominantly equity originated revenue streams to fixed income, commodities, foreign exchange and volatility ones, and a marked increase of related listed and OTC derivatives.

In 2001, 70% of the funds were invested in equity strategies. During the first semester of 2006, 35% of the allocated funds were invested into "blended strategies" i.e. which are multi assets and 12% were invested in pure fixed income. In 2007, more than 50% of the investments will probably be made outside of the equity asset class. Prime brokers should benefit from this trend since the financing spreads are higher. The trend will favor prime brokers that are able to offer multi-asset services and may lead to consolidation in the sector.

STRUCTURED PRODUCTS BASED ON HEDGE FUNDS

Hedge funds are also possible underlyings for derivatives. Many banks, including Société Générale, have developed a business of writing options on hedge funds as well as providing leverage to funds of funds.

The business of structured products on hedge funds allows, like any structured products business, to redefine and restructure the risks according to the wishes of clients. As an example, this allows investment banks to provide capital guarantees to investors that do not wish to take capital risks. More usual structures used to be CPPI.[9] From CPPI, Société Générale has developed structures like Astaris,[10] which have been widely replicated in the industry. The industry has been more and more creative and now embeds many types of exotic options that existed before only in the equity world. Structured products will play their role in the hedge fund world as they have done in the equity market, by customizing pay-offs to the precise investors' needs.

Société Générale, which is a leader in this business, estimates the annual worldwide revenues coming from this business at around USD 2 billion. We expect this business to continue to grow fast.

The business of providing leverage is the part of the structured product business where the aim is to increase risks rather than reducing them, by adding leverage to products instead of providing guarantees. This business applies mostly to funds of hedge funds, which have a very low risk profile: by providing leverage, banks increase the returns of the product, at a price of more risks.

The universe of manageable risks determines the range of actual transactions. Transactions are therefore based on sophisticated risk models that incorporate different layers of risks and different types of risks. The improvement of risks models is permanent. Models now allow new types of transactions that were not possible a few years ago.

7 *The impact of IFRS and Solvency 2 on asset liabilities management and asset management in insurance companies (November 2006)* – http://www.edhec-risk.com/edito/RISKArticleEdito.2006-12-14.5028/attachments/EDHEC%20Study%20Impact%20IFRS%20Solvency%20II%20on%20AM%20ALM.pdf

8 *Source: m.a. partners 2006.*

9 *Constant proportion portfolio insurance. A structure that combines risky and non risky assets and where the exposure on risky assets is reduced when the net asset value of the funds comes closer to the present value of the guarantee.*

10 *"Astaris" is an "enhanced CPPI" structure that combines the benefits of options and those of CPPIs.*

Together, as two intertwined partners, hedge funds and investment banks have extended the reach and efficiency of capital markets.

The benefits that this system brings to the economy as a whole are widely recognized. As mentioned by the European Central Bank,[11] "hedge funds have a role as providers of diversification and liquidity, and they contribute to the integration and completeness of financial markets".

What is often debated, however, is the risks that are created by hedge funds, risks for investors, for banks or for the economy as a whole.

3| THE DEBATES ABOUT HEDGE FUNDS RISKS

In order to analyze hedge funds risks, it is crucial to differentiate between different types of risks for different actors:

• one issue is risks for investors. The debate is driven by some examples of fraud, or by some example of misunderstanding of risks, like in the Amaranth story;

• the other issue is risks for banks. This debate has been driven, obviously, by the LTCM episode. The Federal Reserve felt that it had to intervene, very lightly in fact since it did not use any public money nor had recourse to any legal action;

• another issue is systemic risk. Systemic financial risk has always been seen as a banking risk so this risk is first of all related to the preceding one.

3|1 Risks for investors

The first type of risks often mentioned is risks for the investors. Indeed, hedge funds are taking risks, like any fund, but there is ample proof that hedge funds in general are not especially risky, as shown by the following table:[12]

Table 1
Distribution of maximum drawdown[13] of hedge funds and funds of hedge funds vs. equity funds[14]
(%)

Drawdown	> 10%	> 25%	> 50%	> 75%
Hedge funds				
Funds of hedge funds	30.5	7.6	0.4	0.0
Single funds	77.0	40.4	10.2	2.1
Mutual funds				
Funds of funds	100.0	93.1	69.6	4.9
Single funds	99.7	97.1	73.7	5.1

This table shows, for example, that 73.7% of mutual funds have lost more than 50% of their value, whereas only 10% of hedge funds have lost as much as that. These data are also true if we use volatility, or any other risk parameter. Whatever the risk measure, hedge funds are clearly less risky than equities.

The intuitive feeling that hedge funds are risky is probably a result of the fact that they often bear operational and fraud risks. As mention in a research paper concerning operational risks,[15] "with an average of approximately 15 fund collapses per year (to be compared to approximately 350 hedge fund closures per year) out of a universe of a few thousand funds open to investment, it becomes clear that the risks related to the operational weaknesses of hedge funds significantly outweighs the level of financial risks, which are usually the focus of managers' attention and investors concerns".

Hedge funds still face limited regulatory constraints and the industry still often lacks maturity as regards operational practices, in relation to valuation, reporting and risk management. The lack of transparency creates risk for investors, from pure fraud to style drifting or excessive and unpredictable risk taking, the type of risks that we have seen in the Amaranth story.

11 *European Central Bank, 2005, "Hedge funds and their implications for financial stability", Occasional Paper Series, No. 34, August*
12 *Borrowed from a contribution of Edhec Research Risk Centre to IOSCO Standing Committee 5 on 14 June 2006.*
13 *Maximum drawdown is a commonly used statistic for measuring the risk of hedge funds. It looks at the worst possible loss an investor would have endured in a fund had he or she bought in at the worst possible time offering an idea of how risky the fund can be.*
14 *Data from 01/1999 to 12/2005, based on monthly return. There are 374 hedge funds and 236 funds of hedge funds coming from the CISDM database, and 1495 equity funds and 102 funds of funds coming from Europerformance database.*
15 *Edhec Risk and Asset Management Research Centre, Jean-René Giraud "Benefits and limitations of managed accounts",* http://www.edhec-risk.com/latest_news/Alternative%20Investments/RISKArticle.2006-09-15.2338/attachments/Benefits%20and%20Limitations.pdf

These types of risks may affect some investors but are not a threat to the economic or financial system.

It should be mentioned also that the market itself is able to generate protection solutions. Academic research has shown that operational risks can be dealt in the most extensive way by using managed account platforms.[16] For example, in the Société Générale Group, we have created a managed account platform, the Lyxor platform,[17] that allows investing in hedge funds with a certain degree of transparency and independent monitoring. Regulators should not continue to ignore these structures but on the contrary encourage them by appropriate regulatory incentives.

3|2 Risks for banks

Banks encounter different types of risks in their several businesses related to hedge funds.

OTC DERIVATIVES

By entering into OTC derivatives with hedge funds, banks incur counterparty risks. They try to limit this risk by asking "independent amounts".

Independent amounts are for OTC markets the equivalent of "deposits" in the listed derivatives markets. Independent amounts are collateral amounts given to the bank, which represent an add-on precaution to the marked to market risk. Independent amounts are calculated on the basis of the global risk on the counterparty, using VaR and stress tests. They are often used for exotic derivatives. This approach is, however, not generally accepted by hedge funds, because it runs counter to their wish to optimize their capital usage.

Another technique that works for the benefit of all parties is the "give-up agreement". The give-up agreements effectively transfer the risk of hedge fund default to the prime broker. Give-up agreements are very useful because they tend to concentrate the risks on those who have a complete view on market risks, the prime brokers. The trend is that give-up agreements will become the market standard.

PRIME BROKERAGE RISKS

Numerous legal and risk issues are faced by prime brokers. Among them:

- credit risk for loans and financing;

- counterparty risk, market risk, credit risks and settlement risk for financial instruments;

- legal risks on the investment vehicle. The structure should be governed by bankruptcy law which recognizes the prime broker right to take security interest or other security.

Legal risks are mostly linked to the risk of not being able to seize and liquidate the collateral. The insolvency risk of the customer is the higher risk, which can defeat the contractual arrangement between the parties.

In addition to the classic law of security and contractual set off, modern techniques are available to prime brokers willing to mitigate legal risks in the event their customers become insolvent. Specific legislation on close-out-netting or particular master netting agreements or collateral arrangements has enabled individual transactions exposures to be reduced.

In the area of financial risks, the trend is towards "risk-based margining".

"Classical" prime brokerage used lending against collateral. Arrangement tended to be based on traditional lending fees and requirements for lending. This approach was not in itself unfavorable to good risk supervision. It could even be argued that such approach was in fact too conservative in terms of risks.

The "risk-based margining" idea is to better reflect the potential loss of the portfolio that underlies the risk of the prime broker, by recognizing hedges at single name, sector and portfolio level, by rewarding diversification between strategies and considering individual trades in the context of the wider portfolio.

Prime brokers are able to cross-margin the positions of their customers by using risk methodology and risk calculation tools applied to the global portfolio. Stress

16 *See ibid.*
17 *http://www.lyxor.com*

tests are then used to insure that the proper risks are taken into account, through the calculation of margins. All the identified risks are taken into account, in accordance with overall risks policies of banks, such as: sector risks (risk of sector surge or crash), concentration risks, relative risks values (decorrelation of long and short), market directional risks and liquidity risks. These risks are taken into account in their extreme occurrence, through stress tests that use the worst past observed modifications of the economic environment, as well as extreme imaginary scenarios.

These very sophisticated models are quite convincing. There is no reason to believe that they will not work in practice under stress conditions.

Moreover, hedge fund managers in general do not use all the leverage allowed by their prime brokers and current levels of leverage do not seem alarming. For example, where a classical long-short equity hedge fund would have a leverage of 4 (sum of long and short positions equal 4 times the net asset value), stress test models tend to show that, in many instances, a leverage of 8 or more would be possible. This shows that the leverage of a hedge fund is not generally linked to the limits required by the prime broker but is rather a consequence of the risk return profile sought by the manager.

One reason is that it is sound practice to limit the leverage to a reasonable level in order to leave room for more leverage should the market conditions so require. Another reason is that hedge funds managers tend to be conservative in terms of leverage in order to limit the volatility of their fund.

Structured products on hedge funds

This business is extremely technical and based on sophisticated risk models that include two types of risks: single hedge funds risks and liquidity risks.

The types of risks that happen in this type of structures are "gap risks", typical for CPPI, which are the risks that a sudden downward gap in the value of the assets would not allow the timely rebalancing of the assets which is needed to insure the guarantee. On optional structures, the risks are the typical derivatives hedging risks (gamma and vega risks), amplified by the low liquidity nature of the underlyings. There are also, as in prime brokerage, legal risks; managing the legal documentation of transactions is an important part of the business.

Banks mitigate their risks by putting in place guidelines on the allocation of hedge funds that underlie the structured product. They also invest a lot of resources in monitoring hedge funds qualitatively through due-diligences. They also put different types of limits in order to cover different aspects of risks: nominal limits, stress test limits, limits on delta, limits on vega, expected tail loss limits. Moreover, they regulate their capital requirements using not only Value at Risk, the usual tool used by banks to allocate capital to market risks, but also stress tests losses.

Systemic Risks

In their quest for alpha, hedge fund managers are forced to look permanently for new strategies.

When one of these strategies proves to be viable, a number of managers often move into the same space, following a kind of "herd instinct".

A recent example could be the rush during the past 18 months into emerging markets,[18] and then into commodities. Many managers launched new funds, or created new strategies within multi-strategy funds, specialising in these markets, creating rapid inflows that these markets struggle to absorb, thus adding to volatility and potential instability.

On the other hand, herding behavior has not been proven to be inherent to hedge funds, as have show the history of bubbles, from the tulip bubble of 1636 to the internet bubble of 2000.

Through their ability to engage in short-selling and to take contrarian approaches, hedge funds may rather act as a counterbalance to market herding. Had short selling existed in the 1630s, nobody knows, however, whether a "soft landing" of the tulip market would have happened...

Hedge funds, which act on a view which is supported by first hand knowledge and detailed analysis of companies, help to ensure that they trade at true market

18 *Money flowed faster into emerging markets than any other hedge fund strategy in the first quarter of 2006, according to Tremont Capital Management. Tremont reports that inflows into emerging markets grew at a rate of 7.97%, well above the overall average percentage of 3.18%. Also registering healthy increases were managed futures (4.73%), long/short equity (4.37%) and global macro (4.04%). Total inflows for the first quarter stood at USD 27.6 billion.*

value which is a stabilizing influence on markets. After all, the first shot at the Enron share before the collapse of the company happened to come from a short seller.

Some have however argued that hedge funds should put their positions in a database that would be able to track the global systemic risks of hedge funds.

Skepticism about such database is general. Not only because its feasibility is debatable, but also because the database would have to include not only hedge funds but all capital markets. Since any transaction has a counterparty, it is difficult to see how such database would be useful. Moreover, some risks, like liquidity risks, would not be shown by such database.

Hedge funds are first of all the result of a significant improvement of asset management techniques. These improvements are here to stay, whatever the regulatory environment will become, since these techniques will be more and more part of the mainstream asset management world.

Hedge funds provide important benefits for the economy in general and their risks are manageable.

Investors, especially institutional investors, should however not be complacent about the risks. If they wish to reduce very much operational risks, they may use risks management technique like "managed accounts".

As regards their own risks, banks have put in place sophisticated risk techniques that address in a conservative way all sorts of risks. This is not to say that there will never be any bank failure because of problems with hedge funds, but the degree of risks seems manageable. As US Federal Reserve Board chairman Ben Bernanke told the Senate Budget Committee on 18 January. "The approach we have taken is a market discipline approach". "That system has worked pretty well so far."

There are also general consideration about a systemic risk that would be something else than banking risks, but it has no real argument to back it up, except that we have no understanding of what hedge funds are doing on a consolidated basis.

Well, there are certainly things that we don't understand in this world and we therefore have many reasons to be afraid of many things. But I would certainly not suggest that we apply a "precautionary principle" [19] to finance. I tend to side with the optimists and believe that hedge funds – in spite of some problems that will inevitably happen from time to time – are just a nice new development of capital markets that, like all past capital market developments, will be irreversible and will contribute to a more efficient financial system.

19 *The "precautionary principle" as applied to environmental policy stipulates that any risky practice may rightfully be reduced. According to this principle, the burden of proof lies with those asserting the harmlessness of the practice.*

Indirect supervision of hedge funds

Danièle NOUY
Secretary General
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Many risks associated with hedge funds can be addressed through indirect measures aimed at the hedge funds' counterparties and creditors, nearly all of which are regulated banks and securities firms. Hence, we consider here how indirect supervision has been made more effective over time and how we should be continuing to make it more effective in practice.

The theoretical usefulness of hedge funds in making markets more efficient and more stable is undisputed but does not always materialize in practice. In order to preserve market efficiency and financial stability, we need therefore to increase incentives for an effective and long lasting market discipline. Not to do anything is simply not an option given the growth of the hedge fund industry and the fact that hedge funds often act no differently from other financial institutions, whose history has shown worth a look by financial watchdogs. Risk management needs to continuously keep pace with financial innovation. This is a challenge for the indirect supervision of hedge funds but also a support to the pragmatism of this approach.

In order to be able to press banks to put enough emphasis on sound risk management, international cooperation is required. Without an international level playing field, short term competitive pressure between banks would indeed most likely derail our efforts. This is a strong and welcome incentive for regulators to be efficient. In addition, the cooperation between banking and securities supervisors should continue to allow indirect supervision to be strengthened and updated as characteristics of the hedge fund business evolve over time.

The first mitigant against the risks associated, for any single institution, with hedge funds is robust internal risk management systems. Hence, specific attention is warranted as regards access by banks to more comprehensive information on their Highly Leveraged Institutions (HLI) counterparties, better incorporation of counterparties' transparency and credit quality into collateral policies, effective improvements of complex products exposures' measurement (due account being taken of model risks), enhancements to stress testing (in particular liquidity stress testing). In addition, indirect supervision needs to be leveraged by an improvement in hedge funds broad transparency to the market. Stress tests, indeed, should enable banks to capture their full exposure to a sufficiently broad range of adverse conditions, including not only their direct exposure to a particular hedge fund but also their overall exposure to market dislocations that might be associated with the failure of one or several hedge funds (second round effects).

A second mitigant is an efficient oversight, in particular by banking supervisors, of the trading relations that hedge funds have with their counterparties. In this respect, the Pillar 2 of Basel II (namely the supervisory review process which will deal with all banking risks beyond those covered by Pillar 1 regulatory capital charges) will incorporate some of the risks specifically concentrated in hedge fund exposures, i.e. liquidity risk, concentration risk, tail risk, model risk... It seems also now critical to check that banks' internal information systems are capable of capturing the full range of exposures to hedge funds.

Finally, banks are required by supervisors to hold regulatory capital as a buffer in relation to the risks they take. This capital adequacy requirement forms the third line of defence against the risks that a financial institution assumes today when dealing with hedge funds.

Last but not least, micro and macro prudential targets converge when banking supervisors press each individual institution for more comprehensive stress tests and the related risk management actions, including against second round effects, i.e. against systemic instability.

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The history of indirect supervision of hedge funds is already quite long. In the aftermath of the near collapse of the hedge fund Long-Term Capital Management (LTCM), in September 1998, great attention has been paid by the official sector and industry groups to the risks associated with the activities of hedge funds and to the possible policy responses. In particular, the Basel Committee on Banking Supervision (BCBS) issued a report on banks' interactions with Highly Leveraged Institutions (HLI) in January 1999 in conjunction with a paper outlining sound practices for such interactions.[1] With respect to the possible policy responses, the report described different approaches which included indirect supervisory approaches, enhanced transparency and various direct approaches. The BCBS, in particular, highlighted that many of the risks associated with the activities of hedge funds could be addressed through indirect measures aimed at the hedge funds' counterparties and creditors, nearly all of which are regulated banks and securities firms. In the same vein, the US President's Working Group (PWG) on Financial Markets considered how best to constrain excessive leverage by hedge funds. The Working Group concluded in its report published in April 1999 that hedge funds' leverage could be constrained most effectively by promoting measures that enhance market discipline and improve credit risk management by hedge funds' counterparties. It described this approach as the "indirect regulation" or "indirect supervision" of hedge funds.

Since then, the indirect supervision of hedge funds has also been addressed through various public and private initiatives by, among others, the Financial Stability Forum (FSF), the BCBS, the International Organization of Securities Commissions (IOSCO), the Multidisciplinary Working Group on Enhanced Disclosure (MWGED), and the Counterparty Risk Management Policy Group (CRMPG) I and II... Although a public position was not always taken and that direct regulation has also been advocated, it seems fair to say that most believed that supervisors and regulators could achieve through indirect supervision much of what could be achieved by direct regulation. This remains relevant today.

The purpose of this article is to consider how indirect supervision has been made more effective over time and how we should be continuing to strive to make it more effective in practice.

1| THE RATIONALE BEHIND INDIRECT SUPERVISION OF HEDGE FUNDS

Hedge funds can be considered from a variety of viewpoints. It can be useful for supervisors to analyze the issues raised by the hedge fund industry through two principal criteria, i.e. the hedge funds impacts:

- on financial stability;
- and on financial integrity.

Financial stability means, in my view, not only the resilience of the financial sector against defaults, but also the absence of destabilising financial market dynamics, when such dynamics can increase financial sector default probabilities. Financial integrity means well-functioning but also fair financial relationships (which is a precondition for any structure to function well over a long period of time). We should obviously try to, analytically, disentangle them, but also take into account that they are often inter-related.

These criteria can be applied to the relations of hedge funds with four types of institutions or structures:

- banks and other financial institutions;
- financial markets;
- investors (institutional and retail);
- and the corporate sector.

I will obviously focus on hedge funds relations with banks. We should also take into account that there is no single definition of hedge funds even if their most important characteristics are well known: freedom of investment strategies (including short-selling, use of derivatives and leverage) and of contractual relationships with their customers (in term of fees or lock-up periods for example). These characteristics are linked to the fact that they are in general not, or lightly, regulated in a direct manner, including as regards their degree

1 *See BCBS (1999): "Banks' interactions with highly leveraged institutions" and "Sound practices for banks' interactions with highly leveraged institutions", January.*

of transparency. But hedge funds' and many other financial institutions' activities are becoming more similar. Distinctions between private equity funds, hedge funds and proprietary trading of large investment banks are often blurring and a continuum is building between traditional and alternative fund management. The consequences of complex and/or leveraged risk exposures management are then becoming the key point to address whoever is initiating such trades.

I guess that most people would agree that, in order to preserve market efficiency and financial stability/financial integrity, we need to promote incentives for an effective and long lasting market discipline regarding, among others, hedge funds. From a supervisory perspective, two other options should be disregarded:

- not do anything;
- and try to regulate directly hedge funds.

Not do anything is simply not an option given the growth of the hedge fund industry and the fact that hedge funds financial operations are often not different from those of other financial institutions, whose history has shown to be worth a look by financial watchdogs. We should recognise the theoretical usefulness of hedge funds in making markets more efficient, thanks to enhanced price discovery mechanisms, inconsistencies arbitrage or liquidity enhancement. They can also make markets more stable, by bringing a diversity of targets and constraints among market participants. But we should also recognise that all these theoretical advantages do not always materialize. This is for example the essence of the academic debate around the reality of the "alpha" and the ability of hedge funds to provide return which is not (in a strong form of the "alpha" argument) or not easily (in a softer form of the same argument) correlated to market return and risk. In recent years, correlation between hedge funds returns has also displayed a tendency to increase.[2] This is an indication of potential crowded trades, i.e. of similar trades done by various actors in a single market. Hence the risk of market instability when such trades are unwound, in particular if this come as a reaction to a shock, e.g. a fundamental economic change or the need to liquidate positions because of collateral requirements. A lot of those market participants which are supposed to bring diversity and contrarian strategies might in fact be on the same side of the market and under pressure to unwind their exposure in a short period of time, as was the case in May 2005 when GM and Ford were downgraded. True turbulences were relatively short-lived. But we should note that they were serious although the triggering factor, the downgrade of GM and Ford, had been widely expected.

This recent episode sounds less a reassuring sign than a sound warning that risk management and market discipline needs to continuously keep pace with financial innovation and search for yield. This is, by the way, both a challenge for the indirect supervision of hedge funds and a reason to support this approach, because of its pragmatism and flexibility. It attempts to make various tools, mostly used in a more general context, converge in order to address the most pressing risks which, at certain points of time begin to crystallize in some areas, e.g. around the behaviour and fast moving role of hedge funds in the financial system. I believe that the progress, made in recent years in term of indirect supervision, have already contributed to make the financial system more resilient, as recently witnessed by the "smooth failure" of the hedge fund Amaranth. But progress need to continue at the same speed as financial innovation.

The formidable challenges in terms of costs and effectiveness that arise when one thinks about developing a direct regulatory regime for hedge funds and the absence of any international consensus on that matter are dissuasive. Furthermore, a moral hazard issue is likely to arise if a direct regulation is imposed without appropriate means to enforce it or to draw all consequences of it. In particular, market discipline might decrease if financial institutions assume that the direct regulation offers them an option, a "regulators put", i.e. a floor to potential losses in their relations with hedge funds. They might then assume that direct regulation decreases the risks, or the cost of the risks, hence that they should put more emphasis on short term profit than on avoiding medium term risks. In fact, the freedom to look for profit opportunities and

2 *See for example Tomas Gabaravičius and Frank Dierick (2005): "Hedge funds and their implications for financial stability", ECB occasional paper, August ; and the updates in more recent ECB or Banque de France Financial Stability Reviews.*

the obligation to avail of sharp risk management should go hand in hand in an efficient but stable financial system. This is exactly what the indirect supervision approach seeks to foster.

Let me also stress that, in order to be able to press banks to put enough emphasis on sound risk management, international cooperation is required. Without an international level playing field in term of banking regulation and supervision practices related to hedge funds exposures, short term competitive pressure between banks to grasp immediate fees and commissions would indeed most likely derail our efforts. This holds particularly true in the case of hedge funds which are specialist of arbitraging market discrepancies but also regulatory discrepancies. This is a strong, and let me say welcome, incentive for regulators to be efficient. In today's global financial world, this means that financial regulators and supervisors should always stay close enough to operational issues, which might differ from one market to another, but should also coordinate their objectives and actions.

More specifically, what role should we assign to indirect supervision, i.e. the supervision of the interactions between hedge funds and regulated counterparties such as banks?

2| ENHANCING RISK MANAGEMENT PRACTICES

The first line of defence against the risks associated, for any single institution, with hedge funds, as well as the possible domino risks which can escalate into systemic risk, is robust internal risk management systems within hedge funds counterparties, primarily prime brokers, but more generally, banks. Indeed, on the one hand, banks lending practices impact the leverage that hedge funds can put in place and, on the other hand, banks are likely to be the main channel of any contagion after some hedge funds failure, either, directly, through credit risk, or, indirectly, through the market impact of their reactions.

It is the reason why the BCBS 1999 paper focused on sound practices regarding Highly Leveraged Institutions (HLI) in six areas that related primarily to internal controls: clear procedures for involvement with HLI (including effective due diligence), sound and well-defined credit analysis of potential highly leveraged counterparties, meaningful exposure measurement, effective limit setting, collateral provision and other contractual provisions aligned with the credit quality of highly leveraged counterparties and, finally, ongoing monitoring of HLI creditworthiness and exposures to HLI. These areas of risk management are not new but combine two characteristics: being both important and difficult to put in place effectively ("effectively" being a key word even if it can be tarnished when used too often).

Improvements in risk management and measurement practices have been noticed since the LTCM episode: better awareness of the private sector as well as reinforcing pressure from the official sector has helped market discipline. However, some concerns remain and have recently called for renewed attention given the competitive pressures between banks, which can decrease market discipline. In addition, the increasingly complex relationships that banks have developed with the hedge funds industry can make market discipline more difficult to achieve. The recommended sound practices in the BCBS 1999 report, many of them being also covered in the CRMPG II report,[3] remain relevant and their implementation, in a changing environment, still a standard to achieve. In particular, some general elements of the Committee's characterization of banks' interactions with hedge funds appear still important: "The Committee's review of banks' dealings with HLI has revealed that in many cases there has not been an appropriate balance among the key elements of the credit risk management process, with an over reliance on collateralisation of mark-to-market exposures. Insufficient weight was placed on in-depth credit analysis of the HLI counterparties involved and the effective measurement and management of exposures". The analysis by the supervisor of the relationship between hedge funds and banks needs therefore to be comprehensive and detailed,

3 *Toward Greater Financial Stability (2005): "A Private Sector Perspective", CRMPG II, July.*

going for example far into the technicalities of the collateralisation process and its potential shortcomings.

More specifically, a few areas exist where improvements to counterparty risk management practices still deserve great supervisory attention. Interestingly, many of these areas were already identified in the BCBS 2000 report[4] which examined the extent to which banks had implemented the 1999 sound practices paper. This does not mean that such recommendations are an empty speech. On the contrary, it shows that we face complex issues, which are never totally solved, and have to be continuously considered in a context of perpetual financial innovation.[5]

These areas include:

• Better access by banks, on an initial and ongoing basis, to comprehensive information on their HLI counterparties, including information on their counterparties' risk measures and management practices. This is important to accurately assess the overall risk profile and the credit quality of their HLI counterparties. The industry is fortunately playing a very active role in this area. The CRMPG II report, notably, made some recommendations which are highly relevant to hedge funds' risks, such as to seek more comprehensive data from counterparties and to periodically review the risk metrics, stress-test methodologies or behavioural characteristics of the models used by these counterparties. However, the implementation of these recommendations, although spurred by supervisory encouragements, is still a challenging issue. Indeed, they may sometime be seen by financial institutions as unrealistic, notably given the costs associated with frequent reviews of counterparty risk management practices. Moreover, they might be difficult to make acceptable to the HLI themselves, which often compete with banks proprietary desks. In practice, many counterparties, and HLI in particular, offer their banks only limited transparency regarding their overall risk profile, and even less regarding their risk metrics and stress tests. Limits to such transparency are well understood. But the cursor currently needs to move toward more transparency. Supervisors, worldwide, have begun and should continue, in a coordinated effort, to make it move towards a level, which still fully allows HLI to efficiently exploit trading opportunities, while, at the same time, enabling sound risk management within the banks which finance and trade with them.

• More incorporation of counterparty transparency and credit quality into collateral decisions and margin policies. Closely-linking collateral arrangements to an assessment of counterparties credit quality was an important area, highlighted by the Basel Committee in its sound practices paper, where practices at many banks still need to be enhanced. Collateral is to be set at a threshold that varies depending on the counterparty credit worthiness, but should be sustainable over time and cope with market gaps. Although it appears quite common for banks to use more stringent collateral requirements with derivatives trading counterparties and HLI in particular, the amount and quality of collateralization is not always particularly focused on individual counterparty credit risk profile, funding liquidity risk and leverage level. Margin policies should also, as mentioned in the CRMPG II report, take into account material differences in the transparency offered by the counterparties as well as in the various detailed provisions of the legal documentation. In case of several prime brokers, risks increase given the lower degree of transparency of the hedge fund toward each of its prime broker; hence the bar needs to be raised in term of the required risk mitigation. Finally, initial margins are important besides margin calls. Initial margin constitutes the buffer which enables to cope with price gaps, i.e. sudden large price changes, and those price gaps are much more likely to happen with hedge funds than with many other counterparties, since hedge fund often concentrate trading on complex and illiquid instruments.

• Effective improvements of exposures measurement, notably in the context of complex and illiquid products. Over the past years, banks have continued to make progress in strengthening their assessment of the potential future exposure (PFE) arising from their trading activities. In most cases, these improvements in methodologies covered exposures to the HLI sector as well as to other counterparties. Recognizing such a progress, the Basel Committee, under Basel II, has given banks the possibility, provided they meet some operational requirements,

4 *Banks' Interactions with Highly Leveraged Institutions (2000): "Implementation of the Basel Committee's Sound Practices Paper", BCBS, January.*
5 *A recent Deloitte research, "Precautions that pay off: risk management and valuation practices in the global hedge fund industry", also illustrates this point.*

to adopt, for regulatory purposes, an internal model for estimating expected positive exposure (EPE) arising from their counterparty credit risk. However, it remains challenging to integrate new complex and structured products into such methodologies and such products, e.g. share of hedge funds, which are generally less liquid, have resulted in an escalation of certain types of risk (liquidity, concentration, correlation), which may not be fully captured by current models if they are not constantly upgraded. Model risk needs in this context to be specifically taken into account.

• Enhanced stress testing capabilities. Stress testing and scenario analysis have become central to the general process of risk management. Specific to the risk management of hedge fund related exposures is the importance of the tail risk, i.e. the risk of extreme but important losses. Stress testing methodologies as well as the reporting practices vary significantly across institutions: in many instances, on site exams have shown that the operational effectiveness of such tools is still to be enhanced. From a general perspective, stress tests based on historic crisis are unlikely to be sufficient in case of hedge funds, whose techniques are rapidly evolving. Specifically, correlation of tail risks is a particularly difficult issue which requires due attention, given its importance for an assessment of systemic vulnerabilities. In addition, on site exams have shown that very few, if any, banks' stress testing capabilities incorporate the interactions between extreme market price movements and the degree of market liquidity of their HLI exposures. More generally, they do not sufficiently capture adequately the effects of a general loss of liquidity.

More progress on these areas would be helped by further enhancements to HLI general transparency to the market. Stress tests, indeed, should enable banks to capture their full exposure to a sufficiently broad range of adverse conditions. But this is often not yet done in a totally convincing manner. Stress tests should include, not only their potential direct exposure to a particular hedge fund, but also their overall exposure to market dislocations, which might be associated with the failure of a major hedge fund or with a wave of medium sized hedge fund failures (second round effects). Such second round effects are likely to increase the loss given default on the bankrupt hedge funds since collateral could be subject to large price gaps. In addition, they are likely to increase the correlation between losses on different market and credit exposures. In order to take account of these second round effects, information, not only on the specific hedge funds counterparties of a specific bank, but also broader market information, is required. Hence, the cursor needs to move towards more general market transparency of HLI. Such evolution has taken place for banks and this will continue to be the case under Pillar 3 of the Basel II framework which concentrates on the market discipline. For example, banks have made much more progress than HLI on VaR public disclosure and, notwithstanding the well known limitations of VaR figures, there is no reason why HLI could not communicate such figures to the market, or even more sophisticated ones.

Clearly, the implementation of these recommendations is still work in progress and will be for some time. On the industry side, it is essential that senior managers of financial institutions systematically monitor the progress being made relative to these standards. For supervisors, it is critical to continue to examine in depth the risk management practices of banks that are major hedge funds counterparties, both on an on-going basis to gain precise insight and through discussions in international *fora* to coordinate responses to specific risk accumulation. This has, for example, recently led to successfully tackle the accumulation of credit derivatives backlogs which involved a lot of trades with hedge funds.

3| PROMOTING EFFICIENT OVERSIGHT OF HEDGE FUNDS' RELATIONS WITH OTHER INSTITUTIONS

A second line of defence against hedge funds related risks is an efficient oversight of the trading relations they have with their counterparties, prime brokers and more generally banks, as well as the relationships they have with other institutions or their customers. Such oversight may be carried out by the official sector, notably by banking supervisors. And in some instances, like the fight against money laundering through complex legal structures, this role is essential. But, to some extent, the private sector itself can also play a role.

It is critical for banking supervisors, in addition to the general recommendation they make, to examine the actual risk management practices of the banks that are major hedge funds counterparties. This is part of normal supervisory action. The sound practices of the Basel Committee have been in general incorporated into supervisory action. On-site examinations of banks' activities with hedge funds may be part of routine supervisory reviews of counterparty risk management practices. But they may also be performed in the context of specific targeted reviews which aim at assessing in depth the practices of the major banks involved with hedge funds. Most supervisors, as in France, have indeed carried out over the past years specific on-site examinations which seek to make sure of the adequacy of an institution's internal organization in relation to the specific nature and the risks arising from its activities with hedge funds and to ensure that the accounting and financial information provided to supervisors is not only truthful but also meaningful. In particular, it is important to push for good practices in a business line to be applied in others while this is not to be taken as granted in all large and complex institutions. If not, corrective actions are requested.

In addition, it is important to note that the Basel Committee's sound practices are, under the Basel II framework, part of the guidance related to Pillar 2, namely the supervisory review process which deals with all banking risks and not only those covered by the Pillar 1 regulatory capital charge. This will incorporate some of the risks specificities or specifically concentrated in hedge fund exposures, i.e. liquidity risk, concentration risks, tail risks, model risks... It will also focus, beyond the regulatory capital, on the economic capital that banks consider necessary for running their business in a sound and profitable manner over the long term, i.e. in order to absorb shocks such as those to which they are exposed via their, otherwise lucrative, business with hedge funds. This should undoubtedly contribute to make the regulatory oversight of banks exposures to hedge funds more proactive. And, through international discussion, in particular in the Basel Committee context, it should also make it internationally more coordinated. It should be noted, positively, that the economic capital assigned by many banks to their hedge fund related exposures is often much higher that the regulatory capital, in particular when such economic capital correctly takes into account sharp stress tests. However, less positively, all banks do not show the same cautiousness, in particular in taking into account liquidity gap stress tests. Obviously, as mentioned above, such stress tests are difficult to put in place; they are complex to model and less information is available on hedge funds' behaviour and market role than for other financial or corporate entities. More international analysis on the required data and potential models useful to enhance risk management would therefore be welcome so that a common sound pressure can be made efficiently on international banks.

It seems also currently critical to check that banks' internal information systems are capable of capturing the full range of exposures to individual counterparties, in particular hedge funds, and that supervisors can receive, when need be, such information. This should encompass general information regarding all the various activities of a bank with hedge funds (derivatives, secured financing, prime brokerage...), in the form of quantitative data (exposures, including potential future credit exposures) but also more qualitative information (due diligence procedures, stress-testing...). This is not easy since a bank may have a wide range of exposures to hedge funds, in direct or indirect ways. Indirect exposures are exposures to counterparties that have also exposures to hedge funds and to financial markets affected by hedge funds. Direct exposures can arise from several types of transactions that can be divided into two main categories: transactions where banks act as counterparties to hedge funds, such as though unsecured lending, secured financing, prime brokerage and OTC derivatives, and transactions where banks act as investors in hedge funds, either in their proprietary trading and own account investment civilities or in order to offer to their customers traditional or structured products indexed to hedge funds return, often including some capital guarantee. These various exposures relate to various business areas within banks, with often different risk management and reporting systems. It is all the more crucial for senior risk officers and management to have a comprehensive view of the risks that might seem properly diversified in normal time but might be strongly correlated in time of stress.

From a micro-prudential perspective, this information will allow supervisors to check that banks have a real tool to avail of a comprehensive

view on the risks related to all their activities with hedge funds. From a financial stability perspective, it will help them to assess the degree of vulnerability of their banking system to the hedge funds' sector. The financial industry, through the CRMPG II report, has also highlighted the need for enhanced transparency in this respect, mentioning notably that "financial intermediaries should provide their primary supervisors with timely quantitative and qualitative risk-related information on a regular basis and be prepared to provide such information on an ad hoc basis when circumstances warrant".

In addition to the efforts made by the official sector, third parties, like hedge fund professional associations and rating agencies, can also play an active role in support of an indirect supervision. Professional associations can promote the implementation of codes of good conducts. In addition, rating agencies have already given ratings to various funds, mutual funds but also already to a few hedge funds. However, up to now, they had mixed result in attracting such hedge funds customers. They are now developing their methodologies in order to play a more active role and develop this business. This is welcome since rating agencies role could contribute to make code of good standards, sponsored by the industry, more widely accepted and lead them to more clearly take into account hedge funds counterparties' and investors' interests. It could also increase transparency, since rating agencies, working on a multilateral basis, would be able to compare all hedge funds they rate and could publish part of their findings, contrary to banks which have more bilateral relations with hedge funds and, obviously, do not publish the assessment of their counterparties.

One should however not assume that an increased role of rating agencies will make hedge funds risk very different from what it is today. The role of rating agencies is softer than the indirect supervision, since rating agencies have only an impact through their influence on market discipline, which is not always responding as expected. The information given to the public, markets or regulators, beyond the ratings, might also be scarce and not really oriented towards an assessment of systemic vulnerabilities. In addition, rating agencies are themselves sometimes criticized for shortcomings, e.g. for not being enough forward-looking, which is a specific problem regarding hedge funds whose strategies fluctuate a lot.

Finally, although rating agencies have made attempt to described their current or planed methodologies, it is still too early to say which exact type of rating would become the market standard vis-à-vis hedge funds. This is however likely to be a key element of the success, or not, of the rating agencies. Further analyses in international *fora* between regulators and the industry might be warranted in that respect For example should hedge funds ratings concentrate on appropriate risk management and transparency procedures, so that these two aspects can be relied upon, while leaving aside the assessment of the exact hedge funds' market and credit risks since this changes very quickly, and investors and banking counterparties need to put in place their own risk assessment as promoted by the Basel II framework? All in all, an increased role of rating agencies vis-à-vis hedge funds would probably be beneficial: it allows moving the lines into the right direction, on the controversial debate between market friendly benign neglect and active public interventions prone views. However, it can only be one avenue along with the already mentioned indirect supervision through the banking system.

A "market-led" transparency, i.e. through the increased transparency and the due diligence carried out by institutional investors and funds of hedge funds would also play in the same direction but with relatively similar limits unless it is not supported internationally by the public sector. In particular it is important to improve the quality of hedge fund shares' valuation and of the current private data base on hedge funds. Such data bases usefulness is notably to contribute to the general understanding of characteristics of the hedge fund sector which are necessary to expand stress tests. A factor analysis of a simple series of returns can indeed already give interesting insight. However such data bases currently suffer from numerous well known bias and even shortcomings due, in particular to the voluntary nature of the information given by hedge funds which are not significantly checked. Funds of hedge funds and institutional investors could increase market discipline in this regards.

Finally, one should note that rating agencies, funds of hedge funds when they are sold to retail investors, and hedge funds themselves when they get direct

financing through the issuance of bonds or want to carry out an IPO on an organised exchange, are under the jurisdiction of securities regulators, like the AMF in France, with their international coordination *fora*, such as IOSCO. The supervision by IOSCO members of some of the hedge funds external relationships with non banks, allows a convergence of banking and securities supervision which certainly fosters a more efficient management of hedge funds related risks. True, there might be some aspects of hedge funds activities which are not under the oversight of any regulators, and hence where market discipline is not helped by public support, e.g. bilateral trades between two hedge funds, but this seems to be rare, at least for the time being. The cooperation between banking and securities supervisors should continue to allow indirect supervision to be strengthened when need be and updated accordingly with the changing characteristics of the hedge fund business.

4| IMPLEMENTING ADEQUATE CAPITAL RULES

Banks are required by supervisors to hold regulatory capital, as a buffer in relation to the risks they take on. Capital adequacy requirements indeed form the third line of defence against the risks that a financial institution assumes today when dealing with hedge funds.

For regulatory purposes, banks classify their direct exposures to hedge funds either in the banking book or in the trading book. These exposures are subject to the corresponding capital treatment (through the computations of credit risk exposures in the banking book as well as credit and market risk exposures in the trading book).

Neither the 1988 Basel Capital Accord (Basel I) nor the 1996 Market Risk Amendment (MRA) were well suited to deal with exposures to hedge funds. Basel I did not provide much differentiation of capital requirements in terms of credit risk levels and resulted in the application of a maximum risk weight of 100 %. But exposures to hedge funds can be significantly more risky than those to corporate, notably in view of their leverage and the shortage of information about these counterparties. Hence, the 100 % risk weightings for hedge funds counterparties has appeared inadequate overtime. Furthermore, the MRA, although allowing the use of internal models for regulatory purpose, presented difficulties in capturing risks associated with exposures that are beyond the assumptions of Value-at-Risk (e.g. 99% confidence interval, and 10-business-day holding period). In particular, as shown by on-site exams, the assumption that positions can be closed out or hedged within ten days may prove inappropriate for many hedge funds exposures. For instance, equity stakes in hedge funds or in funds of funds, held for hedging structured products that are supplied to investors, are generally recorded by banks in the trading book even though the liquidity of these equity stakes is limited, notably given the low frequency at which the issuing funds may redeem them (usually on a monthly or quarterly basis and sometimes on a half-yearly basis). The inclusion of such illiquid hedge funds equity stakes in the trading book has therefore generally resulted in insufficient capital requirements: they only marginally contribute to the VaR on the institutions' overall trading portfolio although presenting considerable risks.

Although Basel II does not provide for a specific treatment of exposures to hedge funds, it is much better suited to deal with the risks that hedge funds may pose. First, as far as the banking book is concerned, the spectrum of risk weights in Basel II is much broader than in the 1988 Accord and will appropriately result, notably in the Internal Ratings-Based Approach, in the application of risk weights of over 100% to exposures on counterparties with a high probability of default. Second, the BCBS and IOSCO proposals of July 2005, the so-called Basel 2.5 which is included in the comprehensive version of the Basel II framework, will improve the trading book regulatory regime, including for hedge funds exposures. Indeed, these measures aim at clarifying the types of exposures that qualify for inclusion in the trading book and provide further guidance on prudent valuation methods and stress tests of these exposures. Banks will especially have to implement a clear set of policies and procedures for determining which positions could be included in, and which should be excluded from, the trading book. In this respect, the Basel Committee is of the view that open equity stakes in hedge funds should be booked in the banking book, owing to the significant constraints on the ability of banks to liquidate these positions and

value them reliably on a daily basis. It is important that such guidance be implemented in a strict and consistent manner at an international level.

These measures will result in an appropriate increase in the level of capital charges associated with trading book positions that are less liquid or present a high default risk, such as some hedge funds exposures. In particular, banks will be required to hold regulatory capital to protect against such risk in the form of an incremental default risk charge. These measures will promote the convergence of the level of capital required between the banking book and the trading book and then reduce the possibilities of regulatory arbitrage. Furthermore, the additional Pillar 2 measures under Basel 2.5 will require banks to demonstrate that they hold enough internal capital to cover adequately the risks associated with these hedge fund exposures, taking into account the output of internal valuation adjustments and stress testing.

It is key for supervisors to find the right interactions between market discipline and indirect supervision. Essential for an effective indirect supervision is a combination of several elements which are mutually reinforcing and which contribute together to enhance the resilience of the financial system to shocks: strong internal controls within financial institutions that are major hedge funds counterparties (risk management), efficient external controls of these institutions (oversight) and adequate capital buffer against the risks they take on the HLI sector (capital adequacy).

As already mentioned, this will always be work in progress and international cooperation between banking supervisors as well as with other supervisors is needed to get regulatory and supervisory practices converging in front of new challenge. It is the appropriate way forward to get effective results in the context of the, otherwise positive, but sometime too short term oriented, competitive pressures in the financial sector.

Furthermore, indirect supervision needs to be leveraged by several forms of transparency in order to yield more market discipline: financial institutions should get sufficiently broad information from hedge funds, both directly and indirectly, so as to be able to manage their risks efficiently. In practice, hedge funds still offer their banking counterparties often only limited transparency. The redefinition of the quantity and quality of the information they exchange remains a challenge. The same is true for hedge funds general transparency to the market. Full transparency is neither realistic nor welcome when it impacts negatively market efficiency. But more transparency is needed to ensure financial stability and integrity. The industry needs to move in that direction to continue to grow.

Last but not least, let me note that micro prudential and macro prudential targets could and should converge. On the one hand, stress tests enhance individual institutions' risk management. On the other hand, stress tests need to take into account second round effects, i.e. systemic risk, even if the cost of carrying out such sophisticated stress tests may sometime seem high, at least at first sight, to the banking industry. For the macro prudential approach, it is a very important step: when banking supervisors, in their traditional micro prudential approach, press for more comprehensive stress tests by each individual institution, they want to force banks to take into account the cost they will bear in the occurrence of systemic risk. It is an important and efficient way to comfort financial stability.

Hedge funds: what are the main issues?

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The health and dynamism of modern financial markets strongly depend on the existence of innovative and risk taking investors and institutions. Hedge funds play an important role in fostering market efficiency and stability.

The theoretical value added brought by hedge funds may, however, not fully materialize in practice, looking at their performances, but hedge funds investors should be able to make informed judgments.

The specific role and market impact of hedge funds may increase the potential for market manipulation and market abuse. However, hedge funds are not fundamentally different, in this regard, from other investors: strong and efficient implementation of existing rules and procedures should be adequate and sufficient to preserve market integrity.

It is an open question whether stronger "governance" requirements should be introduced for those hedge funds indirectly collecting retail investors' money, either through professional codes of conducts, market mechanisms reinforced by a "rating" process or more compulsory and binding regulations. One of the issues that could be considered is whether and how to eventually encourage hedge funds to apply the set of best practices for asset valuation proposed by the International Organization of Securities Commissions.

Hedge funds' activities may have implications for systemic risk, both through potential losses to their bank creditors and through adverse market dynamics that might in turn affect banks. Potential mitigating actions should take into account these two aspects. First, appropriate intervention by the supervisors on the prime brokers to make sure that they ask and get broad information from hedge funds and that they put in place a comprehensive risk management of all hedge funds related exposures is essential. Second, there might be scope for policy makers to encourage appropriate organization of infrastructure in order to improve the information available on the markets in which hedge funds operate. Finally, authorities may explore how to devise processes giving them, on a case by case basis, access to relevant information about hedge fund exposures and positions.

Hedge funds play an increasingly active role in many financial markets. They have recently, attracted a lot of attention. This article seeks to highlight some of the main issues which seem worth considering in the light of the current international debate on hedge funds.

1| THE ROLE OF HEDGE FUNDS IN FINANCIAL MARKETS

1|1 Hedge funds and market efficiency, liquidity and stability

Any discussion should start with a clear recognition of the benefits brought by hedge funds to financial market efficiency, as well as an acknowledgement of the fact that most / some of those benefits would not exist if hedge funds were directly and specifically regulated.

Market efficiency requires that prices reflect at any time all the information available to investors. That, in turn, means that all profitable arbitrage opportunities can be permanently exploited, including between assets with different risk characteristics.

Market efficiency depends on "technical" conditions i.e. the ability for supply and demand for financial instruments to meet through an appropriate infrastructure. Technical efficiency is a necessary but not sufficient condition. Economic efficiency also requires that some market participants are willing to incur (sometimes) significant costs to gather information and, then, take the risk to act on this information with the hope of making a profit. Those actions move markets and, as such, ensure that prices do reflect available information. This process of "price discovery" rests upon the ability of some investors to hold proprietary information and be able to take advantage of it. This means that there are pockets of inefficiency in the markets which can be exploited by informed investors. In other words, –this is a well known paradox[1]– , a market is efficient only if some investors believe it is inefficient.

This is the basic rationale against forcing hedge funds to be *publicly* transparent about their positions and strategies.

Hedge funds have an edge in fostering financial innovation, as shown by their significant involvement in complex and innovative markets (e.g. structured credit). A significant part of their research goes into devising new strategies and products aimed at packaging, distributing and holding risk.

Hedge funds bring to the market investors with a presumably higher –in any case different– propension to take risks. As such they increase the risk taking capacity available in the financial system and contribute to a better allocation of these risks.

Heterogeneity of investors is good for market stability. If all players had homogeneous risk profiles and preferences, markets would barely trade. To the extent that hedge funds exhibit "different" risk profiles and risk aversion, –and they have specific analytical and informational capabilities– they may act as "contrarians" when prices move away from equilibrium and help and stabilize financial markets by providing, in those circumstances, additional liquidity.

1|2 Mixed evidence on the theoretical benefits of hedge funds

The many theoretical benefits of hedge funds, as described above, may fail to materialize in practice. A whole body of research has been devoted to look at hedge funds performance. The results are not all conclusive, in part due to data availability and reliability. Reporting to third-party databases computing aggregate hedge fund returns is voluntary, and their results may be affected by survival bias. There may be doubt, nevertheless, as to whether some investment strategies implemented by hedge funds deliver true diversification as well as a better risk / return over the long run.

According to some estimates, a stronger correlation between hedge funds returns in recent years points to great similarities in investment strategies. Correlations between those returns and equity market performances (and even perhaps fixed income market yields and currency carry trade returns) create doubts about the "absolute return" characteristic of hedge funds as well as their contribution to effective portfolio diversification.

1 *Grossman (S.) and Stiglitz (J.) (1980): "On the impossibility of informationally efficient markets", American Economic Review 70 (3), June*

It is thus not clear, in some cases, that superior returns are obtained through truly innovative portfolio selection (delivering *alpha*, or "out performance") rather than simply by taking in more systematic risk (exploiting *beta*). In the latter case, the issue of whether fees taken by hedge funds managers (typically 2% of assets managed plus 20% of profits) are always met with commensurate returns arises. Such a fee structure may also create a bias towards "fat tail" investment strategies (such as selling put options) delivering high returns most of the time with a small probability of huge losses.

These problems, however serious they may be, do not, by themselves, make a case for any kind of regulation. Investors in hedge funds are –or should be– able to make informed judgments. To the extent that hedge fund managers are extracting abnormal remunerations, these should be progressively challenged and eliminated through increased competition. Indeed, several investment banks are now starting to sell synthetic instruments replicating hedge fund strategies and, hopefully, producing similar returns at significantly lower costs for investors.

2| HEDGE-FUND-RELATED RISKS FOR THE FINANCIAL SYSTEM

2|1 Investor protection

High net worth individuals are still predominant among hedge funds' investors, but hedge funds now tap into a larger share of household savings that is channeled through institutional investors (mainly funds of funds and pension funds). The latter now amounts to around 30% of the investor base. Traditionally, direct investment in hedge funds used to be accessible only to wealthy investors, due to high entry tickets (e.g. 100,000 dollars or more). Some jurisdictions (e.g. France) actually impose high quantitative barriers for direct hedge fund investment (from 125,000 to 250,000 euros). However, the development of the fund of hedge funds industry has blurred this type of barrier, and has lowered significantly the entry ticket for an indirect exposure to hedge funds. As part of a similar trend, pension funds have increased their allocation to alternative investments (including hedge funds).

By itself, "retailisation", namely increased participation of retail investors in hedge funds, does not make a case for specific regulation of hedge funds, providing, however, that appropriate investor protection measures are taken independently. For fund of funds, particular care should be given to the conditions of their authorization, and their rules for governance, asset allocation, and due diligence. For pension funds, the responsibility and control of trustees could be reinforced.

However, even after accounting for such investor protection measures, another concern is about the valuation processes in hedge funds, especially for complex or illiquid financial instruments. Hedge funds frequently invest in assets that are complex or illiquid by nature or in more liquid assets but in such amounts that their positions sometimes become difficult to value. Besides, since managers' remuneration is based on the mark-to-market, or more often mark-to-model, profits at the end of the year, overoptimistic valuation of positions may prove very tempting. In other terms, given the incentive structure of hedge fund managers, their interests are not necessarily perfectly and permanently aligned with those of their investors. It is thus not clear how to reconcile the two objectives of, on the one hand, giving hedge funds' managers sufficient leeway to value their most complex assets, and on the other hand, ensuring the integrity of valuation, especially when retail money is (indirectly) involved.

2|2 Market integrity

Regarding market integrity, which relates to market abuse and insider trading, actual risks exist. They are not per se specific to –but can develop more easily within– hedge funds. Insider information may not be adequately managed in hedge funds, partly because they are not subject to "Chinese walls" or similar rules. Conflicts of interest may arise if a hedge fund is engaged across markets, and is tempted to use in one market an information obtained from his involvement in another (e.g. hedge funds engaged in private equity may use information to trade on credit markets). In addition, hedge funds have become dominant in some markets (e.g. structured credit) and might be able to manipulate prices.

However, hedge funds are not fundamentally different, in this regard, from other investors: strong and efficient implementation of existing rules and procedures should be adequate and sufficient to preserve market integrity. Implementation issues may complicate the issue, though, especially since hedge funds are active in relatively opaque market segments and on complicated cross-market operations which cannot be easily screened by market supervisors.

2|3 Systemic risk

Systemic risk occurs whenever failure of one individual institution can trigger very adverse consequences for a significant number of other institutions. There are many possible transmission channels:

• through an increase in counterparty risk as failure of one entity can endanger the viability of its counterparties, thus starting a chain effect;

• through a reduction in market liquidity because, to prevent default, a financial institution may start selling assets and liquidating positions, an action susceptible of creating brutal price adjustments; if other institutions are marked to market, they will themselves engage in further liquidations, thus aggravating the impact of the initial shock;

• through "pure" contagion triggered, for instance, by a general reassessment of risk inside an asset class of through a wide range of asset classes.

From that point of view, it is clear that hedge funds potentially might present significant and specific risks. To start with, they are major –often dominant– actors in several important market segments. They account for around 40% of the turnover of major stock exchanges. They are prominent participants in credit markets (27% of investors in high yield bonds according to The Bond Market Association, a quarter of credit derivatives turnover according to Fitch). More than other investors, hedge funds pursue global, cross-market strategies, and may increase the linkages (positive and negative) of markets across countries and asset classes.

In some cases, hedge fund activity may result in one-way markets and higher volatility in less liquid market segments, particularly during periods of stress. Since hedge funds heavily support liquidity in some markets, liquidity may dry up very rapidly, should they decide to withdraw and close their positions simultaneously.[2] Furthermore, they can leverage themselves with very high multiples either directly (through borrowing from prime brokers) or indirectly (through intensive selling of credit derivatives). They may thus be especially vulnerable to a sudden decrease in market liquidity. Last but not least, hedge funds keep close and permanent business relations with large banks, which are central actors in the financial system.

Apart from the "lender of last resort" intervention (which will not be discussed here), the best protection against systemic risk rests on two preventive "pillars": a strong capital base for major market participants and efficient risk management.

Hedge funds have no capital base of their own but can rely on their investors' capital. Lock up periods (typically one to two years) help stabilizing the financial system in times of stress since capital is "constrained" to remain available and absorb shocks. A further buffer is provided by margin and collateral requirements imposed on hedge funds by prime brokers, which should insulate lending banks from any difficulties suffered by their hedge funds clients. Finally, banks have a strong incentive in fostering comprehensive and accurate risk management systems at their client hedge funds.

Those two pillars form a very solid base for an efficient market discipline on hedge funds' risk taking and activity. They have worked well in recent episodes. The most recent examples of hedge fund-related turbulences (the May 2005 crisis on credit markets and the Amaranth demise in September 2006) are a case in point.

However, those episodes have taken place in very benign economic conditions, and the impact of hedge funds difficulties on financial stability could be different in a less favourable environment.

2 *A case in point is May 2005 where a number of hedge funds tried to unwind similar positions on Credit default swap (CDS) index tranches, causing temporary but still widespread dislocation, before other hedge funds entered the market to exploit the mispricings created by this situation.*

In addition, several actual or potential fragilities can be detected in the way market discipline presently works. Some of the mechanisms devised to protect individual institutions could increase, rather than reduce, some aspects of systemic risk in time of stress. Margin calls, while guaranteeing lenders against any possible loss, can force widespread liquidation of assets and positions by hedge funds in falling markets, especially in a context of fair value accounting thus increasing the risk of contagion through withdrawal of liquidity and market instability.

Another concern is that the capital buffer of hedge funds could be rapidly exhausted in stress situations if their leverage ratio is high, as shown by the failure of the Long-term capital Management (LTCM) fund in 1998. It does not seem to be the case at the moment, as anecdotal evidence suggests that leverage remains limited compared to the pre-LTCM period. But it is increasing. Besides, *effective* leverage has become notoriously difficult to measure, due to the difficulty in capturing the effect of different layers of leverage, and in particular the leverage embedded in the most complex forms of credit derivatives.[3]

A last important concern is that the relationship between hedge funds and their prime brokers is complex and fragile. Prime brokers' incentives are not always perfectly aligned with the requirements of proper market discipline, as these entities depend on hedge funds for a very significant part of their revenue. If no pressure were exerted by banking supervisors, competition between prime brokers to get hedge funds' clientele could lead to a relatively weak enforcement of risk monitoring and market discipline. Furthermore, many hedge funds deal with several prime brokers, none of which getting automatically a comprehensive view of their activities, risk profile, and exposures. Finally, hedge funds and prime brokers might be competitors on many activities, and find themselves on opposite sides of the market. This creates inherent conflicts of interest and puts some limitations on the quantity and quality of information that can productively be exchanged between them.

3| SOME TENTATIVE CONCLUSIONS

From the preceding analysis, it emerges that two important questions might be highlighted to frame the debate on hedge funds.

3|1 The consequences of increased involvement of retail investors in hedge funds

On the one hand, existing rules and procedures for investor protection should provide the basis for effective regulation in this field. On the other hand, it is not clear how those rules can always be made compatible with the non transparent environment in which hedge funds necessarily operate. It is an open question whether stronger "governance" requirements should be introduced for those hedge funds indirectly collecting retail investors' money, either through professional codes of conducts, market mechanisms reinforced by a "rating" process or more compulsory and binding regulations. In this light, the work of International Organization of Securities Commissions (IOSCO) to develop a set of best practices for the valuation of hedge fund assets seems very promising.[4] In order to encourage hedge funds to apply them, banking supervisors could take them into account in their requirements vis-à-vis prime brokers.

3|2 The implications of hedge funds' activities for systemic risk

Potential risks arise both directly through the potential losses that prime brokers could incur as a result of their exposures to hedge funds, but also indirectly through adverse market dynamics triggered by hedge funds (for instance market liquidity disturbances due to disorderly portfolio liquidation). Such dynamics

3 *As a striking illustration, let's imagine that 100 of cash are invested in a fund of hedge funds. This is total capital. Then, this hedge fund borrows 200 and invests the capital and the borrowed money (i.e. 300) in another hedge fund. This other hedge fund borrows again 300 and invests the total (i.e. 600) in a subordinated Collateralized debt obligations (CDOs) tranche, which is typically leveraged 10 times. Overall, the total exposure of the fund of hedge fund is 6,000 but the share of capital is still 100, i.e. a leverage of 60 times! With such a pyramid of leverage, a fall of 2% in the value of assets is enough to wipe out the entire capital.*

4 *Within a group bringing together regulators and representatives of the alternative management industry, IOSCO has suggested standard procedures in the area of hedge funds valuation and assigned responsibilities in the valuation process among all concerned parties: the prime broker, the depositary, the auditor and, naturally, the manager. It has published a series of guiding principles which professionals will be encouraged to apply to themselves.*

might seriously affect banks, even if they had managed their counterparty risks carefully. Therefore, the challenge is not only to foster market discipline in the hedge fund –prime broker relationship, although this is key and remains a precondition, but also to prevent, or at least mitigate, the effects of potential adverse market dynamics.

Financial markets have undergone significant structural changes since the 2000 Report on Highly Leveraged Institutions. These changes basically come to the simple observation that market dynamics are increasingly dissociated from banking intermediation. The distribution and allocation of risk –hence liquidity– takes place more and more outside banks' balance sheets, although banks keep a central role in the financial system through the "originate and distribute" model.

A first change is the growth of securitization and credit derivatives, which have facilitated the dispersion of credit risk across firms and across sectors of the financial system. However, it has also made markets more opaque, complicating the identification of the ultimate bearers of risk and the interlinkages between various market segments.

In connection with the growth of derivatives, the means used to create leverage in the financial system have expanded and diversified beyond the banking sector. In particular, the importance of "embedded" instrument leverage (e.g. the case of CDOs) has increased, allowing for the accumulation of different layers of leverage and hence new forms of risk concentration.

Finally, new valuation challenges for complex financial instruments have emerged. The models used to measure exposure and price risk in the newest and often illiquid instruments are, by definition, less grounded in experience.

Those structural changes have taken place so far in a very benign financial environment characterized by ample liquidity, broad based rise in asset prices and subdued volatility. Admittedly, risk management techniques have also improved markedly, in a continuous effort to adapt to this new environment. However, the current financial system remains essentially an untested world in stress situations.

In such a new –and fast evolving– financial landscape, it is not easy to figure out how a hedge fund related crisis would look like. It often takes a combination of causes to account for the potential reasons for a crisis. Therefore, we need to maintain a degree of humility and caution about our capacity to anticipate the nature and dynamics of future stresses to the financial system, in particular as regards the concentration of risk and the existence of crowded trades. However, the practical question of who needs to know what and when, in order to minimize systemic risk and cope efficiently with it when it materializes, cannot be so easily discarded.

To this end, two avenues can be explored:

• ***Improving the information available on the markets in which hedge funds operate.*** One of the intrinsic strengths of markets with organized infrastructure when compared with markets which are totally over-the-counter (OTC) is their capacity to record transactions in a centralized manner and in a "seamless" way, thanks to advanced technology. Therefore, it is easier to know what the main participants are doing without having to put in place a heavy reporting scheme, which would otherwise be needed in an OTC market to get such information. The example of the credit derivative market is very relevant, as the implementation of a "data warehouse"[5] will probably yield precious information for financial stability, even though that was not the initial purpose. There might be scope for policymakers to encourage such "organization" of infrastructure in certain market segments or platforms that are deemed relevant for financial stability, like the Federal Reserve Bank of New York did for OTC derivatives, and to encourage hedge funds to use such "organized" markets. This would also be beneficial for the prevention of market abuse and insider trading.

• ***Devising processes to obtain relevant information for crisis management.*** In order to use wisely and efficiently their crisis management tools without creating moral hazard, authorities may need to get access to critical information at a certain time. One avenue to explore would be, for authorities, to devise processes giving them, on a case by case basis, access to relevant information about hedge funds. There might be value in making sure ex ante that specific information about hedge funds can be gathered easily and quickly if needed.

5 *Work has been undertaken under the aegis of the G10 Committee for Payment and Settlement System (CPSS) concerning the infrastructure of OTC derivatives markets and how it can be strengthened.*

Finally, such avenues would not be as effective if they were not preceded by a stronger grip by supervisors on the relationship between hedge funds and prime brokers. In particular, supervisors should and do insist that prime brokers ask and get sufficient information from hedge funds in order not only to assess their own risk, but get a broader view of all implications deriving, through financial markets, of their clients' activities (including through the use of stress tests). This "indirect supervision" approach is the least intrusive and also the most effective in the short term, in particular at the international level. Implementation of the pillar II of the Basel II agreement will give banking supervisors additional tools in that respect.

Monitoring hedge funds: a financial stability perspective

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Investor inflows into hedge funds have been significant in recent years and they have continued unabated. As a result, the presence and role of these investment funds in global capital markets have become increasingly important, and to a much greater extent than the amount of capital they manage would suggest. This is because hedge funds can, and often do, leverage their investment positions. Indeed, their leveraged assets are sometimes comparable with the assets of large banks. The growing and active participation of hedge funds in a large number of financial markets implies that the functioning of these markets could be seriously affected if the hedge fund sector came under stress.

The positive contribution of hedge funds to the efficiency and liquidity of global financial markets is widely recognised, but there are also concerns that in times of stress their activities may create risks to financial stability. The lack of transparency and limited publicly available information about their balance sheets and activities poses significant challenges for financial stability analysis. While it is possible to base such an analysis on a multitude of information sources on hedge fund activities – including dedicated financial media, commercial hedge fund databases, quarterly industry reports, hedge fund return indices, academic studies, some supervisory data and market surveillance – these sources are not sufficient for an adequate monitoring and robust evaluation of hedge fund activities from a financial stability perspective.

Three groups of indicators could be important for financial stability analysis, namely those which shed light on banks' exposures to hedge funds, provide yardsticks of the crowding of hedge fund trades, and facilitate the gauging of endogenous hedge fund vulnerabilities. The latter group would include the measures of funding liquidity risk, leverage and exposures to market risk factors. The construction of all these indicators would be greatly facilitated if basic information on hedge fund balance sheets were available. Since this is not the case, various indirect estimation methods have to be relied upon.

A "desirable vs. available" analysis reveals the most important information gaps, but it does not aim at providing recommendations on how to enhance hedge fund transparency in practice. Instead, it proposes three elements which a transparency framework would ideally include: first, more aggregate information to all market participants; second, a highly standardised reporting template that would make disclosures more effective; finally, adequate information for a joint analysis of the aggregate activities of banks, hedge funds and other highly leveraged institutions in order to have a comprehensive picture of risks to the smooth functioning of financial markets.

NB: The author would like to thank Tomas Garbaravičius of the ECB's Directorate Financial Stability and Supervision for his valuable assistance in preparing this contribution.

In the public mind, hedge funds are often linked with three things: extraordinary investment returns (associated with sophisticated and potentially highly leveraged investment strategies exploiting market inefficiencies), non-transparent offshore investment activities, and spectacular occasional incidents such as the near-collapse of LTCM in September 1998. In other words, they are often described as investment funds which take on high risk but offer the potential for commensurately high returns, and achieve this in highly opaque ways. There is little doubt that they have grown in importance in recent years, not least because as a group they have become one of the largest alternative investment vehicles and an increasingly dominant force in many financial markets..

There is a broad consensus that hedge funds, as highly active and flexible financial market participants, contribute significantly to the efficiency and liquidity of the various financial markets in which they trade. At the same time, there are also concerns that their activities may, under certain circumstances, create risks to the stability of financial systems. These concerns are further compounded by the fact that there is little transparency about the activities of hedge funds. This makes the monitoring and assessment of their activities a difficult task and leaves public authorities and market participants in an uncomfortable position. Against this background, this article aims at shedding more light on how potential risks to financial stability posed by hedge funds could be monitored given the public information which is currently available, and it also attempts to identify the main information gaps hindering such efforts.

The article is structured as follows. Section 1| describes the main characteristics of hedge funds and compares the total amount of capital under management within the industry with the size of other groups of financial intermediaries. Section 2| considers the positive and possible negative effects of hedge fund activities on the financial system, while Section 3| reviews the main information sources that are publicly available and can be used to monitor the emergence and evolution of potential risks to financial system stability, and explains the most important features, advantages and limitations of these sources. Section 4| proposes three main groups of indicators which could be useful for financial stability monitoring and discusses practical challenges that can arise in constructing these indicators, including the availability of relevant information and possible indirect estimation methods. Section 5| summarises the outcome of a "desirable vs. available" analysis by highlighting the main information gaps, which complicate the effective conduct of a more robust surveillance and evaluation of hedge fund activities from a financial stability perspective, and it also considers several possible ways to address them.

1| THE SIZE OF THE HEDGE FUND INDUSTRY

A starting point for gauging the size of any industry is usually a fairly precise definition of the activities of the firms comprising that industry. In the case of hedge funds this is not a straightforward task. There is no generally accepted and reasonably accurate definition of what a hedge fund is. Broadly speaking, hedge funds represent a relatively unconstrained form of active investment management and a versatile business model.[1] Indeed, hedge funds have flexible investment mandates, usually with relatively few, if any, constraints on leverage, short-selling and traded assets, and they enjoy or are structured to benefit from tax advantages and minimum regulatory intervention. The uncertainty about the precise defining features of a hedge fund is further magnified by the self-declaration principle: essentially any fund would be considered a hedge fund if its managers were to market it as such, although it would be very unusual if the fund managers were not to charge performance fees in addition to management fees. Moreover, some hedge fund managers have additional capital under management in private managed accounts[2] that are run in parallel with their hedge funds, and there are plenty of other investors, including the proprietary desks of large banks, which pursue strategies substantially similar to hedge funds. Thus, the pool of hedge fund-like capital available that can be leveraged and quickly deployed is far larger than the amounts managed in legal hedge fund structures would indicate.

1 *Alfred Winslow Jones, a sociologist and journalist, is often credited with being a founder of one of the first hedge funds in 1949. Jones's fund used leverage and short-selling to hedge its stock portfolio against broader market movements.*
2 *According to Tremont Capital Management, hedge fund managers ran about USD 325 billion in private managed accounts at the end of June 2005.*

Notwithstanding these conceptual challenges, statisticians around the world have been discussing how to define hedge funds for statistical reporting purposes and are expected to come up with some workable definitions. Currently, there are at least two such initiatives: one by the ECB and the other by the IMF. However, it cannot be excluded that the rapid convergence of hedge funds and traditional investment funds, which are increasingly adopting flexible hedge fund-like strategies, may render such definitions obsolete sooner than expected.

A consequence of these difficulties, together with the relative opaqueness of the hedge fund sector, is that estimates of the size of the industry vary considerably. Most estimates are based on information collected by commercial hedge fund databases, although these are often supplemented by data on funds tracked internally by database managers. By early 2007, several data providers indicated that, on the basis of joint internal and commercially distributed hedge fund data samples, the total capital under management by single-manager hedge funds globally was rapidly approaching the USD 1.5 trillion mark.[3] Moreover, in addition to numbers derived from these sources, some other reported figures include estimates of additional amounts for which reliable information is difficult to come by. Other approaches which are used to gauge the size of the sector combine information from several commercial databases[4] or information derived from surveys of hedge fund administrators.[5] Given the range of estimates, it is always useful to cross-check them and bear in mind the different methods used to construct them.

A comparison of capital under management of single-manager hedge funds with equivalent measures for other institutional investors would suggest that the global hedge fund industry still appears rather small (see Table 1). However, the lack of information on hedge fund leveraged assets makes it impossible to compare the overall asset size of hedge funds with that of other highly leveraged institutions, such as banks. The total leveraged assets of an individual hedge fund can sometimes be quite significant and comparable with the size of some systemically important banks,

Table 1
Size of selected institutional investors and financial asset markets globally
December 2005

	USD billions	% of world GDP	Indicator	Source
Hedge funds[a)]	1,350	3	Capital under management	Strategic Financial Solutions
Open-end investment funds	17,771	40	Net assets	European Funds and Asset Management Association
Pension funds	18,569	42	Investments	International Financial Services, London
Banks (OECD)[b)]	2,906	7	Shareholders' equity	Bureau Van Dijk (Bankscope)
Total of the above	**40,596**	**91**		
Insurance companies[c)]	14,500	33	Invested assets	International Financial Services, London
Banks (OECD)[b)]	53,552	120	Assets	Bureau Van Dijk (Bankscope)
Stock market capitalisation	37,168	84		International Monetary Fund
Debt securities	58,949	133		International Monetary Fund
Bank deposits	38,000	85		McKinsey Global Institute
World GDP	**44,446**	**100**	Nominal GDP	International Monetary Fund

Notes: The terms capital under management, net assets and assets under management are usually used interchangeably and they are equivalent to shareholders' equity, whereas the term (gross) assets or investments include investments that may have been financed by debt. Open-end investment funds and pension funds have restrictions on the use of leverage and, therefore, their assets/investments should be close to net assets.
a) Single-manager.
b) OECD commercial banks and holding companies, consolidated. The IMF estimated that the assets of all banks worldwide were equal to USD 55,673 billion in 2005.
c) 2004 data, life and non-life.

3 *According to Lipper TASS and Hedge Fund Research estimates, at the end of 2006 the total capital under management globally by hedge funds was respectively USD 1.05 trillion and USD 1.43 trillion.*
4 *See Strategic Financial Solutions (2006). This study, which is conducted annually, is based on data from 12 commercial hedge fund databases. At the end of 2005, it dentified 6,900 single-manager hedge funds (excluding commodity trading advisers and managed futures funds) and roughly 3,600 funds of hedge funds worldwide, managing in total nearly USD 1.35 trillion and around USD 0.7 trillion respectively.*
5 *See Hedge Fund Manager Week (2006). According to the hedge fund administrators surveyed, the total value of single-manager hedge fund assets under administration was almost USD 2.1 trillion at the end of October 2006, up from USD 1.37 trillion at the end of October 2005. However, it has not been precisely defined whether the assets held by administrators are equal to the hedge funds' net asset value, or whether they also include debt-funded assets.*

as was exemplified by the size of LTCM positions at the time of its near-failure.[6] The total single-manager hedge fund capital under management, however, is close to half of bank shareholders' equity worldwide, although it is dwarfed by the capital entrusted to traditional investment funds.

What is more important, however, is that such comparisons, even if they were possible on a leveraged basis, do not capture the true influence of hedge funds on trading volumes and market liquidity. This is because hedge funds tend to change their portfolio composition much more frequently than other market participants. According to some market surveys, hedge funds increasingly account for significant shares of trading volumes in various cash and derivatives markets and their presence is crucial for the burgeoning market for credit derivatives, where they account for more than 55% of the total credit derivatives trading volume.[7]

2| IMPACT ON FINANCIAL STABILITY

The magnitude of systemic risk, both in absolute and relative terms, posed by hedge fund activities is difficult to assess owing to the lack of sufficient publicly available information about their balance sheets and trading activities. Moreover, any systemic risk assessment is further complicated by the diversity of hedge funds and the multitude of factors that may affect individual and collective hedge fund behaviour under different market conditions. It is very likely that under normal market conditions the balance between positive and possible negative effects on financial system stability would prove to be positive. Nonetheless, it cannot be excluded that active risk-taking by hedge fund managers may have prolonged recent benign market conditions and contributed to the build-up of so far invisible vulnerabilities within the financial system, which could unravel in unexpected ways in the event of an adverse market shock.

Positive effects of active hedge fund investment strategies are widely acknowledged. They include improved market liquidity,[8] enhanced price discovery processes and an increased flow of financial innovations, which may all contribute to the stability of financial markets. In addition, hedge funds presumably provide more diversification opportunities for investors and thereby foster more complete markets. There is some evidence, however, of a high correlation between the returns of at least some hedge fund strategies and the substantial negative price movements in major equity and bond markets, which reduces potential diversification benefits.[9]

In their quest for higher returns, hedge funds also tend to assume risks which more regulated financial institutions are usually reluctant to be exposed to and, more importantly, they may be willing to provide risk capital in volatile market conditions or when there is a risk of looming stressed conditions, as evidenced by the acquisition of substantial parts of the Amaranth Advisors investment portfolio in September 2006. However, this very valuable stabilising influence is conditional upon the availability of sufficient liquidity buffers when needed and the absence of highly-leveraged crowded or concentrated one-way bets across the hedge fund sector.

The possible simultaneous exit of hedge funds from concentrated investment positions is probably the main way through which hedge funds could adversely impact on the liquidity and price volatility of affected financial markets, particularly of small and illiquid ones. Nevertheless, the risk of crowded trades is a more general risk to smooth market functioning, which can also be associated with the activities of other market participants, and, therefore, it is not confined to hedge funds.

Other possible negative effects on financial stability could materialise through banks' exposures to hedge funds. Banks' direct exposures comprise credit (financing and trading) and investment exposures, and it is very important that banks, as key counterparties, prudently manage them. Several reports have noted significant improvements in the way banks manage their exposures to hedge fund clients, but, nevertheless, important challenges

6 *As another example, at the end of August 2006 the total gross assets of Citadel, a large multi-strategy hedge fund that was the first to issue a hedge fund bond in December 2006, were reported to be USD 166 billion, or more than 12 times larger than its net assets of USD 13 billion.*
7 *See, for example, Greenwich Associates (2006).*
8 *Researchers from the US Commodity Futures Trading Commission (CFTC) using micro trading data found that managed futures hedge funds can dampen rather than increase volatility in energy markets by providing market liquidity to other market participants. See Haigh, Hranaiova and Overdahl (2005).*
9 *See Brown and Spitzer (2006).*

remain.[10] Furthermore, the progress made in the management of such exposures may be uneven across prime broker banks. The same applies to hedge fund managers, as one recent survey of hedge funds' risk management practices highlighted quite a few important shortcomings.[11]

There are also some indications that intense competition among banks for the lucrative hedge fund servicing business could have led to some dilution of the credit standards applied, particularly with respect to margin terms, thereby diminishing the effectiveness of the counterparty discipline exercised by banks. Moreover, investor demand for some of the better hedge funds remains strong and, therefore, investors may not always be in a position to demand and obtain adequate disclosures.

3| INFORMATION SOURCES: FEATURES, ADVANTAGES AND SHORTCOMINGS

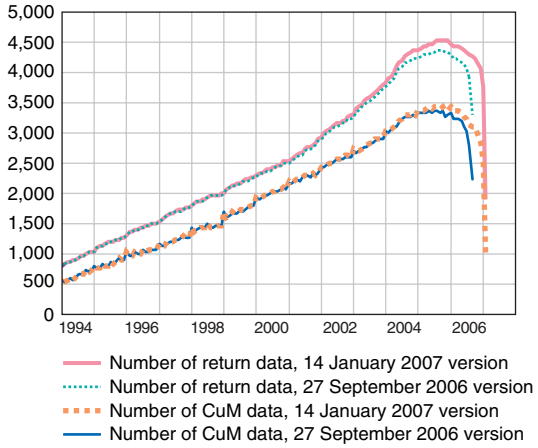
The ECB, as well as other central banks, is unable to monitor the activities of hedge funds through its own regular statistical data collection activities, not least because hedge funds are predominantly domiciled offshore. More generally, the statistical information collected by public institutions is increasingly inadequate and a greater reliance on commercial information sources is becoming more common and even inevitable. However, commercially available information is based on voluntary reporting by contributors and this can lead to deficient and non-uniform coverage, and can impair the timeliness and quality of such information. Nevertheless, there is a range of available information sources on hedge fund activities, including dedicated financial media, commercial hedge fund databases, quarterly industry reports, hedge fund return indices, academic papers, some supervisory data and market surveillance.

The rapid expansion of the hedge fund sector has spurred the development of a wide spectrum of *dedicated financial media,* which includes magazines, websites and newsletters covering the latest news as well as more analytical reports about the industry. These sources of information are complemented by conferences and other specialised events, the main purpose of which, besides discussing broader and specific hedge fund-related issues, is to provide networking opportunities that bring hedge fund managers and investors together. There are also plenty of market surveys of investors, hedge fund managers, and prime brokers focusing on their preferences, expectations,[12] risk management practices[13] and other topical issues. All of these pieces of public information provide glimpses of the bigger mosaic and are useful for improving our understanding of the hedge fund sector and of the conjunctural developments associated with it, but they do not provide a sufficient information basis for financial stability analysis.

The *commercially available hedge fund databases* are one of the most important sources of quantitative and qualitative information about hedge funds. Currently there are at least 12 databases with partially overlapping samples. Hedge fund managers report information to databases mainly for marketing purposes and this voluntary reporting leads to various data biases, of which the most obvious are survivorship, incubation (backfill or instant history), self-selection and liquidation biases.[14] In these databases, only monthly returns on investors' capital and capital under management are reported as time series.[15] All other information is static either by its nature (e.g. on redemption frequency, inception date) or due to infrequent updating without tracking of changes made (e.g. on average and maximum leverage). Both the time series data on capital under management and hedge fund returns are available with time lags, and the first time series are also less complete than return data. This is illustrated in Chart 1, where the lines indicating the number of funds reporting data for capital under management

10 *See, for example, ECB (2005).*
11 *See Deloitte (2007).*
12 *See, for example, Deutsche Bank (2007).*
13 *See, for example, Mercer Oliver Wyman (2006) or Deloitte (2007).*
14 *Survivorship bias arises if defunct funds are excluded from an analysis. Incubation bias refers to the fact that only funds that experience good historical returns and survive the incubation period are likely to join databases and to backfill the whole or part of their instant history of returns. Self-selection bias arises due to the voluntary nature of hedge fund reporting, which makes the sample of hedge funds in a database unrepresentative of the universe of hedge funds. Liquidation bias occurs because disappearing funds may not report the final periods leading up to and including their liquidation.*
15 *Time series of investor net flows can be derived from the time series of hedge fund returns and capital under management.*

Chart 1
Number of funds with return and capital under management data at various points in time in two different versions of the database
December 1993 – January 2007



Source: Lipper TASS database (27 September 2006 and 14 January 2007 versions).
Note: CuM stands for capital under management. Single-manager hedge funds and funds of hedge funds. Only funds which reported monthly net of all fees returns.

at any given point in time in two different versions of the database are always below the lines showing the number of funds reporting return data. The lines taper off at the end of the sample because of lagged reporting, the impact of which however disappears after several months. Chart 1 also indicates that the aggregate historical information obtained from a database will vary depending on the version used, since historical and contemporaneous fund-specific information is added, deleted or modified in the database continuously.

Combining information from all available hedge fund databases is possible in principle, but quite complicated in practice. Moreover, even if such work were to be initiated, it would not be possible to distribute results to a wider audience of outside users on a frequent basis due to non-competition clauses in database user licence agreements.

There might be several ways to overcome the fact that most information in commercial databases is static and thus to obtain some insight into the evolution of a chosen indicator over time. First, one could aggregate hedge fund information by the year when a fund joined the database or by the fund's inception year and then compare whether older or younger funds tend to have different properties, in order to interpret differences as a weak sign of possible changes of an indicator over time, particularly if hedge funds tend to provide their static information only at the time of joining the database. Second, if static information is modified infrequently or should be invariable by its nature, then its evolution over time could be estimated by aggregating information on funds which reported their return or capital under management data at various points in time. However, if hedge funds tend to update relevant information relatively frequently, time series of particular static indicators could be created by analysing differences in various versions of a database, and this could be the third way of tackling the static nature of most data in hedge fund databases.

As mentioned above, many database managers track internally more funds than those that are included in the commercial versions of their databases. This broader set of joint commercially available and internal information is often presented in their *quarterly industry reports*,[16] which contain aggregate quarterly data on capital under management and investor net flows by strategy. Given the larger underlying samples used to produce these reports, data in such reports are preferred to a simple aggregation of the information available in any one database and are generally used by market participants as a primary source of basic information on broad developments in the hedge fund sector.

The same broader datasets are used to create various monthly non-investable *hedge fund indices*, intended to track the overall sector performance and the average returns of specific hedge fund investment strategies. However, various index providers use different samples, investment strategy categories, eligibility rules and weighting schemes. As a result, even for the same (or very similar) investment strategy there are significant coverage and performance differences, which complicate the choice of an index for analysis purposes.[17] Some non-investable indices have investable versions, some of which report hedge fund returns more frequently than monthly, but these investable indices tend to underperform non-investable ones due to stricter eligibility rules and looser investor redemption terms, which prevent funds included in the investable index from investing in less liquid assets.

16 *See, for example, Lipper TASS (2007) or Hedge Fund Research (2007).*
17 *Owing to this, the EDHEC Risk and Asset Management Research Centre has suggested using the first principal component of various competing indices for the same investment strategy. See EDHEC Risk and Asset Management Research Centre (2004).*

During this decade, the number of *academic papers* on hedge funds has been increasing exponentially and they could provide useful indicators for monitoring and analysing hedge fund activities from a financial stability perspective. However, the bulk of academic research has tended to focus on an analysis of hedge fund returns,[18] capital under management and investor net flows, since only these data are available as time series in hedge fund databases. There have been relatively few publications concentrating on financial stability issues, but their number is growing. The authors of such papers analyse hedge fund liquidations,[19] activities during various crisis episodes,[20] the co-movement of hedge fund returns during periods of stress[21] or they attempt to measure hedge fund leverage[22] and illiquidity exposure.[23]

There is also some information collected by supervisors, as some of them have launched *regular data collection on prime brokers' exposures* to hedge funds (e.g. the UK FSA's semi-annual surveys of selected prime brokers on their largest exposures to hedge funds). Supervisors may opt to disclose their findings in an aggregate form, but the bank-level information collected would remain available only to supervisors, as is the usual practice for all firm-specific supervisory data. Public reporting by banks of their direct exposures to hedge funds is essentially non-existent, although enhanced transparency was seen as one of the main measures to improve counterparty discipline after the near-default of LTCM.[24]

Besides regular information-gathering from banks, public authorities may also initiate *thematic surveys* on banks' dealings with hedge fund clients. In 2005, for example, the Banking Supervision Committee of the European System of Central Banks conducted a survey on large EU banks' exposures to hedge funds, which provided encouraging as well as some worrisome information on banks' risk management practices. Similar one-off projects provide snapshot quantitative information, but gleaned qualitative knowledge of prevailing market practices is very useful for guiding future analytical and policy work.

Finally, given the lack of frequent (daily or weekly) up-to-date information on hedge fund activities, *market surveillance* by the authorities responsible for the safeguarding of financial stability is indispensable for monitoring, understanding and analysing hedge fund activities. It includes keeping a watchful eye on price developments in financial markets, regular dialogues with market participants and, in particular, contacts with prime brokers and hedge fund managers. Market surveillance is also the key way to learn about hedge fund-related stressed conditions in financial markets.

4| INDICATORS FOR MONITORING HEDGE FUND RISKS TO FINANCIAL STABILITY

After reviewing the various information sources available for analysing hedge fund activities, the next logical step is to identify a set of pertinent indicators which could be useful for financial stability analysis. Taking into account the channels through which possible negative effects of hedge fund activities on financial stability could materialise, three groups of indicators could be suggested to measure and monitor:

- *endogenous hedge fund vulnerabilities*, which could lead to difficulties or a failure of a large hedge fund or a group of hedge funds with far-reaching repercussions for exposed banks and affected financial markets. These internal vulnerabilities include funding liquidity risk, exposures to certain market risk factors and excessive leverage;

- *banks' exposures to hedge funds*; and

- *crowding (concentration) of hedge fund trades*, when the number and size of one-way hedge fund positions are large relative to the amounts outstanding of underlying instruments and thereby markets

18 *The issues which are explored in such papers include biases in hedge fund data, hedge fund performance measurement, non-normality of return distributions, persistence, serial correlation, micro (fund-specific), market risk and macroeconomic factors of returns, diversification properties, etc. See, for example, an overview of papers on hedge fund performance by Géhin (2006).*
19 *See, for example, Kundro and Feffer (2004); and Baba and Goko (2006).*
20 *See, for example, Eichengreen, Mathieson, Chadha, Jansen, Kodres and Sharma (1998).*
21 *See, for example, Chan, Getmansky, Haas and Lo (2005) and Garbaravičius and Dierick (2005) pp. 46-49 sub-section on the issue of crowded trades.*
22 *See McGuire, Remolona and Tsatsaronis (2005).*
23 *See Getmansky, Lo and Makarov (2004).*
24 *See The US President's Working Group on Financial Markets (1999) and Financial Stability Forum (2000).*

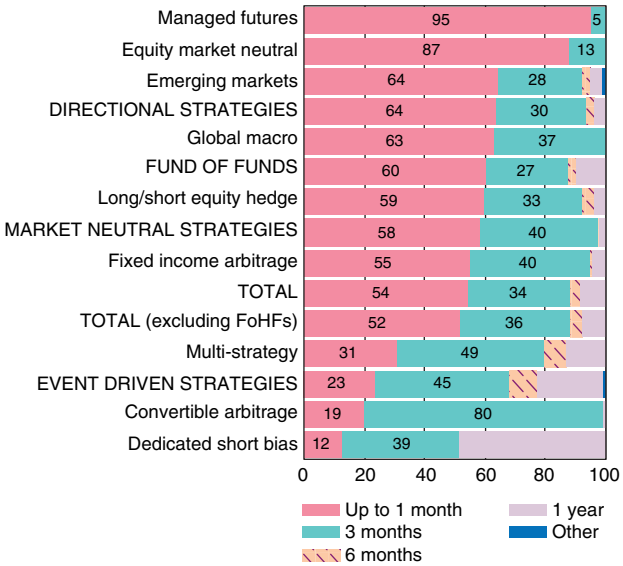
become vulnerable to a possible simultaneous unwinding of such concentrated investments by a group of relatively homogenous investors.

4|1 Indicators of endogenous hedge fund vulnerabilities

Indicators within this group would largely be based on information on the size and structure of hedge fund balance sheets. Since such information is not readily available from any publicly available information source, indirect methods would have to be devised to measure and monitor endogenous hedge fund vulnerabilities.

Funding liquidity risk is associated with the risk that a fund will not have sufficient liquidity buffers to meet various liquidity requests and this, in turn, may force the hedge fund manager to resort to forced asset liquidations in possibly already frail financial markets. Liquidity pressures may arise either from asset/liability mismatches related to short-term financing provided by prime brokers or from investor redemptions. Information on financing mismatches requires hedge fund balance sheet data, which, however, is not available.

Chart 2
Hedge fund redemption frequency by strategy
(December 2005; % of capital under management)



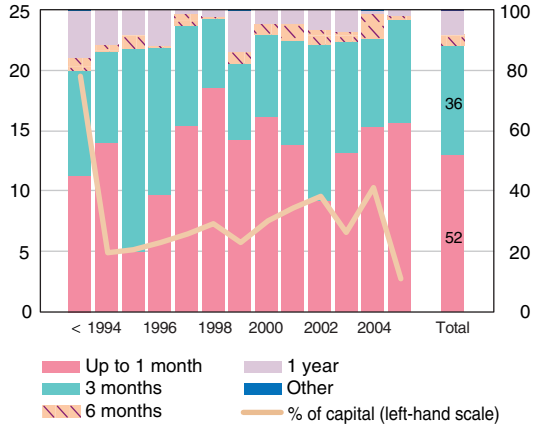
Source: Lipper TASS database (27 September 2006 version).
Note: The directional group includes long/short equity hedge, global macro, emerging markets, dedicated short bias and managed futures strategies. The market-neutral group consists of convertible arbitrage, fixed income arbitrage and equity market-neutral strategies. FoHFs stands for funds of hedge funds.

By contrast, the structural vulnerability of the hedge fund sector to investor redemptions could be estimated by exploring the profiles of hedge fund redemption restrictions based on individual fund-level data in hedge fund databases. Hedge funds apply various combinations of investor redemption restrictions, including initial lock-ups, penalties for early redemption, redemption frequency, redemption notice and payout periods that ideally should match the liquidity of the underlying investment portfolio. All of these redemption characteristics could be analysed by aggregating and comparing them by strategy (in order to evaluate whether redemption restrictions are adequate given strategy's risk profile, see Chart 2), by fund vintage year (see Chart 3) or in some other way (see Chart 4) in order to obtain some idea of the prevailing trends.

Information on hedge fund investor structure is also not available, although estimates of the share of capital provided by funds of hedge funds (FoHFs) could be constructed by comparing estimates of their capital under management to the capital of single-manager funds. Like banks, FoHFs perform a maturity transformation function when they offer their investors more favourable redemption terms than underlying single-manager funds, and this feature should be taken into account when analysing the funding liquidity risk faced by FoHFs.

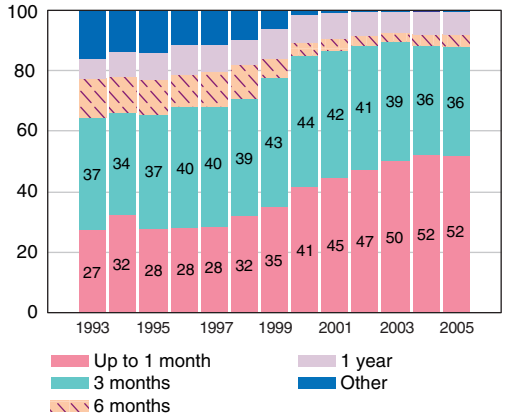
Since information on investor gross flows is not available, historical aggregate investor activity by

Chart 3
Single-manager hedge fund redemption frequency and capital by vintage year
(December 2005; % of capital under management; distribution of redemption frequency and total capital)



Source: Lipper TASS database (27 September 2006 version).
Note: Only funds launched before 2006.

Chart 4
Evolution of single-manager hedge fund redemption frequency
1993-2005
(% of capital under management)



Source: Lipper TASS database (27 September 2006 version).

strategy can be obtained by summing separately net flows of funds that have experienced net outflows or net inflows.[25] Moreover, it is quite likely that aggregate net flows into the hedge fund sector may be dependent on macro-financial factors.[26] Hence, econometric models could be used to obtain more timely estimates or even forecasts of expected aggregate net flows on the basis of observable and measurable contemporaneous macro-financial variables.

Little is known about *hedge fund balance sheets and exposures to market risks* and, therefore, it is difficult to foresee how vulnerable hedge funds would be under different market scenarios. However, hedge fund exposures to certain risk factors might be gauged indirectly by applying econometric techniques (e.g. regression methods) or by aggregating qualitative information in hedge fund databases for the markets and assets hedge funds tend to trade in.[27]

In the case of regression methods, moving time windows must contain a certain minimum amount of return observations in order to allow the estimation of market risk factor loadings. As a result, these estimates would represent moving time window averages rather than the desired end-of-period information. Nevertheless, the direction of coefficient changes could be used as an indication of portfolio shifts. Similar difficulties are experienced by the creators of synthetic hedge fund return replication products aimed at providing hedge fund-like returns more cheaply by investing in traditional liquid assets. It remains to be seen what impact the recent wave of these products will have on hedge fund fees and the sector itself.

Another limitation of indirect approaches based on time series analysis of hedge fund returns is that hedge funds typically report their returns net of all fees, whereas an accurate regression-based estimation would require information on gross returns. Automated transformation of individual hedge funds' returns net of all fees to original gross returns would probably be very complicated due to complex hedge fund fee structures, involving management and performance fees, high watermarks, hurdle rates and possibly other hedge fund-specific arrangements.

Leverage represents the third endogenous vulnerability, since it amplifies the impact of price swings on investment return and, therefore, may lead to involuntary and swift closures of market positions or even to the depletion of investors' capital. As in the case of investor redemption restrictions, some indication of characteristic leverage levels and their possible changes over time could be obtained from hedge fund databases by examining distributions of provided static leverage measures by strategy and by vintage year.

Moreover, leverage might also be assessed indirectly by utilising the same econometric methods used for estimating hedge fund exposures to various market risk factors. In this case, the total elasticity of returns to market risk factors could be interpreted as an indicator of pertinent leverage,[28] although, here again, the same limitations encountered in estimating hedge fund exposures would apply too.

4|2 Indicators of banks' exposures to hedge funds

Except for supervisory data or one-off thematic surveys, information on banks' exposures to hedge fund clients is scarce, because banks disclose very little information about their prime brokerage

25 *See ECB (2006b), pp. 43-44.*
26 *See ECB (2006a), pp. 139-142, Box 17 on global search for yield and funding liquidity risks for hedge funds.*
27 *See ECB (2006b), pp. 50-51.*
28 *For details, see McGuire, Remolona and Tsatsaronis (2005).*

operations. Since a large proportion of hedge funds were and remain domiciled in offshore centres, the BIS data on consolidated bank claims on private non-bank borrowers in offshore centres could have been used for making some inferences on banks' exposures to hedge funds. However, these claims on non-banks may increasingly include claims on special purpose vehicles and other non-hedge fund entities domiciled offshore, which makes such information less relevant for the analysis of banks' links with hedge funds.

Another way of gauging banks' exposures could be to employ commercial hedge fund databases that provide information on prime brokers used by individual hedge funds. In order to estimate the risk profile of prime brokers' hedge fund clients, characteristics of connected hedge funds could be aggregated, for example, by their strategy, size, leverage or return volatilities.[29] Such mapping of the prime brokerage market could be used as a first step towards closer scrutiny of prime brokers' exposures to hedge funds and could allow the detection of possible prime brokers' concentrations on certain hedge fund strategies or other factors that could make them vulnerable to dislocations in certain financial markets.[30]

Banks' agreements on conducting business with hedge funds often include provisions for net asset value (NAV) decline triggers, which allow banks to terminate transactions with a particular hedge fund and seize the collateral held if a fund's NAV declines substantially[31] and the risk of a fund's failure or closure increases. The proportion of hedge funds in a database breaching such triggers may provide an indication of how widespread historically were risks for prime brokers owing to difficulties experienced by their hedge fund clients.

4|3 Indicators of risk posed to financial markets

A key risk posed by hedge fund activities to financial markets is related to the possibility of abrupt collective hedge fund exits from crowded trades, which, however, is not confined only to hedge funds. Therefore, its monitoring would require detailed information gathering and reporting of large exposures by a broader range of market participants, including banks.

Nonetheless, there are some indirect ways of estimating this potential risk. For example, higher pairwise correlations of hedge fund returns within an investment strategy could be interpreted as a symptom of increasingly similar investment positions across hedge funds pursuing that strategy, although it could also be an indication of the strategy's capacity constraints.[32] However, such estimations would not be sufficiently timely and it would not be clear which markets are at risk given the lack of information on hedge fund exposures.

5| MAIN INFORMATION GAPS AND SOME POSSIBLE WAYS TO ADDRESS THEM

Comparisons of what is desirable for financial stability monitoring purposes and what is actually available highlight the existence of important information gaps which hinder reliable assessment. Given the information available, most indicators for financial stability analysis need to be developed "bottom-up" by using individual hedge fund data in commercial hedge fund databases, which makes such indicators susceptible to the widely known deficiencies of such databases. Furthermore, most quantitative information either in hedge fund databases or from other sources is available with considerable time lags relative to monitoring needs and it is not available as time series. Only hedge fund returns, capital under management and investor net flows, derived from the latter two, are available as monthly or quarterly time series.

All in all, there is no reliable and timely publicly available information on endogenous hedge fund vulnerabilities, banks' exposures to hedge funds

29 *However, aggregation is complicated by the fact that hedge fund managers indicate the names of different entities within the prime broker's group, and, therefore, the group's structure has to be taken into account. Moreover, future updates of such information have to consider mergers and acquisitions between prime brokers too.*
30 *See Garbaravičius and Dierick (2005), pp. 38-41.*
31 *NAV decline triggers are often calculated on a monthly, rolling 3-month and rolling 12-month basis with corresponding frequently used NAV decline triggers of 15%, 25% and 40%. See also ECB (2006b), pp. 102-103.*
32 *See Garbaravičius and Dierick (2005), pp. 46-49 sub-section on the issue of crowded trades.*

and crowded trades. The monitoring and evaluation of hedge fund activities for the financial stability assessment would benefit enormously from better aggregate information on hedge fund activities, particularly with respect to their off- and on-balance sheet positions. Even basic aggregate information on total balance sheets and their breakdowns would make a significant contribution to the construction of the indicators proposed.

However, after identifying desirable information and checking it against available data for remaining information gaps, it is still not obvious how this enhanced transparency could be achieved, i.e. who (banks or hedge funds) could be asked to provide more and better information, to whom it should be provided (to the public or confidentially to supervisors, who would then disclose aggregated information publicly) and the details of what exactly should be reported. The answers to these questions go beyond the scope of this article, but they presumably will emerge after the ongoing global discussions on hedge fund transparency address these practical issues.

Proposals should include input from the private sector, foremost hedge funds and prime brokers, and would preferably take the following three elements into account:

• First, any disclosure enhancements should aim at making more aggregate information available to all market participants. The aggregation of individual hedge fund disclosures should alleviate hedge funds' concerns that too much transparency may adversely affect their trading strategies. In this context, it is useful to bear in mind that weekly public information on open positions in exchange-traded derivatives has not been harmful; on the contrary, has proven very useful for various market participants. Another notable example relates to mandatory and publicly available 13-F filings of long holdings of equity securities publicly traded in the US by managers of large equity portfolios (having an aggregate fair market value of at least USD 100 million) with the US Securities and Exchange Commission.

• Second, it is important that any reporting on hedge fund activities would be done by using a highly standardised template in order to ensure meaningful comparisons and easy aggregation across strategies and countries. Nevertheless, it may prove challenging to devise such a template, not least given the diversity of hedge fund strategies and risk profiles.

• Finally, in order to have a complete picture of risks to the smooth functioning of financial markets and ensure a level playing field, banks and other highly leveraged institutions (HLIs) would ideally report similar information (if not already available) together with hedge funds, and such information would also be included in regular (e.g. quarterly) publicly available aggregate statistics.

Alternative investment vehicles may require alternative monitoring approaches for financial stability purposes. Hedge funds provide a typical example of this. Most quantitative information, which is usually obtained from hedge fund databases or quarterly industry reports, is available at time lags and frequencies which do not meet monitoring needs, and is unavailable as time series. Bilateral disclosures to investors on investment terms and to both banks and investors on risk profiles need to be timely and sufficient in order to effectively contribute to risk management and counterparty discipline. Such disclosures are reportedly improving, partly in response to demands from institutional investors. There is, however, insufficient public information on hedge fund risk profiles. Without sufficient publicly available information, the monitoring of hedge fund activities from the financial stability perspective by public authorities becomes a major challenge. Such monitoring is of importance given that prime brokers' and investors' risk appetite may vary substantially owing to competitive pressures and financial market conditions, and a weakening of counterparty discipline cannot be excluded. The aggregation of individual hedge fund data for public reporting purposes should alleviate hedge funds' concerns about the confidentiality of their proprietary trading strategies.

Most of the remaining information gaps could be addressed through better information on hedge fund balance sheets, which could significantly advance the monitoring of hedge fund activities for the assessment of financial stability by improving the quality of indicators relating to endogenous hedge fund vulnerabilities, to banks' exposures to hedge funds and to crowded trades. Such information would usefully complement the information obtained by public authorities through their market surveillance and would enhance the analysis of prevailing trends and the potential build-up of vulnerabilities.

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The world of hedge funds: prejudice and reality
The AMF's contribution to the debate on alternative investment strategies

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*Even if there is no uniform and legal definition of the term "*hedge fund*", it is generally agreed amongst securities regulators that all hedge funds have potentially common characteristics: no self imposed rules in terms of diversification of assets, unlimited use of derivatives and of complex financial techniques, intensive use of leveraging and substantial performance commissions, and shares not frequently redeemable by the investors.*

*At the international level, hedge funds cannot be considered any longer as a « black hole » in the financial sphere given the growing number of regulatory authorities that have already implemented supervisory systems in relation to such funds. It is obvious though that much remains to be done in this ever changing area, which is all the more complex to regulate that it today is the object of prejudice that can sometimes generate confusion. Hedge funds' "*shareholder activism*" is both criticized and hailed as a mechanism creating value. Their risk-taking approach generates concerns as to financial stability and can nevertheless supply welcome liquidity to the markets. The transparency of their operations is considered as being insufficient, whereas their strategies make them truly successful with an increasing number of investors.*

The clarification of the specific risks attached to hedge funds' activity is therefore a prerequisite to defining the regulators' priorities for action. The AMF has identified five main areas that may need further initiatives at the international level:

• the systemic risk due to the potential failure of a large-size hedge fund or a chain of several smaller hedge funds leads to consider improvements of the investors' credit risk assessment on hedge funds by, for example, urging hedge funds' rating;

• the risk of market abuse calls for ways to enhance the transparency of the hedge funds' activities on OTC markets;

• the risk for the governance of listed companies and of misbehaviour put into question certain practices such as stock lending at shareholders' meetings;

• the operational risk of incorrect valuation of illiquid or complex assets has pushed IOSCO to take initiatives on the valuation process and internal controls of hedge funds;

• the risk of misselling to insufficiently informed investors requests new domestic and international standards before any further retail exposure to alternative products.

NB: Speach delivered at "the Executive Briefing" meeting (Paris, December 14, 2006).

First allow me to thank the leaders of "*Premier Cercle*" for having invited me to make the closing address to this especially timely conference on hedge funds. Hedge funds clearly represent a central focus of thought and action for the AMF (the France's Financial Markets Regulator). As a matter of fact, at its last meeting on December 7, 2006, our Scientific Advisory Board, addressed the issue of the eligibility of hedge funds indices for retail investors' funds, an issue which, as you know, is being actively discussed at the European level.

On this matter as well as on many others, AMF always strives to find the proper balance between:

• on the one hand, carrying out its legal mission encompassing the protection of savings, the supervision of market integrity and the control of the quality of information provided to investors,

• and on the other hand, its constant concern to establish a regulatory framework enabling participants in the European financial markets to display their talents in an ever more competitive global environment.

Today, the purpose of my talk will be to demonstrate that hedge funds are not a "black hole" in the financial sphere or a "forgotten concept" for regulatory authorities of financial markets, who have already implemented adequate supervisory systems even though much remains to be done to regulate an ever changing sector.

Indeed, hedge funds often make use of the very latest concepts developed in the field of financial technology, and they do so in a completely globalized environment. Regulating them is therefore an art which is all the more complex and delicate. The regulatory process can only be efficiently carried out in the appropriate international arenas where regulators, drawing from their domestic expertise, create a common set of guiding principles that include international problem sets which characterize the sector.

It is a complex topic as well because hedge funds today attract criticism and are the object of prejudices that can sometimes generate confusion:

• their "shareholder activism" is at once criticized for the so-called short term managerial bias it is supposed to generate, and at the same time hailed for the value creation that results from their actions on behalf of the community of shareholders;

• their risk-taking generates concerns as to financial stability; yet many concur that hedge funds supply welcome liquidity to markets and improve their efficiency;

• the lack of transparency of their operations is feared. But, at the same time, their original strategies make them truly successful with an increasing number of investors, be they institutional or, more recently, individual.

That is why, before sharing our thoughts on the appropriate means of regulating hedge funds, I would like to question a number of preconceived notions that purport to describe their role in, and their impact on, the financial system (1|).

After having sorted through the ideas and clarified the debate, I will address the true regulatory issues, based on a logical analysis of the risks generated by their growing importance (2|).

I shall conclude by describing the answers given or debated in international forums in which the AMF is engaged (3|).

1| HOW IS THE WORLD OF HEDGE FUNDS EVOLVING?

First of all I would like to convince you that many preconceived notions cloud the debate on hedge funds and deserve to be fought.

1|1 Definition

The concept of hedge funds itself should first be defined. The fact that it bears an English name carries in itself some responsibility for the confusion currently prevailing in our country, as France proves especially reluctant to integrate into its culture the new tenet of a financial capitalism which is more and more disintermediated.

Besides, the very term "hedge fund" is a misleading one. Its literal French translation is "*fonds de couverture*", (or coverage fund) which in theory limits the hedge funds' activities to arbitraging, whereas those funds actually use more and more diversified management techniques –called alternative management– that allow speculating, in its original sense, on the markets' future trends, i.e. taking risks on their orientation. And that applies to a great variety of markets, each having highly varied degrees of liquidity and transparency: natural gas, contemporary art, as well as foreign currency markets.

Given that context of semantic misunderstanding, you will easily understand why the AMF preferred using the concept of "alternative (asset) management" when the decision was taken, in 2003, to create a secure legal framework in order to give French hedge funds the proper environment for the development of their "on shore" activities.

1|2 Key features

Based on our studies, none of our main counterparts has come up with a legal, detailed and formal definition of a hedge fund. However, it is generally accepted that all hedge funds have the following characteristics:

• they have none of the traditional restrictions imposed on retail investment funds in terms of diversification and marketability of financial assets, thus giving them the option to acquire significant amounts of non-liquid or complex assets;

• unlimited use by hedge fund managers of derivative products or of financial techniques enabling them to sell short;

• intensive use of leveraging by managers, thanks to financing supplied by the prime brokers;

• substantial outperformance commissions, a powerful incentive to motivate managers to take, or rather have their funds take, significant market risks;

• fund shares often not redeemable at any time by investors, although they are granted windows of opportunity to sell back their shares at pre-set periods based on lock up rules defined by each fund.

Therefore, even though, as outlined by International Organization of Securities Commissions (IOSCO), there is no harmonized definition of the term hedge fund, there is definitely an international consensus among regulators to characterize hedge funds according to the criteria I have just mentioned. Moreover the fact that there is no precise and universal definition does not preclude debate on the regulation of hedge funds; after much reluctance in some jurisdictions, it is now at the heart of the work performed by international regulatory bodies.

1|3 The present regulatory framework

Thus, the first misconception to be clarified is that hedge funds are not regulated at all, that they constitute a kind of Unidentified Financial Object (UFO). IOSCO's latest report on hedge funds recalls this in a very timely fashion. This document was prepared by IOSCO's specialized committee in charge of asset management which is chaired by AMF. It is a clear testimonial to the recent efforts made by a number of regulators worldwide to set up a supervisory framework for hedge fund activities. The most significant example is, of course, the decision rendered by the Securities and Exchange

Commission (SEC) at the end of 2004 to make compulsory, as of February 1, 2006, registration with the SEC of hedge funds, or, more precisely, of their managers, when the funds are marketed to US clients. The fact that, on June 23, 2006, American courts invalidated the decision to make registration compulsory has in no way deterred the SEC from considering setting up a new registration framework, encouraged as it was, if I may say so, by the recent mishaps at Amaranth. Thus SEC has recently announced new regulatory measures for hedge funds, proving, if it were necessary, that "regulatory fatigue" does not affect this area of financial regulation.

On a more global basis, the IOSCO document shows that 18 of the world's 20 largest financial markets for asset management supervise the management or the distribution of hedge funds in one way or another.

In addition, hedge fund activity is also indirectly regulated, both:

• through prudential monitoring of banks and prime brokers which supply the necessary financing to obtain the leverage implemented by hedge funds;

• and, in continental Europe, through the depositary who plays a key role in the external controlling process of hedge funds.

In short, be it indirectly or directly, hedge funds escape regulation less and less frequently, even though the terms of public intervention quite obviously vary as a function of specific national factors.

A second misconception to be corrected is that hedge funds are still sold exclusively to a wealthy clientele, i.e., institutional investors or high net worth individuals, in short to a sort of financial elite.

1|4 The spectacular growth of hedge funds

If that statement remains largely true, it is no longer an absolute truth because of the rapid growth of the sector's activity. The most common estimates are that in 2006 hedge funds manage some USD 1.3 trillion compared to USD 400 billion only six years ago. This spectacular growth was made possible by an enduring monetary policy of low interest rates coupled with a deep-seated imbalance of world trade flows, which resulted in massive growth of liquidities seeking attractive yields. That growth is also explained by the expansion of hedge funds' client base. Institutional investors, including pension and collective management funds, significantly increased their holdings of those vehicles which are viewed as pertinent to the diversification of their portfolios.

Similarly, in many countries such as Hong Kong, Australia, Germany and soon the United Kingdom, beyond so-called "qualified" investors, a new category of investors with relatively more modest financial means are now able to invest in alternative management products. This is also partially the case in France where funds hedge funds can now be accessed by individuals with a minimum amount of EUR 10,000.

The failure of a hedge fund can thus become a source of concern, indirectly but in a major way, for the "man on the street", his financial intermediaries and also his political representatives. That development justifies the interest for the issues raised by hedge funds now shown by the heads of state and governments of the G7 nations.

In short, hedge funds are far from being a "separate world." Rather, their growth and diversification have built a "continuum" between traditional and alternative management. This situation creates a genuine challenge for regulators, as it forces them to set up a coherent regulatory framework to avoid regulatory arbitrage. A regulatory ban in the area of hedge funds could indeed be easily circumvented by using ad hoc vehicles that would be little or completely unregulated.

1|5 A mature industry

The final prejudice to be allayed is that hedge funds are intrinsically dangerous for the financial system as they are seen as only loosely organized and not subject to appropriate internal control procedures. Clearly it is not quite true. Nowadays hedge funds are no longer small boutique firms made up of genial artisans or "financial Mozarts". In many cases hedge funds are genuine corporate bodies with reporting procedures to both internal and external controllers that are

more and more demanding. Moreover, large banks, in their capacity of liquidity-lending prime brokers, are strongly encouraged by their prudential regulators as well as by their own interest to vet the solidity of the structures they finance.

In conclusion, it would be a misinterpretation to view hedge funds as non-regulated, uncontrolled entities in the hands of "Doctors Strangelove of the financial world" who, working on behalf of an exclusive elite of high net worth individuals, could put the financial system in jeopardy. That vision no longer reflects the reality of today's hedge funds.

However, the developments I have described do not mean that these investment vehicles do not pose regulatory problems and that an in-depth analysis of the risks they generate is not necessary, or even urgent.

2| WHAT DOES A MORE RATIONAL RISK-ANALYSIS SAY?

The regulator must devise a risk-based approach in order to adapt and calibrate its intervention to the real issues generated by hedge funds.

The identification of risk areas is today the prerequisite to defining the regulators' priorities for action, based on the "better regulation" approach of the Autorité des Marchés Financiers which I had the opportunity of presenting on November 30, 2006, when closing our annual meeting. Let me now present what we view as the real risks posed by hedge funds.

First risk: the systemic risk, i.e., the risk of overall destabilization of financial markets stemming from the failure of a large-size hedge fund or a chain of failures of several smaller hedge funds. Today that risk appears rather low. According to available studies, the annual failure rate is 3 per mil, a remarkably stable rate over the past 10 years, a period which has witnessed a 7-fold increase of the number of hedge funds. Nevertheless, that risk does exist and must be managed.

Second risk: market abuse, i.e., potential market price manipulations and insider trading. The high yields sought by managers and the use of outperformance commissions may lead hedge funds to test the limits of certain rules which it might be tempting to infringe given the amounts of possible gain. In a market environment where speculative funds represent between one-third and one-half of daily trading volumes on the major financial markets, the impact of such market abuse can easily be imagined.

Third risk: the misbehavior in shareholder activism. Hedge funds are seen as exerting too much influence on the strategy of some listed companies, which, according to some, could negatively impact all stakeholders, as it would too often favor a short-term approach of the target company's strategy. Some typical cases come to mind in this context, for example, at the time of large stock restructurings –the term of "locust plague" had been used– or for some recent takeover bids in Europe. Moreover, in this context, the transparency, or even the legitimacy of some techniques used by this type of player, are also questionable, be it stock borrowings or the many highly-criticized structures designed to hold securities positions.

Fourth risk: insufficient supervision of operational risks and application of internal control. I refer here to the risk of inadequate valuation of illiquid and complex assets that are held in various proportions by hedge funds. When performance is bad or when bonus prospects are based on the managers' absolute performance, careless valuation of the positions held may prove very tempting.

Fifth risk: misselling or the sale of inappropriate alternative products to insufficiently informed retail clients. The likelihood that this will occur is especially high since today the sale of products based on sophisticated financial techniques is more and more widespread. The UCITS directive itself, which applies to retail investors, allows the extensive use of derivative products. Besides, these instruments, once they are listed, benefit from all of the features of the European passport and may theoretically be part of retail UCITS that are widely distributed on a cross border basis.

Having identified these risks, how can the regulators prevent and manage them?

3| WHAT REGULATORY RESPONSES COULD WORK MOST EFFICIENTLY?

For the AMF, the time has come to create a credible and commensurate regulation strategy within an international framework.

First of all, the AMF has for several years carefully monitored the issue and taken action on the domestic front that has given it the opportunity to participate in the global efforts.

Thus, backed by the terms of the Financial Security Act of 2003, the AMF defined in November 2004 the conditions for the creation of two kinds of French direct alternative management vehicles: funds authorized to operate under streamlined investment rules (ARIA) and contractual funds. The groundwork had been initiated in 2003, when the architecture for funds of hedge funds was developed. Designed in close partnership with market participants, the regulation adopted by the AMF focuses on the responsibilities of the depositary and of the prime broker in the area of direct alternative management, on the activity program of management firms that plan to undertake alternative management activities, on the quality of information supplied to investors and on the conditions to be met for the proper marketing of these innovative products. Today alternative management in France represents EUR 36 billion of managed assets, of which slightly less than 50% are managed by funds of hedge funds.

Capitalizing on its domestic experience, the AMF is an active participant in the review carried out by IOSCO and Committee of European Securities Regulators (CESR) and in the analyses of the European Commission.

The French regulatory authority has indeed always been a very active participant within international regulatory bodies. It is a founding member of IOSCO and I currently chair the organization's strategic committee, called the Technical Committee. Since 2004 the AMF has chaired IOSCO's Standing Committee 5 or "SC5" dedicated to the area of asset management.

At the European level, in 1997, the AMF was a founding member of FESCO (Forum of European Securities Commission), which was renamed CESR in 2001. The CESR working group in charge of asset management is currently working on hedge funds indices. Finally, the AMF contributes directly to the European Commission's studies on alternative management.

Thus the AMF has little by little forged for itself a doctrine which was shared with the public at the end of September 2006 in its answer to the European Commission (EC) expert group report on that topic. Allow me to present the answers that the French regulator wishes to promote in order to tackle the five previously listed risks.

3|1 The systemic risk

Even though the specter of LTCM still lingers in everyone's memory, it looks as if the financial system's robustness has improved, thanks especially to better coordination between international regulators, be it within the G7, FSF or the Joint Forum which brings together IOSCO, the Basle Committee and IAIS –International Association of Insurance Supervisors. I believe that this improved coordination has enabled us to better grasp and contain risks. The use of margin calls, prudential controls on prime brokers and the demands of reporting to control authorities have undoubtedly contributed to this improvement. The recent example of Amaranth, in the United States, where a USD 6 billion loss in less than a month had no major impact on domestic or international financial stability, tends to confirm that statement. But in this area it is better to behave with caution and vigilance rather than to blindly trust the market. To quote asset managers, "past performance does not predict future returns" and that saying also applies to regulators. The recent warnings on financial stability made at the end of October 2006 by the president of the European Central Bank before the European Parliament remind us of the necessity to remain vigilant. In its June 2006 *Review of Financial Stability*, the ECB did note that since mid-2003 yields published by hedge funds were "increasingly correlated". Therefore it would appear that all hedge funds invest in the same direction, which could create a mass effect in case of a reversal of market trends. In brief, the ECB tells us that alternative managers have become more or less conformists and imitate each other. According to the ECB, correlation even "surpassed the levels reached immediately before LTCM's quasi-crash of 1998".

It is within this context that the Bundesbank's proposal, made last summer, to have hedge funds rated by rating agencies deserves consideration. The AMF has already initiated various studies relating to the rating of the funds and shares the concern expressed by some large investors to obtain from hedge funds more transparent and homogeneous management and risk assessment processes.

This orientation is in our mind predicated upon the following:

• first, that the goal of the approach be correctly defined, making a distinction between what clearly pertains to the control of hedge funds' operational risks and what pertains to the prevention of systemic risks on a global scale;

• then, that the subject of the rating be defined: it could be the funds and/or the managers;

• finally, that a supplementary prudential procedure be studied, in terms of equity allocation by the prime brokers and based on the published ratings of hedge funds, which would be encouraged to take the rating route based on concrete consequences on their ability to secure bank financing.

3|2 The risk of market abuse

Hedge funds are admittedly subject to the same rules as the other operators, and in particular to the provisions of the "market abuse" Directive.

In Europe, as far as market abuse matters are concerned, the hand of the regulator may be heavy and its scope of action is far-reaching, well beyond its own borders. Even if the market player acts in a non-European center, he can indeed be sanctioned by a European regulator. In effect, cooperation amongst regulators is more and more efficient, within the European Union as well as with our other worldwide partners. This was demonstrated by a number of the AMF's recent inquiries which led to sanctions against London-based hedge fund managers.

Indeed, the problem extends well beyond the case of hedge funds: the techniques used by hedge funds or their market counterparts and the opacity of those techniques are the real root of the problems as far as the operational implementation of the legislation on market abuse is concerned. The recent explosion of over-the-counter transactions on derivatives, based on a growing number of more or less correlated underlying securities and opening the field to a great variety of arbitraging strategies, puts the national regulators before a formidable technical challenge due to the swiftness of the transactions and their cross border nature. Thus, our American colleagues have recently taken a major initiative in the field of derivatives by creating a giant database, the famous DTCC-managed "Trade Warehouse", intended for global geographic coverage with further extension to other types of fixed-income and equity derivatives. Europe should urgently acquire a similar instrument which would give its market authorities the same depth of information and enable them to have more efficient exchanges with their counterparts across the Atlantic in the future.

3|3 The risk for the governance of listed companies

Theoretically, this risk exists only if funds take short-term stakes, using non-transparent techniques, with the sole objective of putting pressure on management, at a specific point in time for the defense of their specific interests, i.e., during stockholders' meetings or when a major event occurs in the life of the company.

The AMF demonstrated recently its interest in this sensitive topic via the study conducted by Yves Mansion, a member of the AMF Board, on "Improving the exercise of shareholder voting rights at shareholders' meetings in France". The report, published on September 15, 2005, deals with the delicate question of stock lending during the general meeting season. One of the effects of this financial technique is to deprive the lender as "beneficial owner" of the voting rights attached to the shares and to release some of the decision-making powers of the general meeting to "borrowers" who are not exposed to the long term economic risk of share ownership. The report also makes detailed reference to recent transactions that took place abroad, showing that the regulator should probably pay more attention to this technique which could warrant introducing Europe-wide regulations.

The AMF recommended that, at the time of the general meeting, managers recall the shares they had lent, which is in keeping with the recommendations of the Myners Report in the United Kingdom.

More fundamentally, the global issue of the transparency of hedge fund activities is now raised, a topical question which should also undoubtedly be asked for private equity. It is being asked keenly and forcefully, all the more since the degree of discretion and opacity of the funds' strategy is often inversely proportionate to the degree of transparency they demand from the management of quoted companies. In our view, the fact that for tax reasons those funds are established in the Bahamas or the Cayman Islands does not imply that they should never have to be accountable to their constituents and to the markets in a transparent, precise, non deceptive manner, and on a regular basis.

At a time when thinking on the investors' role in corporate governance is making progress, albeit too slowly, for retail investment funds, one can only regret that the topic is never discussed when it comes to hedge funds and the private equity sector. Since 2003, French asset management companies have been compelled to account for their voting policy at general meetings while it is not the case for foreign hedge funds which invest in quoted European companies. This is, in my view, food for thought.

3|4 The operational risk of incorrect asset valuation of illiquid and complex assets

Today this risk is studied by the AMF-chaired specialized committee of IOSCO in charge of asset management which was given a working mandate also being closely monitored by the Financial Stability Forum. The objective is to create a set of best practices for the valuation and administration of hedge funds. As mentioned earlier, hedge funds frequently invest in assets that are complex or illiquid by nature or in more liquid assets but in such amounts that their positions sometimes become difficult to value. Alternative management professionals, in the United States or in the United Kingdom, have become conscious of the necessity to disseminate a code of good behavior for the sector. Within a subgroup bringing together regulators and representatives of the alternative management industry, IOSCO's SC5 endeavors to answer that need appropriately by suggesting standard procedures in the area of hedge funds valuation and by assigning responsibilities in the valuation process among all concerned parties: the prime broker, the depositary, the auditor and, naturally, the manager. At the end of the first half of 2007, this working group will publish a series of guiding principles which professionals will be encouraged to apply to themselves.

Enforcement will of course depend on each jurisdiction's regulatory system, on whether the hedge fund's management firm is or is not required to register and, above all, on the market discipline those principles will have defined. One may be reasonably optimistic as the effective application of IOSCO's regulatory principles by its members is regularly verified by the IMF, as well as by the organization itself through its Implementation Committee.

3|5 The risk of misselling of hedge funds to insufficiently informed investors

In this area, work is mostly being done at the European level, which gives me the opportunity to return to the response of the AMF to the European Commission which I briefly mentioned earlier.

On July 4, 2006, the European Commission published a report by industry experts on alternative funds. The report reviews a number of solutions meant to make those funds more widely accessible within the European Union. It calls for the removal of obstacles to the participation of institutional investors in alternative funds. The AMF has contributed to the work done by the European Commission on the topic of alternative management by underlining the necessity to prevent the risk of misselling.

The AMF has thus indicated that the recommendation calling for a wider distribution of funds of hedge funds appeared to be the most promising strategy in the short term.

More generally, the AMF wishes to promote on a global scale the implementation of best practices in

the area of the management of funds of hedge funds and suggests that these recommendations later be adopted in a pan-European context in order to allow mutual recognition of funds of hedge funds in the near future.

At the beginning of 2007, the AMF will evaluate the impact of French regulations on domestic funds of hedge funds, which were introduced in 2003. It will analyze in particular the lessons to be drawn from the Amaranth case study for French management firms in the context of the future legal environment in Europe.

Alternative multi-management rules assign the managers of funds of funds specific responsibility in terms of the due diligence procedures they should conduct on underlying funds. Besides –without trying to predict the conclusions of the work currently done by CESR to determine the eligibility of hedge fund indices for retail investors– a shift in this area would prevent any regulatory arbitrage risk in favor of investment products less demanding in terms of their managers' normal due diligence.

More generally, to piggy-back on J. Delmas-Marsalet's report on the marketing of financial products, the AMF pays close attention to how hedge funds target their clientele as well as to the terms and conditions attached to this type of product which require, at the very least, stricter rules on the quality of the advice given before they are sold to individual investors. The AMF is very interested in seeing which direction the European Commission will take on these matters, whether through its next steps, following the publication of its White Paper on asset management in mid-November 2006, or through its interpretation of the MFID on the conditions of the sale of financial products.

In order to be efficient, the regulation of hedge funds has to be thought through by appropriate international ad hoc regulatory bodies.

In order to be relevant, the regulation of hedge funds must be based on rules that are deemed appropriate, have been agreed upon and will be respected by all parties involved.

In order to be controllable, it has to be integrated into a process of convergence of the rules adopted by the various national regulatory bodies. It has to rely on efficient information systems, particularly in the area of over-the-counter transactions and in the most sensitive areas of the markets. Finally, it should be based on close collaboration among national authorities and should be able to count on their unconditional, collective commitment.

I hope to have convinced you that the AMF, be it within IOSCO, CESR or the European Commission, is drawing upon its national experience and working closely with its partners to create regulatory initiatives and integrate the latest developments in financial markets, without however abandoning its mission of protecting national savings. In this context, significant change in regulatory thinking is underway: future regulation efforts will be more clearly focused on operators and their behavior —whether they be portfolio managers, depositories, prime brokers or distributors— instead of on a control of investment vehicles which are obviously becoming ever-more diversified.

Financial conditions, alternative asset management and political risks: trying to make sense of our times

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Developments in the financial sector have led to an expansion in its ability to spread risks. The increase in the risk bearing capacity of economies, as well as in actual risk taking, has led to a range of financial transactions that hitherto were not possible, and has created much greater access to finance for firms and households. On net, this has made the world much better off. Concurrently, however, we have also seen the emergence of a whole range of intermediaries, such as hedge funds, whose incentive structures can lead them to take more risk, especially in times of plentiful liquidity and stability. As a result, under some conditions, economies may be more exposed to financial-sector-induced turmoil than in the past. I highlight concerns about the political spillovers if such instability arises.

NB: The author wishes to thank Charles Collyns and Laura Kodres for helpful comments.

Stock markets have been scaling new heights recently. Risk premia and measures of risk aversion are at extremely low levels. With the equity markets anticipating strong earnings growth, credit markets foreseeing low defaults, and the bond markets expecting little inflation, one has to ask: isn't anyone pricing in risks? If not, what is going on?

In what follows, I will argue that we might be seeing the confluence of two strong forces –first, a widespread surge in productivity across the world, with the associated domestic demand varying country by country based on the strength of domestic financial markets, and second, the increasing institutionalization of, and competition within, advanced financial markets for savings. While the world has grown strongly as a result of both these forces in recent years, risks have built up and there is no guarantee that the future will be as rosy as the recent past. Some of the risks are cross-border, and financial –central to the theme of this conference– but I will focus, not just on the risks to financial stability, which have been widely discussed, but the associated political risks.[1]

1| THE PRODUCTIVITY REVOLUTION

We are now in the fourth year of strong world growth, growth that has been maintained in the face of headwinds such as soaring commodities prices. In my view, productivity growth, fostered in part by the revolution in information technology, but also in part by the rationalization of production through the creation of global supply chains, has played a critical role in this expansion. While much attention has been focused on the extraordinary surge in US productivity since 1995, equally impressive productivity growth in emerging markets has been little commented upon. Taken together, rapid, and largely unexpected, worldwide productivity growth can explain why the demand for commodities is so strong, how emerging markets have weathered commodity price increases without a serious slowdown in investment, why inflation is still largely contained despite the unprecedented rise in raw material costs, and why both household incomes and corporate profits are buoyant at the same time.

The reaction of domestic demand to rising productivity growth has varied across countries, in part based on the sophistication of their financial sector. In the United States, for example, the surge in productivity led to a boom in investment in the late 1990s, financed by deep financial markets. Not all the investment was wise, but the debris created by the bust was quickly cleared by the financial markets. Growth picked up again, though corporate investment remained subdued. In addition, though, the United States' strong arm's length financial system allowed consumers to borrow against future incomes and consume immediately. Indeed, the expectation of higher future incomes coupled with accommodative monetary policy and low interest rates may have fueled the housing boom, which expanded consumption even more as the financial system allowed borrowing through vehicles such as home equity loans. Also, residential investment compensated somewhat for the fall off in corporate investment. Thus the United States' financial system translated productivity growth into strong domestic demand, and a large current account deficit (also see WEO September 2006).

Emerging markets countries with less sophisticated financial systems did not have the capacity to reallocate resources effectively to the newly productive areas. Some, for example in East Asia in the mid 1990s, allocated resources indiscriminately, leading to investment booms and very severe busts. Experience brought more circumspection in investment. Others, realizing their limitations, were more circumspect from the outset. Regardless of the path, barring some notable exceptions like China, investment in emerging markets has been relatively muted in recent years (see WEO 2005) even in the face of strong growth. Moreover, because of the limited availability of housing– and retail finance, households in these countries have not been able to expand consumption through borrowing. Thus domestic demand in these countries has been relatively muted and these countries have generated net savings or current account surpluses.

1 *See, for example Borio (C.) (2006):* "Monetary and prudential policies at a crossroads: new challenges for a new century", *BIS working paper, White (W.) (2006):* "Is price stability enough?", *BIS working paper, Rajan (R.) (2006)* "Has financial development made the world riskier?", *NBER Working Paper.*

2| THE SAVINGS INVESTMENT IMBALANCE

Despite widespread strong productivity growth, nominal investment, especially corporate investment, has remained relatively weak for the world as a whole, while desired savings is strong. Call this a "savings glut" as did Chairman Bernanke or "investment restraint" as did the IMF, the net effect is an imbalance between desired savings and realized investment. Consequently, real long term interest rates have been low for some time. Interestingly, even as the Federal Reserve raised policy rates during 2006, long term interest rates fell further – in slowing domestic demand in the United States, markets may believe the Fed is aggravating the worldwide excess of desired savings over realized investment further.

Current conditions are unlikely to be permanent. Given aging populations in developed countries though, one would presume that the rebalancing of worldwide investment to desired savings will have to take place primarily in non-industrial countries. Investment will increase partly through foreign direct investment, but partly mediated by the financial systems in emerging markets, which will have to develop further. Increases in consumption as safety nets improve, and retail finance becomes widely available will also help reduce desired savings. Certainly, the seemingly perverse pattern of net capital flows, from poor to rich countries, will have to change, if for no other reason than to accommodate demographics.

I now want to turn to my second issue –the increasing institutionalization of, and competition within, advanced financial markets. The link between the issues will soon be clear. The break-up of oligopolistic banking systems and the rise of financial markets has expanded individual financial investment choices tremendously. While individuals don't deposit a significant portion of their savings directly in banks anymore, they don't invest directly in the market either. They invest indirectly via mutual funds, insurance companies, pension funds, venture capital funds, hedge funds, and other forms of private equity. The managers of these financial institutions, whom I shall call "investment managers", have largely displaced banks and "reintermediated" themselves between individuals and markets.

As competition between these various institutional forms for the public's investment dollar increases, each one attempts to assure the public that they will offer superior performance. But what does superior performance mean?

3| PERFORMANCE MANAGEMENT

The typical manager of financial assets generates returns based on the systematic risk he takes – the so called beta risk– and the value his abilities contribute to the investment process –his so called alpha. Shareholders in any asset management firm are unlikely to pay the manager much for returns from beta risk –for example, if the shareholder wants exposure to large traded US stocks, she can get the returns associated with that risk simply by investing in the Vanguard S&P 500 index fund, for which she pays a fraction of a percent in fees. What the shareholder will really pay for is if the manager beats the S&P 500 index regularly, that is, generates excess returns while not taking more risk. Indeed, hedge fund managers often claim to produce returns that are uncorrelated with the traditional market (the so-called market neutral strategies) so that all the returns they generate are excess returns or alpha, which deserve to be well compensated.

In reality, there are only a few sources of alpha for investment managers. One comes from having truly special abilities in identifying undervalued financial assets –Warren Buffet, the US billionaire investor, certainly has these, but study after academic study shows that very few investment managers do, and certainly not in a way that can be predicted before the fact by ordinary investors.

A second source of alpha is from what one might call activism. This means using financial resources to create, or obtain control over, real assets and to use that control to change the payout obtained on the financial investment. A venture capitalist who transforms an inventor, a garage, and an idea into a full fledged profitable and professionally managed corporation is creating alpha. A private equity fund that undertakes a hostile corporate takeover, cuts inefficiency, and improves profits is also creating alpha. So is a vulture investor who buys up defaulted emerging market debt

and presses authorities through various legal devices to press the country to pay more.

A third source of alpha is financial entrepreneurship or engineering – investing in exotic financial securities that are not easily available to the ordinary investor, or creating securities or cash flow streams that appeal to particular investors or tastes. Of course, if enough of these securities or streams are created, they cease to have scarcity or diversification value, and are valued like everything else. Thus this source of alpha depends on the manager constantly innovating and staying ahead of the competition.

Finally, alpha can also stem from liquidity provision. For instance, investment managers, having relatively easy access to finance, can hold illiquid or arbitrage positions to maturity: if a closed end fund is trading at a significant premium to the underlying market, the manager can short the fund, buy the underlying market, and hold the position till the premium eventually dissipates. What is important here is that the investment managers have the liquidity to hold till the arbitrage closes.

4| Illiquidity seeking

This discussion should suggest that alpha is quite hard to generate since most ways of doing so depend on the investment manager possessing unique abilities – to pick stock, identify weaknesses in management and remedy them, or undertake financial innovation. Unique ability is rare. How then do the masses of investment managers justify the faith reposed in them by masses of ordinary investors? The answer is probably liquidity provision, which is the activity that depends least on special managerial ability and could be termed the poor manager's source of alpha.

The problem when the world has excess desired savings relative to investment, and when central banks are accommodative, is that it is awash in liquidity. Many investment managers can enter the business of liquidity provision, and even as they take ever more illiquid positions, they compete away the returns from doing so. The point is that current benign conditions engender "illiquidity seeking" behavior. But they could have worse effects.

5| Tail risk and herding

For what is the manager with relatively limited ability to do when central banks flood the market with liquidity and the rents from liquidity provision are competed away? He could hide risk – that is, pass off returns generated through taking on beta risk as alpha by hiding the extent of beta risk. Since additional risks will generally imply higher returns, managers may take risks that are typically not in their comparison benchmark (and hidden from investors) so as to generate the higher returns to distinguish themselves.

For example, a number of hedge funds, insurance companies, and pension funds have entered the credit derivative market to sell guarantees against a company defaulting. Essentially, these investment managers collect premia in ordinary times from people buying the guarantees. With very small probability, however, the company will default, forcing the guarantor to pay out a large amount. The investment managers are thus selling disaster insurance or, equivalently, taking on "peso" or "tail" risks, which produce a positive return most of the time as compensation for a rare very negative return.[2] These strategies have the appearance of producing very high alphas (high returns for low risk), so managers have an incentive to load up on them, especially when times are good and disaster looks remote.[3] Every once in a while, however, they will blow up. Since true performance can only be estimated over a long period, far exceeding the horizon set by the average manager's incentives, managers will take these risks if they can.

One example of this behavior was observed in 1994, when a number of money market mutual funds in the United States came close to "breaking the buck" (going below a net asset value of USD 1 per share, which is virtually unthinkable for an ostensibly riskless fund). Some money market funds had to be bailed out by their parent companies. The reason they came so close to disaster was because they

2 *Peso risk is named after the strategy of investing in Mexican pesos while shorting the US dollar. This produces a steady return amounting to the interest differential between the two countries, although shadowed by the constant catastrophic risk of a devaluation. Another example of a strategy producing such a pattern of returns is to short deep out-of-the money S&P 500 put options (see Chan, Getmansky, Haas and Lo, 2005).*

3 *Certainly, the pattern of returns of hedge funds following fixed income arbitrage strategies suggested they were selling disaster insurance. The worst average monthly return between 1990 and 1997 was a loss of 2.58 percent, but losses were 6.45 percent in September 1998 and 6.09 percent in October 1998.*

had been employing risky derivatives strategies in order to goose up returns, and these strategies came unstuck in the tail event caused by the Federal Reserve's abrupt rate hike.

While some managers may load up on hidden "tail risk" to look as if they are generating alpha, others know that for the more observable investments or strategies for their portfolio, there is safety in mimicking the investment strategies of competitors – after all, who can be fired when everybody underperforms? In other words, even if they suspect financial assets are overvalued, they know their likely underperformance will be excused if they herd with everyone else.

Both the phenomenon of taking on tail risk and that of herding can reinforce each other during an asset price boom, when investment managers are willing to bear the low probability "tail" risk that asset prices will revert to fundamentals abruptly, and the knowledge that many of their peers are herding on this risk gives them comfort that they will not under perform significantly if boom turns to bust.

6| Risk seeking

Times of plentiful liquidity not only induce investment managers to seek illiquidity, tail risk, as well as herd, since they are also times of low interest rates, they may induce more familiar risk seeking behavior. For example, when an insurance company has promised premium holders returns of 6 percent, while the typical matching long-term bond rate is 4 percent, it has no option if it thinks low interest rates are likely to persist, or if it worries about quarterly earnings, but to take on risk, either directly or through investments in alternative assets like hedge funds. Similarly, a pension fund that has well defined long dated obligations will have a greater incentive to boost returns through extra risk when risk free returns are low. All manner of risk premia are driven down by this search for yield and thus risk.

So let me summarize. We are experiencing a widespread phenomenon of high productivity growth, but low investment relative to desired savings, which has pushed down interest rates and pushed up asset prices. With plentiful liquidity, investment managers have reduced the premia for risk as they search for yield. In an attempt to generate alpha, many managers may be taking on beta risk, and even underpricing it. Of course, low interest rates and plentiful access to credit will, for a time, result in low default rates, which will appear to justify the low risk premia. The search for yield and for illiquidity knows no borders as oceans of capital spread across the globe, and asset prices across the globe are being pumped up. As one says in French, "Pourvu que ca dure!"

7| Consequences

What could go wrong? Our hope is of a "soft" landing in the real sector where the factors that led to the current real sector imbalances reverse gently – for instance, domestic demand picks up in the non-industrial world, and growth recovers in Europe and Japan, even while tighter financial conditions slow consumption in the United States. As a better balance between desired savings and investment is achieved, interest rates move up slowly, credit becomes less easy (aided by central bank tightening), and illiquidity seeking and risk seeking reverse gently without major blow-ups.

Of course, if any of this happens more abruptly, the consequences could be uglier. I will not belabor the possible risks to the banking system. Indeed, I do think the greater concern has to be about the rest of the financial system, the 80 percent of value added by the financial sector that is outside the banking system. The non-bank sector is increasingly central to economic activity and is not just a passive holder of assets. Moreover, some non-banks such as insurance companies and some hedge funds are subject to runs. But most important, risks to financial stability are invariably compounded by political risk.

Let me explain this last concern. Finance, as Luigi Zingales and I have argued in our book *Saving capitalism from the capitalists*, is never popular. The anti-finance constituency gains especial clout in the aftermath of a financial crisis, and while some of the constraints it imposes on finance may be warranted, some like the Glass-Steagall Act, imposed in the United States after the Crash of 1929, are neither justified by the evidence nor, by most counts, welfare enhancing.

It may well be that today's financial sector comes out of a future political investigation smelling like

roses. But I see some ingredients that have me more concerned.

First, the general public's money is being invested in some of the more risky ventures, a fact highlighted by the revelation that a number of state pension funds were invested in a risky hedge fund like Amaranth. Diversification into such alternative investments can be a valuable component of an overall investment strategy if it is carefully thought out. The problem is that all too often, it takes place as a form of herding and late in the game – after lagging pension managers see the wonderful returns in energy, commodities, or from writing credit derivatives made by their more competent or lucky competitors, there is pressure on them to enter the field. They do so late, when the good hedge- or commodity funds are closed to investment, and when the cycle is nearer peak than trough. Myriad new unseasoned hedge or commodity funds are started precisely to exploit the distorted incentives of the pension or insurance fund managers who queue like lemmings to dutifully place the public's money. Thus far losses from isolated failures have been washed away in diversified portfolios and the public has not noticed. Will this always continue?

Second, the fees charged by investment managers like hedge funds and private equity cannot but arouse envy. It is surprising that despite the furor over CEO pay, very little angst has been expressed over investment manager pay, even though Kaplan and Rauh (2006) suggest that investment manager pay growth has probably exceeded CEO pay growth.[4] My sense is that there is a belief amongst the public that many investment managers are following sophisticated investment strategies –in other words, that the managers are generating alphas and earning returns for their talents– hence their pay is not questioned.

Yet investigations of collapsed funds such as Long Term Capital Management (LTCM) don't seem to indicate terribly sophisticated strategies –indeed more beta than alpha. While there is a selection bias in examining failed funds –they are likely to have more beta– it is also likely that large funds with unsophisticated strategies got to that size through a series of lucky bets that paid off. So their managers will have taken home enormous sums of money before it is realized that they had simply been gambling with other people's money. Large losses, "greedy" managers, and an angry public– this is a perfect scenario for a muck-raking politician to build a career on. The regulatory impediments that could be imposed on the investment managers who add value, and on the financial sector as a whole, could be debilitating.

Third, and accentuating the political problem, is that while it is clear to the public how a bank making a loan benefits the real economy or "Main Street", it is less clear to it how an investment manager who spreads and allocates risk, improves governance, or reveals information through his trading, helps. We economists know these are very important functions in the economy but they are not so easily sold politically.

And finally, since capital has spread across borders, any sudden future retrenchment could not only inflict pain on recipient countries but also generate foreign political pressure seeking to impede the free flow of capital.

The last few years have been, in many ways, the best of times for the world economy. The financial sector has contributed immensely. However, the current conjuncture has led to some practices that deserve examination. In particular, I worry whether compensation structures give too much incentive to take risk and, relatedly, whether pay is sufficiently linked to performance. Much of the debate has been over whether these are systemic concerns. My point today is that even if the consequences are not collectively important enough to stress enormous economies like those of the United States or the Euro area, if questionable practices are numerous enough, they could stress the political system, which then may react in a way that has systemic consequences. To avoid the risk of possibly excessive political reaction, it is important that the issues that I have just alluded to be discussed by the financial sector itself, and where necessary, and possible, adjustments made. It would be a shame if sparks from the red-hot financial sector set off a conflagration that destroyed the very real gains finance has made in the last few decades. Indeed, history suggests abundant caution.

4 *Kaplan (S.) and Rauh (J.) (2006): "Wall Street and Main Street: what contributes to the rise in the highest incomes?", Working Paper, University of Chicago.*

Hedge funds in emerging markets

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The paper outlines hedge fund activities in Asia and Hong Kong based on data from the Securities and Futures Commission in Hong Kong and private research firms specialised in hedge funds.

In terms of growth, investment strategies, use of leverage and investor base, hedge funds in Hong Kong display characteristics similar to those of hedge funds investing in Asia's emerging markets. Various financial sectors' exposures to hedge funds remain small across the region and certain Asian markets are observed to be at the forefront of an international movement to enhance the oversight of hedge fund activities.

However, the paper has highlighted the need for regulators to be aware of the potential concerns on hedge fund activities including the systemic risk on financial stability, investor protection challenge and the risk of settlement failure. Finally, the paper proposes to enhance the effectiveness of regulating hedge fund activities in the region through continued vigilance on counterparty risk management, enhancement on collection of data, improvement on cross-border and cross-market sharing of information as well as regulatory cooperation.

This paper provides an overview of hedge fund activities in the emerging markets[1] within the Asia Pacific region and the potential implications for financial markets, followed by a brief review of the current regulatory approaches in these markets and issues in relation to the oversight of hedge funds. As data on hedge fund activities in the region are very sketchy, our analysis is predominantly based on Hong Kong figures[2] as well as data from private research firms specialised in hedge funds.

1| Definitions

Since its inception in 1949 by Alfred Winslow Jones, hedge funds have become a very heterogeneous group of funds which in some cases have some common characteristics but do not necessarily hedge.[3] The term "hedge funds" is not legally defined in many jurisdictions but generally understood to be any investment vehicle that is privately organized, administered by professional investment managers, and not widely available to the public. In this paper, funds that exhibit the following characteristics are regarded as hedge funds:[4]

• use of alternative investment strategies such as long/short exposures, leverage (including leverage embedded in financial instruments such as derivatives), use of derivatives for trading purpose, and/or arbitrage techniques;

• pursuit of absolute returns, rather than measuring investment performance relative to a benchmark;

• charging performance-based fees in addition to a management fee based solely on assets under management; and

• having investment mandates that give managers more flexibility to shift strategy.

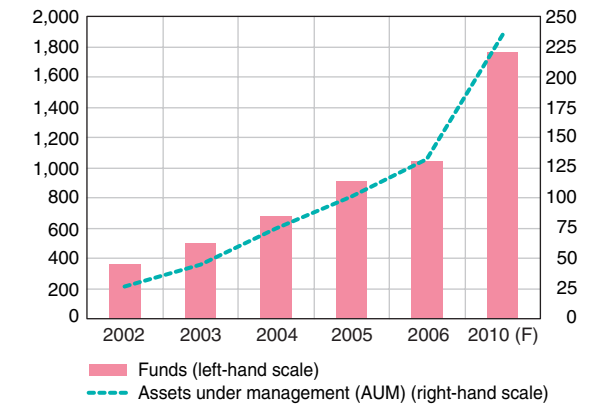
For the purpose of our discussion, the term "hedge fund managers" include those fund managers that manage hedge fund assets as well as those that advise hedge funds. The term "assets under management" (AUM) refers to the value of assets managed and/or advised by such hedge fund managers.

2| Recent developments of hedge fund activities in Asia's emerging markets

The assets of Asia-focused hedge funds have grown more than six times from around USD 20 billion in 2002 to over USD 130 billion by the end of 2006.[5] Some industry analysts have projected that the total would reach USD 250 billion by 2010[6] (Chart 1). According to Eurekahedge, the number of hedge funds currently investing and/or located in Asia stood at 1040,[7] an increase of over 15 per cent compared to 2005. These funds managed some USD 132 billion worth of assets. Excluding funds with a Japan, Australia and New Zealand or global mandate, however, only 335 of these hedge funds have a mandate for investing in Asia's emerging markets. Together, these 335 funds managed about USD 50.8 billion worth of assets, approximately 4 per cent of the estimated USD 1.2 trillion[8] asset portfolios managed by hedge funds worldwide. The figure jumps to around 8 per cent if hedge funds with a mandate for investing in Japan, Australia and New Zealand are included but is still far below the 15 per cent global share enjoyed by Asia's capital markets. In other words, Asia Pacific hedge funds still make up a smaller proportion of the world's hedge fund market capital than the capitalisation of the regional markets might indicate. Most industry players expect this gap to narrow quickly and indeed a trend of continued growth of assets and number of funds investing in Asia has been observed.[9]

1 *For Asia, emerging markets refer to the markets in the region excluding Japan, Australia and New Zealand.*
2 *Figures for Hong Kong are based on the "Report of the survey on hedge funds managed by SFC licensed managers (for the period 31 March 2004–31 March 2006)", issued by the Securities and Futures Commission (SFC) in October 2006.*
3 *See Hui (Hong Kong Monetary Authority), Mori (Bank of Japan) and Persson (Sveriges Riksbank) (2007)*
4 *These characteristics of hedge funds are used in the SFC survey on hedge funds.*
5 *Baddepudi (R.)*
6 *Gray (2006a)*
7 *Based on Eurekahedge's data as at 22 February 2007.*
8 *Source: SFC's Report.*
9 *McCafferty (2006)*

Chart 1
Growth of hedge funds in Asia Pacific

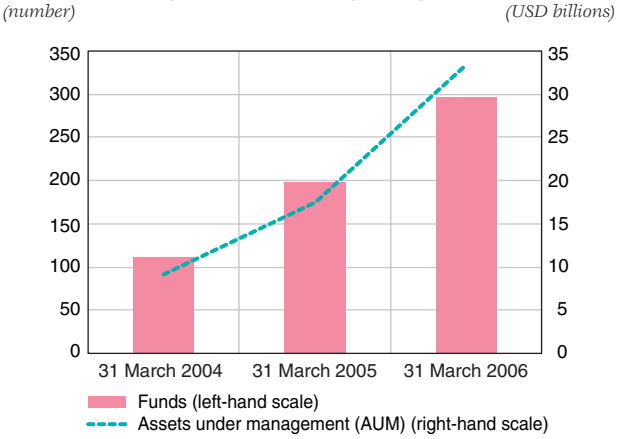


Source: Eurekahedge.

This impressive growth rate, observed by Simon Gray, has been assisted by a convergence of factors, notably the emergence of China as an economic power and the rebirth of Japan after a slump lasting more than 15 years, amid a general economic rebound across a region that now appears fully recovered from the financial crisis that afflicted many East and South East Asian countries in 1997.[10] In Hong Kong, the growth rate of hedge funds between 2004 and 2006 also resembles that of the Asia Pacific (Chart 2).

As shown in Charts 3 and 4, smaller hedge funds (i.e. with AUM of USD 100 million or less) make up a 60 per cent majority of the hedge fund industry in the emerging markets within Asia. One should expect this to change, however, as more and more large hedge funds in the overseas are attracted to the region. Take Hong Kong for instance, larger hedge

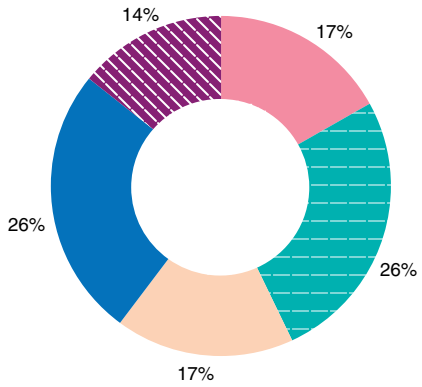
Chart 2
Growth of hedge funds in Hong Kong



Source: SFC's report

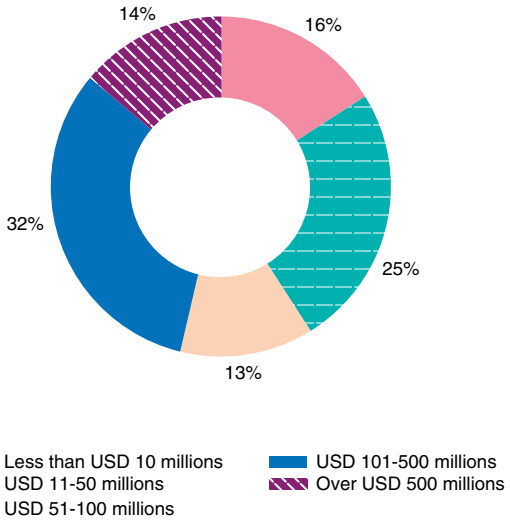
10 Gray (2006a)

Charts 3 and 4
Assets under management (AUM)
Per individual hedge fund in Asia Pacific



Source: Eurekahedge.

Per individual hedge fund manager in Hong Kong

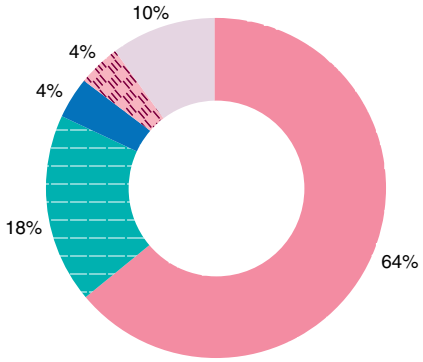


Source: SFC's report.

fund managers made up 46 per cent of the market in 2006, up from 34 per cent in 2004. As reported by the SFC, the average AUM of hedge funds also increased by 40 per cent from USD 81 million to USD 113 million between 2004 and 2006.

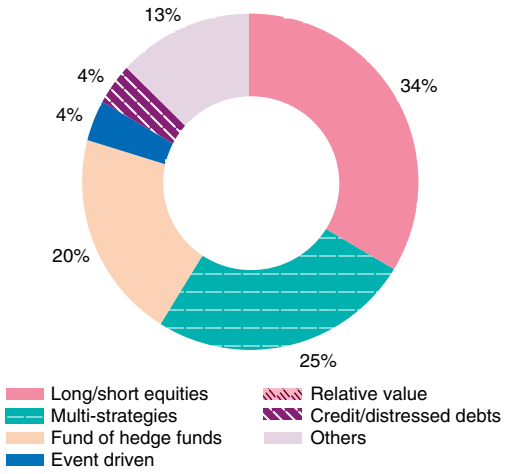
Long/short equities, employed by more than 60 per cent of the hedge funds (Chart 5), is still the most popular investment strategy in Asia's emerging markets. Such a high popularity of a relatively less sophisticated strategy might indicate that the hedge fund industry in Asia's emerging markets is still in the early development stage. This might also reflect the fact that equity trading predominates in the capital markets of Asia's emerging markets.

Charts 5 and 6
Distribution of hedge funds by investment strategies
In Asia Pacific



Source: Eurekahedge.

In Hong Kong

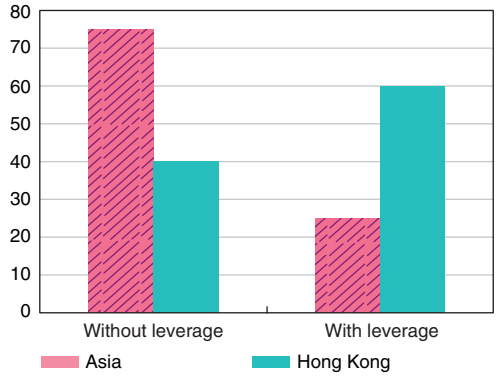


Source: SFC's report.

As shown in Chart 6, the picture in Hong Kong is similar but somewhat different. Only about one third (34 per cent) of the hedge funds in Hong Kong adopts equities long/short investment strategy which might imply the hedge fund industry in Hong Kong is relatively mature. There is a significant proportion (25 per cent) of hedge funds employing multi-strategies. Also worth noting is that about 20 per cent of the hedge funds in Hong Kong adopts fund of hedge funds investment strategy. This might reflect the growing interest of investors in these products as they are perceived to be less risky than single hedge funds due to more diversification of portfolio.

On the use of leverage, results from the SFC's survey indicated that 40 per cent of hedge funds (Chart 7) in Hong Kong do not use any leverage. While this is

Chart 7
Use of leverage by hedge funds
in Asia Pacific and Hong Kong
(%)



Sources: Eurekahedge and SFC's report.

considerably lower than the average of Asia Pacific in which 75 per cent of hedge funds have no leverage, the level of leverage in Hong Kong is not excessive given that majority of those which used leverage had a leverage of less than 200 per cent of its net asset value.

Traditionally, the investor base for the hedge fund industry was confined to high net-worth individuals. In the past decade, institutional investors have increasingly dominated the investment flowing into the hedge funds in Asia's emerging markets. In Hong Kong, the SFC's report concluded that majority of investors investing in hedge funds were institutional investors. This, argued by Hui *et al* (2006), is due to a combination of reasons including search for higher yield at the benign interest rate environment, portfolio diversification benefits, improved asset-liability management and growing public acceptance of hedge funds by institutional investors as alternative investment options.[11]

Statistics on various financial sectors' exposures to hedge funds are not readily available. However, based on the limited information we gathered, the levels of various financial sectors' exposures to hedge funds remain small across the region. According to the Monetary Authority of Singapore (MAS), the exposures of Singaporean banks to hedge funds amounted to less than 1 per cent of total assets. In Hong Kong, according to an informal survey conducted by the HKMA in late 2006, the level of the banking sector's direct and indirect exposures to hedge funds was only 0.2 per cent of total assets.

11 *Hui* et al *(2006).*

3| POTENTIAL CONCERNS ON HEDGE FUND ACTIVITIES IN ASIA

At the time of the Asian financial crisis, the main concern shared by many Asian regulators was for the highly leveraged positions incurred by macro hedge funds that could destabilise currencies in small and open emerging markets. This is the so-called "Elephant in the pond" issue. However, with the reduction in the number of macro hedge funds in recent years, their significance has largely reduced. Major credit providers and counterparties of hedge funds have generally improved counterparty risk management while hedge funds have downsized and become less leveraged. The collapse of Amaranth in September 2006, however, has again aroused concerns on the activities of hedge funds, particularly the systemic risk they pose to financial stability.

The concern on systemic risk is that a large number of hedge funds employing similar strategies in the markets would increase the volatility of financial markets through momentum trading. Recent episodes[12] seem to support this argument although Hui *et al* (2006) has pointed out that this concern should not be restricted to hedge funds or absolute return portfolios but are probably more an externality of relative portfolios, i.e. index portfolios and mutual funds, that track a benchmark index. However, it is clear that hedge funds, as frequent and aggressive traders in the emerging markets, are becoming the biggest clients[13] in generating brokerage business. Fierce competition for hedge funds' business could force some banks and securities firms to relax their risk management measures, allowing hedge funds to increase their leverage and exert an even bigger influence on the volatility and liquidity of the financial markets.

Another concern is that investors may not fully understand the risks involved in hedge funds as they are largely unregulated and there is a general lack of transparency of their investment strategies and portfolio composition.

It should also be noted that fantastic growth of derivative markets and hedge funds of the last few years has taken place in benign times. The resilience of the valuations, the diversification of portfolios, the depth of liquidity and firms' risk management have not been tested by a severe shock. Potential rationalisation of large number of small funds into a smaller number of large funds could also affect the short-term stability of the financial markets. Recent empirical studies on tail risk have also revealed that the perceived diversification benefits of hedge funds do not extend to periods of extreme market conditions and that the true market risk of hedge funds has been underestimated.[14] The regulators must be aware of these risks and strive to understand, assess and mitigate these risks.

The growth of hedge funds and over-the-counter (OTC) derivative trading also raises concerns on settlement. With confirmation of complex OTC derivatives being decentralised and non-standardised, backlogs of unconfirmed trades might be built up among market participants, especially in times of significant market volatility. Such backlogs of trades, coupled with market volatility, are likely to intensify the overall systemic risk of financial markets.

4| REGULATORY APPROACHES

It is important to note that the US, UK and other major regulators hold the view that direct regulation of hedge funds is inappropriate. The oversight of hedge fund activities has mainly taken the form of counterparty risk management.[15] In particular, regulated financial institutions have been reminded to aggregate their exposures to hedge fund counterparties on an institution-wide basis and demand sufficient margins for such positions. Regulators have also begun to monitor more closely financial institutions' exposures to hedge funds to ensure that sufficient capitals have been set aside against these risks.

12 *For instance, the sell-off in global equities in mid 2006.*

13 *As reported in Hedgeweek Special Report February 2006, hedge funds with offices in Singapore and Hong Kong generated 30 per cent of all reported commissions earned by brokers over the past 12 months on trades of Asian stocks.*

14 *Studies have shown that hedge fund returns tend not to follow a normal distribution but ones that are characterised by fat tails. This means that contagion between hedge funds and the market (traditional assets) cannot be adequately diversified, particularly in extreme market conditions. In other words, funds with low correlation with the market can still collapse when the market collapses. Please refer to Hui* et al *(2006) for more in-depth discussion on tail risk.*

15 *See for instance the Hong Kong Monetary Authority's Circular of 9 March 1999 on "Basle Committee on banking supervision's report on banks' interactions with Highly Leverage Institutions (HLIs) and sound practices for banks' interactions with HLIs".*

While efforts in the United States to subject hedge fund managers or advisers in the United States to registration have so far been unsuccessful,[16] some Asian markets such as Hong Kong and Singapore require hedge fund managers[17] to register with the relevant regulators, regardless of whether the funds they manage are authorized or not. This registration requirement subjects the hedge fund managers to the relevant codes and regulations. Hong Kong and Singapore are also among the first and the few jurisdictions to, for investor protection reasons, require all hedge funds offered to the public to be authorized. Some of the mandatory investor protection measures include reporting requirements on the funds' performance, leverage, risk measure (e.g. Value-at-Risk) and concentrated exposures as well as the qualification and experience requirements for the personnel in charge of managing the funds.

But the greatest challenge to the supervision of hedge funds is arguably the lack of data as hedge funds, being unregulated, are not obliged to disclose information to regulators. The problem is more acute in the OTC derivatives markets, where participants are not required to report their open positions to regulators. In the collateralised debt obligations market, where hedge funds are active traders, regulators have little information about the size of hedge fund positions and the level of leverage that the prime brokers are providing to support these positions.

Similar to their overseas counterparts,[18] some regulators in Asia, such as the SFC in Hong Kong and the MAS[19] in Singapore, are trying to fill the gap by collecting more information about hedge funds' activities from the prime brokers (i.e. banks and securities firms) to monitor their potential risk exposures to hedge fund counterparties. There are also attempts to improve the transparency of the OTC markets in which most hedge funds operate. With the growing share of hedge funds in the financial markets and their broadening investor base, more and more regulators within the Asia Pacific region and in overseas are reviewing whether hedge funds should be placed under a more well defined regulatory and disclosure framework.

It must however be noted that certain regulators within the emerging markets in Asia share the view of the Bank of England[20] that the growth of hedge funds is not the major source of vulnerability in the financial systems. In Singapore, for instance, some industry practitioners have observed that the Government is taking a number of initiatives to make the country more attractive as a hedge fund destination, perhaps in recognition that there is a place for hedge funds in the market, and that regulators should focus on systemic risk to the market rather than actual investments.[21] And it is hard not to recognise the benefits hedge funds could bring to the local financial systems. In Hong Kong, for instance, latest SFC's data showed that 30 to 40 per cent of the daily turnover on the stock market comes from hedge funds. In other words, over 30 per cent of market liquidity is provided by hedge funds. And this trend is expected to continue.

Indeed, the growth of hedge funds should not be viewed as necessarily bad for stability. From a systemic point of view, the growth of hedge funds and the derivative markets they feed off is part of a shift from bilateral negotiated banking finance to arms length finance through asset markets. In the long run, the active trading of hedge funds makes markets more liquid and facilitates genuine hedging activities. This should be good for the stability of financial market. Increasingly, hedge funds have become an important part of the risk transfer process, providing liquidity to evolving structured derivative markets. So hedge funds can be positive for market efficiency, particularly in the emerging markets.

16 *In 2004, the Securities and Exchange Commission made an effort to subject hedge fund managers or advisers to mandatory registration through an amendment of rules. But a federal court in June 2006 has overturned that 2004 amendment on technical grounds, and the ruling gives rise to a wave of withdrawal of registration by hedge fund managers.*

17 *In Hong Kong, all hedge fund managers are required to be licensed regardless of whether the related fund is privately or publicly offered. In Singapore, hedge funds offered only to institutional investors are not subject to any authorization or recognition requirements.*

18 *The Financial Services Authority in the United Kingdom, for instance. There have also been debates in the United States on whether the OTC futures market should also be subject to the regulation of the Commodity Futures Trading Commission.*

19 *In May 2005, the Monetary Authority of Singapore conducted a survey of the Singapore banking sector's exposure to hedge funds, covering all commercial and merchant banks in Singapore. In addition, a few financial institutions identified by the industry to have significant prime brokerage businesses were short-listed and surveyed on their prime brokerage activities in Singapore.*

20 *Speech by Sir John Gieve, Deputy Governor, Bank of England (2006)*

21 *Gray (S.) (2006b)*

Hedge funds are here to stay, with increasing influence and impact on the financial systems of the emerging markets in Asia. They have helped to increase market liquidity and enforce market efficiency but the systemic risks they pose to the stability of financial markets needs to be managed. There are different views regarding regulation of hedge funds, but a common agreement is that focus should be on the hedge funds' counterparties –particularly the systemically-important institutions– being able to manage their risks.[22] In other words, regulators should continue to be vigilant on counterparty credit risk management by regulated entities. To foster market discipline on hedge funds, regulators should, as suggested by The President's Working Group on financial markets[23] in the United States, clearly communicate to regulated entities their expectations regarding prudent management of counterparty credit exposures. To enhance the overall effectiveness of regulating hedge fund activities in the emerging markets, however, financial regulators in the region would also need to improve collection of data on hedge funds and their activities, increase cross-border and cross-market sharing of information with other regulators, and develop some form of regulatory cooperation to avoid regulatory arbitrage.

22 *Hui* et al *(2006).*
23 *The President's Working Group (PWG) on Financial Markets (2007).*

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Fund of hedge funds: origins, role and future

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The emergence of the fund of hedge funds (FoHF) was the natural evolutionary outcome of the appearance of the hedge fund itself and its consequential rapid rise to success as a result of offering absolute returns to a market where the generality of world savings was invested in relative returns. However, the lack of transparency, large minimum required investment and some early highly publicised accidents restricted access to this investment class mainly to high net worth individuals. To overcome this, the concept of packaging hedge funds into funds of hedge funds was born, though at first with mainly institutional investors using these funds as providers of ill-defined alpha rather than introducing them into their portfolios as a particular style.

From this simple beginning, the role of the fund of hedge funds has evolved into today's fully-fledged multi-manager. This progression occurred naturally as the growing concern to identify more rigorously the type of risk from which hedge funds generated their returns and the need for managers to prove their added value meant that, increasingly, funds of hedge funds had to clarify their role in terms of risk management, asset allocation and reporting as they do today. A lack of experience, together with the complexity of risks to which hedge funds were exposed, highlighted both the importance of making a risk assessment prior to an investment, and the importance of risk management during the investment's lifetime.

Despite a better understanding of risk exposures and alpha sources, building a well-diversified multi-manager portfolio remains a difficult task. However, due to their in-depth knowledge of alternative styles and their use of an investment process combining top-down asset allocation and bottom-up manager selection, funds of hedge funds have been able to build robust portfolios, generating absolute returns over the long term. Furthermore, capitalising on their ability to consolidate and interpret information from various hedge fund managers has allowed funds of hedge funds to produce meaningful reports for their investors.

Over the last few years, it has been thought that the huge inflow of money into this universe would exhaust the source of alpha. However, this capacity constraint concern has since faded (to be replaced to a certain degree by manager constraints) and funds of hedge funds have been able to strengthen their role by providing secured access to a diversified source of alpha as a result of their ability to identify, monitor and time risk factors.

The knowledge acquired in understanding and evaluating the role of skills in producing absolute returns has also proved to be of value when applied to the traditional space, and has contributed to broadening the added value of the managers' institutional proposition. As funds of hedge funds have become fully-fledged multi-managers in their own right, they are also now able to compete in the institutional sector with the traditional multi-manager.

1| ORIGIN OF FUNDS OF HEDGE FUNDS

The emergence of the fund of hedge funds was the natural evolutionary consequence of the appearance of the hedge fund itself and its rapid rise to success. During the 1980s, hedge fund capital grew by several hundreds of billions of dollars, offering absolute returns to a market where the generality of world savings was invested in relative return funds linked to traditional benchmarks. Fuelled by their superior performance, absolute returns generated by hedge funds went from 15% per annum (versus a balanced world index of 10%) in the 1980s to 19% (versus a balanced world index of 9%) in the 1990s. (see Chart 1)

On a risk-adjusted basis, absolute returns have performed four times better than relative returns –contrary to general belief. Even when the abnormality of absolute returns is included in the risk quantification, investors who were used to evaluating their investment on a relative risk basis (i.e. on the risk of underperforming the traditional benchmark) recognised that relative risk had to be reconsidered in the evaluation of the probability of benefiting from positive performance. This new attitude dramatically increased the attraction of absolute risk adjusted returns and of hedge funds. Mitigating this success, however, was the lack of transparency offered by the new breed of hedge fund managers, jealous to guard the secrets of their successes.

Inevitably all hedge fund managers were not born equal. Since 1993, several accidents (Granite CTA (1993), LCTM (1998), Manhattan (2000) and more recently Bayou Capital (2005) and Amaranth (2006)), have made headlines that have sulphur-tainted the success story. Greed and fear played their roles in the selection of hedge funds and in the positioning of these investment vehicles in an optimum manner. Moreover, hedge funds broadly were reserved for high net worth clients able to make the minimum required investment of upwards of USD 500,000. These forces came together to spawn the creation a diversified portfolio of hedge funds accessible to lower level uptake.

Chart 1
Performance comparison – absolute vs relative return
(Monthly data, January 1990 – December 2006)

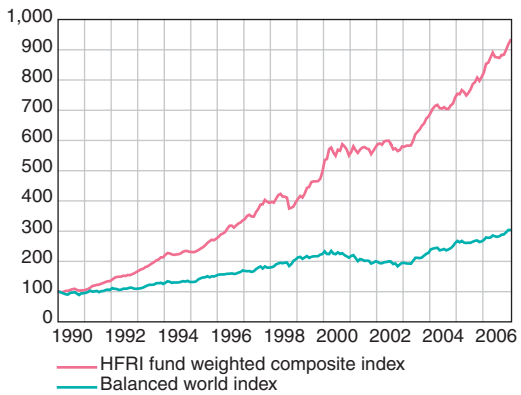
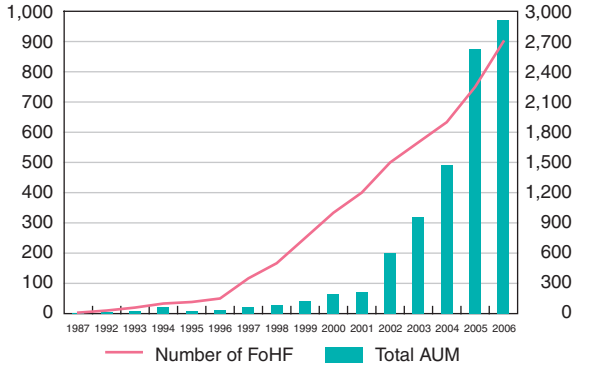


Chart 2
Funds of hedge funds (FoHF) growth
1987-2006
(USD billions) *(number)*



Sources: Hennessee Group, Barclay Group

Hedge funds packaged into funds of funds were an evolutionary success story that led assets under management (AUM) to USD 42 billion by the end of 1999, soaring to USD 972 billion by the end of 2006 and to one trillion dollars today – 111% cumulative per annum growth over the period. (see Chart 2)

Packaging indeed it was, with added value from the manager consisting mainly in offering a simple diversification and some mutualisation of the specific risk with an average number of investments amounting to between 10 – 25 different hedge funds. Such a simple construction led the managers to concentrate on investing in the larger and most successful hedge funds for which due diligence and evaluation of performance was easier to achieve than for younger, more specialised funds that did not offer a long track record. In other words, fund of fund managers were relying in most cases on the successful hedge funds to make their own offering attractive with little added value other than that of providing access to quality capacity. This had the immediate consequence of

fund of fund returns converging quickly to the mean return of hedge funds (less the fund of fund fees), with very little dispersion around the mean. Another consequence, less noticeable in the beginning but nonetheless consequential for the industry, was that institutional demand for these products resulted in lower fees as fund of funds were substantially similar and managers were not yet competing on added value. This situation led institutions, encouraged by consultants, to look at fund of funds as an asset class (as differences were not obviously identified) and to introduce them into their otherwise traditional portfolios as providers of ill-defined alpha rather than introducing them as a style with the accompanying benefits in terms of asset allocation.

In other words, investing in alternative products consisted mainly in monitoring the tracking error of the traditional allocation model resulting from the introduction of absolute return.

This situation lasted until the early years of the present decade, when increasing concern over the need for the more rigorous identification of the type of risk from which hedge funds generated their returns, as well as the growing need to stand out from the crowd and embrace the challenge of adding value in order to survive, began to take effect. To convert the fund of hedge funds business from a popular (albeit not well understood) fad into a solidly based industry, their role evolved from the original simple model to today's fully-fledged multi manager, allocating capital by strategy rather than by asset class or geography. Indeed, some time ago, as globalisation took effect, geography as a means of diversification disappeared. At the same time, bonds and equities in the deflationary boom cycle (such as the one we have been in since 1980) have been seriously correlated thus reducing significantly the quality of a traditional balanced mandate. So, allocating capital to different hedge funds meant, de facto, allocating capital to different styles and strategies. With this, the role of a fund of hedge funds became clear –to select the best managers for the relevant style, ensuring quality of performance and capacity, as well as structuring the appropriate liquidity to allow for an optimum dynamic allocation process.

2| HEDGE FUND RISK

Hedge funds make the headlines with unfortunate regularity. High profile collapses, generally accompanied by huge losses for investors and (less well-publicised) lengthy and costly legal engagements, are a well-travelled track.

Amaranth and Bayou Capital are two recent, notorious cases –though the causes of each collapse were very different. Amaranth, a respected multi-strategy American hedge fund, lost almost USD 10 billion from a single massive spread bet on energy futures that went against them. The loss was never recovered and the company ceased activity not long after. In the case of Bayou Capital, the company defrauded investors of half a billion dollars by manipulating illiquid security prices with the help of it own associated brokerage company.

These two examples illustrate the variety of risks to which a hedge fund investor is exposed. Fraud and market risk are not the only dangers. Because many hedge funds use significant leverage in an effort to generate outsize returns, even a small investment management blunder can cause a massive implosion. A hedge fund is not a risk-free investment.

Risks are commonly divided into three categories: market risk, investment management risk and operational risk. The Financial Services Authority (FSA) estimates that around twenty hedge funds collapse every year. The majority of these appear to be the result of operational risk (fraud and/or inadequate resource and structure) and only around 40% to be the result of investment risk (e.g. market and/or investment management).

Since hedge funds operate in a lightly regulated environment, little prevents a fund manager from misleading his investors. The investor (or the multi manager) has to fully understand and accept these risks and carefully monitor them. Risk management has therefore to be present at every stage of the investment process, a process that generally starts

with in depth due diligence (the initial risk assessment exercise applied to any candidate hedge fund). To this risk assessment is added a market risk analysis of the fund and its strategy.

The decision to invest in a hedge fund has to be accompanied by an effective monitoring process. This monitoring is only possible if a sufficient level of transparency can be obtained from the hedge fund manager.

Provided that these conditions are met, the investor is in a good position to manage his allocation passively or dynamically according to his own mode of management.

3| DUE DILIGENCE

Due diligence is the voluntary investigation of the business, legal and operational aspects of managers targeted for investment. The depth of the due diligence exercise is entirely up to the hedge fund investor. As it is now commonly accepted that the process significantly reduces the manager specific risk, proper due diligence is now considered as industry-standard by the great majority of fund of hedge fund managers.

Due diligence typically covers two main areas: the operational and legal set-up of the fund and of the management company, and the investment strategy and related risk management policy (if any). The first of these will typically include a brief history of the firm, the principal biographies, the various service providers and how they interact as well as the level of responsibility and accountability of the various parties. The second is aimed at describing how a hedge fund produces its returns, the type of instrument traded, how they are traded, how the portfolio is constructed and what are the risk management policies.

A more thorough review can be made. The inclusion in the due diligence of the fund service provider (administrator and prime broker, auditors) can, for example, be beneficial. This might enhance the independence of the pricing system (for illiquid securities) and other key factors in evaluating operational risk (e.g. ownership, staffing, execution procedures etc.).

Some companies would also include in their due diligence a principal background check and references (i.e. Securities and Exchange Commission filings, legal past or pending legal litigations).

A thorough due diligence should be an integral part of the process of investing in hedge funds and should never be overlooked or considered as a bureaucratic constraint. In the case of Bayou, proper due diligence would very likely have raised issues relating to the potential conflict of interest brought about by the ownership link between the management company and its brokerage arm. However, due diligence would not have protected against the collapse of Amaranth.

Due diligence can also be used in the asset allocation process by limiting the exposure to hedge funds that appear weak operationally but still show great potential (i.e. start-up funds).

In depth due diligence may require the extensive use of resources and where a hedge fund, perhaps by design, has a short opening and closing period to raise capital, the individual investor has a limited time to make an informed decision. As experts, funds of hedge funds can help in this process by providing skills and infrastructures that contribute to the reduction of manager specific risk.

4| TRANSPARENCY

The hedge fund industry has a culture of (occasionally justified) secrecy that poses problems for due diligence and risk monitoring.

Hedge funds are under no obligation to disclose information to investors. However, growing pressure from institutional investors is gradually imposing new standards of transparency such as weekly pricing, exposure reports, sector allocation etc. There are still improvements to be made, in particular in areas such as offering memorandums that define what a fund manager is allowed to do (as evident in recent discussions on PIPEs - private investments in public equity, side pockets and/or other complex fee or redemption term structures). Nonetheless, we have seen over the last few years significant changes. In general, hedge fund managers are now willing to cooperate with a due diligence exercise.

Full transparency, however, though conceptually appealing, poses its own questions. For instance, it is in everyone's interest to keep the hedge fund manager's competitive advantage quiet –if anyone wants it to remain so. Full transparency can erode a hedge fund's competitive edge and precipitate the collapse of the vulnerable. Transparency risks generating a false sense of security in investor and regulator alike. Full and timely transparency did not lead to the raising of a red flag about Amaranth's. Self evidently, hedge fund managers are remunerated for their ability to produce return and manage their specific risk and not for the data they provide to their investors. Amaranth's dutiful registering with the SEC of their long exposure did not prevent its collapse. But to argue that increased investor transparency requirements have reduced hedge fund performance is probably to exaggerate.

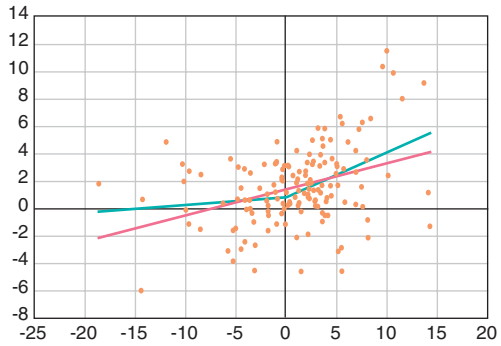
Nonetheless, an investor reasonably needs to monitor the risk to which he is exposed and appropriate transparency can be achieved without compromising the proprietary nature of a hedge fund's investment strategies. Disclosure can be limited to aggregated performance, exposures (long and short) and specific risk indicators (such as greeks, value-at-risk, margin to equity etc.). Some well-known quantitative third party risk management software providers now offer products and infrastructure that allow the fund manager and investors to share information without compromising confidentiality. A minimum level of transparency should include performance/risk attribution and contribution, broken down into meaningful categories (depending on the strategy), top exposures and strategy-specific risk measures.

Yet an investor can be rapidly overcome by the amount of information that needs regularly to be processed. This again is where fund of hedge funds can add value by providing skills and infrastructure to monitor investments and allocate capital accordingly.

5| RISK ASSESSMENT

A basic step in any alternative risk management process is to partition the universe of hedge funds into categories. In the alternative world, this partitioning exercise is generally driven by the manager's skills that determine the investment style or strategy, rather than by the more traditional asset class or geography sector that is commonplace in the long-only space. This is well illustrated by alternative index vendors who publish monthly returns of risk arbitrage, long-short equity, convertible bond arbitrage etc.

Chart 3
Regression analysis
(%; DJ EuroStoxx 50 monthly returns X-axis; Hedge fund monthly returns – Y-axis)



A hedge fund investor must then be able to identify the drivers or risk and return of each strategy and sub-strategy. Various quantitative methods can be used to analyse and monitor the systematic exposure of each strategy –the most straightforward one being simple or multiple regression analysis.

In addition to traditional market exposure, hedge funds are also exposed to 'alternative' factors, *e.g.* factors that result from the systematic approach of an investment style. Moreover, because of the active nature of most styles, it is important to recognise the non-linearity of the risk/return profile and its implications for the methods used in the quantification and monitoring of the relevant relationships. This is illustrated in the chart below that shows the relationship between the monthly returns of a well-known European long/short manager and the EuroStoxx 50 index.

In Chart 3, the red line measures the sensitivity of the return to the factor using a linear model; the green line uses a piecewise linear model (with slopes varying according to the direction of the market – positive versus negative). This analysis illustrates the typical non-linearity (the green is not a straight line) in the relationship between the hedge funds return and the reference index. This option-like pattern is typical of an absolute return manager – e.g. this analysis suggests that on average, in the long run, this manager loses less money than he gains.

This regression analysis also allows the identification of the alpha that is made up of 'pure alpha', or the manager's skills in selecting securities, as well as alternative betas, i.e. normal returns generated from an exposure to systematic risks, other than market risk. The change in the return profile of hedge funds is more likely to be due to a change in the value added through dynamic betas, which depends on the ability of managers to time factors successfully, whereas the level of pure alpha is linked to the number of opportunities available on the market.

For example, a very common strategy in the long/short equity was to have a long exposure to small cap equities and a short exposure to large cap equity. The sensitivity to this 'spread' cannot be well captured simply by analysing a small and large cap relationship separately. This is because there is a time dependent correlation between these two factors that is exactly what the fund manager is trying to exploit. For technical type strategies, a hedge fund investor can construct his own synthetic risk factor – for example to describe the return of a long volatility style, a simple benchmark can be constructed by combining a market index with a basket of options with the appropriate pay off structure. For trading, a simple benchmark can be constructed by applying a classical technical algorithm on a reference market index. This type of approach is obviously not suitable for all types of investment strategies.

Armed with these tools, a risk manager is in a much better position to understand the nature of the systematic risk to which he is exposed and to detect any potential drifts that are not easily identifiable through a basic analysis based purely on market factors.

The critical step in this approach is the ability to understand the fundamental nature of the strategy of the manager. This is where qualitative expertise comes into play.

This approach of systematic beta exposure analysis is universal but is irrelevant for some strategies that are more driven by market events. However, it remains one of the many risk indicators that should be analysed, despite its having the limitations common to any historical data analysis.

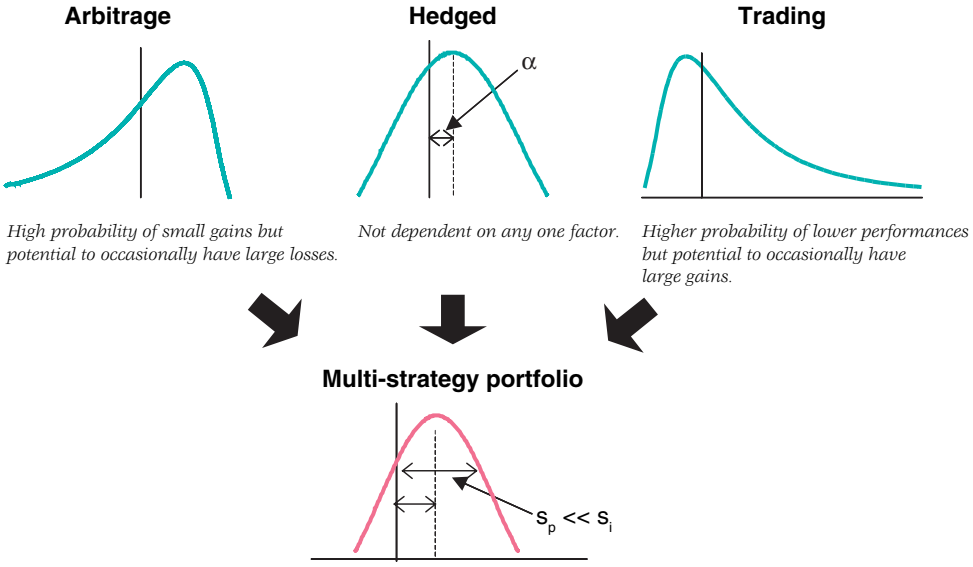
6| ASSET ALLOCATION

Despite all the risks associated with hedge funds and the difficulties of monitoring them, many believe such funds can play a constructive role in a well-diversified portfolio and it is here that risk management and portfolio management skills come into play. Traditional risk management techniques such as mean-variance analysis, beta and value-at-risk do not fully capture many of the risk exposures of hedge fund investments.

The very first question –how many hedge funds need to be invested in to diversify risk?– requires some careful thought given the nature of the risk involved. It cannot be answered by simply considering the correlation of historical returns because the variance and the covariance do not tell the whole story. To account for manager specific risk, another risk indicator (or maybe more than one other) that is more sensitive to the downside risk needs to be considered. The downside standard deviation, the conditional value-at-risk with or without Cornish Fisher expansions or the expected shortfall are good candidates. In most cases, there will probably not be a simple analytical solution and the answer to this simple question will almost certainly require some complex simulation analysis with the inevitable loss of generality that goes with it. Most simple studies suggest a minimum number of hedge funds to be in the range of ten to twenty. However, when introducing operational risk into the model, this number increases to dozens, resulting in a possible over-diversification of the alternative and traditional risks and their associated trading costs.

What percentage of a hedge fund portfolio should be allocated to a given manager in order to maximise the risk/adjusted return and/or satisfy a risk-return objective? There is no definite answer to this. Traditional asset allocation methodologies (mean-variance, capital asset pricing models, Black-Litterman methods) suffer from the same limitations as when used for traditional asset classes (historical bias, instability, complexity etc.). Moreover, for a hedge fund portfolio, the additional difficulty in measuring the risk of a portfolio of hedge funds and the non-normality of return makes these various

Chart 4
Gaussian and non gaussian distribution
(%)



approaches at best limited and, in most instances, inadequate. The answer to this question is still a matter of debate between academics and practitioners.

The generation of absolute returns requires an in-depth knowledge of alternative styles. Despite being referred to often as one single class, hedge fund strategies cover an extended range of styles, which have little in common with each other. Correlations between the various alternative styles are not stable and an active asset allocation allows the preservation of the risk and return characteristics of a portfolio over time. Similar to the long-only universe, this active process requires the combination of both a top-down and a bottom-up approach.

The top-down asset allocation starts with the identification of the macro-economic and common hedge fund factors, which have an impact on the risk and return of individual styles. The factors provide a statistical basis for the forecast of each strategy/style performance under various economic and market scenarios. Once the factors have been identified, the weights to each style, based on the mandate of the portfolio, can be allocated.

A key for the protection of an investor's capital and enhancing return is the active management of the asset allocation through a portfolio construction process based on those various alternative styles, geography and asset classes. As shown in chart 4, the distribution of returns is very different from one style to another. The management of a multi-strategy portfolio requires the blend of various strategies to provide a more stable return distribution with a higher positive alpha.

Once the weights have been defined at the portfolio level to optimise its risk and return profile, it is necessary to review and adjust the weights of the managers within each style. This can only be successfully achieved if hedge funds are properly classified between the various styles, which supposes an in-depth review and full understanding of the manager's investment process. The weights by managers are adjusted taking into account their risk contribution within the style and within the portfolio, their expected returns, based on their sensitivity to the style forecasted return and a qualitative review of the manager skills.

The bottom-up manager selection starts with the screening of the entire hedge fund universe to identify attractive new managers, which have then to be classified according to the identified styles. Based on the initial assessment and categorisation, a full due diligence process is set up in order to review in detail the qualitative, quantitative, legal and operational robustness of the manager.

A challenging step following the top-down asset allocation and the bottom-up manager selection is the reconciliation of the two processes in order to build a robust portfolio. The main challenge is to assess to what extent the risk, return and correlation forecasted for the style indices during the top-down asset allocation can be applied to the individual managers identified by the bottom-up selection. The more precise the definition of the styles and the more detailed the categorisation of the manager, the more accurate and robust will be the extrapolation of the forecasts from the indices to the managers. This is critical as it allows one to assume limited divergence between the managers and the relevant indices and to model the relationship using a linear equation under a single index model.

The robustness of any asset allocation model can obviously only be guaranteed by a regular review of both the top-down and the bottom-up processes. As correlations between styles are not stable, it is important to review the macro-economic and hedge fund factors regularly in order to adjust the style's weight and to preserve in the long term the portfolio performance. Similarly, managers within the portfolio have to be reviewed closely and on a regular basis to ensure that hedge funds do not drift from their original style and that their risk and return characteristics are in line with what is expected, i.e. that the manager does not significantly underperform his peers.

A useful tool for the manager review is to monitor abnormality or red flags. It is up to the investor to define these red flags and to put in place a monitoring process. These could be, for example, abnormal returns, a sudden increase in the fund's volatility, too large price discrepancies between estimates and final prices (for funds which provide estimated performance), or a large change in the hedge fund assets under management. Interestingly, most if not all hedge fund failures have happened to hedge funds, which have previously posted some outstanding risk-adjusted performance. Understanding how performers have achieved their best results is probably as important, if not more important, than worrying about their worst ones. When something looks too good, it is a good time to wonder if this is not indeed too good to be true, especially if a due diligence has raised issues about the pricing methodology used in valuing the fund assets. There is also the qualitative monitoring: change in service providers (such as the administrator or the prime broker) or change of fund terms (liquidity, fees etc.).

The limitation of the red flag approach is that when an abnormality is identified, it can sometimes be too late to be acted upon. This is why a hedge fund investor must have not just one but as many risk indicators as possible to enable him to make a wise and informed judgment.

7| REPORTING

Investing in hedge funds is not a free lunch. Committing money to this asset class is no guarantee of absolute returns. A successful alternative investment is more likely to be made in several hedge funds, allowing for a sufficient level of diversification by managers and across alternative strategies.

For many years, funds of hedge funds have been criticised for the poor quality of their reporting, which focused on comparing returns to a benchmark (often a market index), using indicators designed for the long-only universe, such as the Sharpe ratio. Thanks to the institutionalisation of the industry, the transparency of hedge funds has improved and managers are keener to disclose specific information, such as their various risk exposures, etc.

Despite this increased transparency, it would be a delusion to believe that producing a report on a portfolio of hedge funds is an easy task. The complexity and non-linearity of risks to which hedge funds are exposed cannot be assessed through traditional tools, because using those tools can lead to a significant underestimation of the risks associated to alternative strategies. Therefore these strategies require the use of more advanced indicators, such as style VaR, the Omega ratio, conditional beta analysis, etc.

Moreover, even within the same strategy, not all hedge funds communicate the same indicators to their investors, nor in the same manner. For instance, it would not be possible to compare correlation analyses if they were not calculated versus the same market index, over the same period and using the same frequency of data (daily, weekly, monthly, etc.). The production of a usable report requires infrastructure, as it requires the collection,

combination and interpretation of information received from the various managers.

Over the past few years, investors have been made aware of the importance of transparency when investing in the alternative universe, increasing their requirement for more detailed reporting on their investments. The main challenge facing fund of hedge fund managers is to produce reports that provide clear evidence of the value added and that meet the needs of their clients. For instance, there are no official definitions of the various hedge fund styles, and the categorisation of managers between the various styles can therefore be affected. Through their reporting, fund of hedge funds can help the investor to refine their definition of the various styles and improve their understanding of the alternative universe. They can also develop customised reporting, according to the specific needs of their investors (e.g. identification of specific risk exposures depending on the characteristics of the overall portfolio, i.e. both alternative and traditional allocation).

8| CAPACITY CONSTRAINTS

Hedge funds have been recognised since the 1980s for their ability to generate returns in excess of other asset classes. According to traditional performance attribution models, the part of the return that does not come from the rewards of market risk is considered to be alpha, or the manager skills that generate return in excess of the market. Due to the lack of transparency in hedge funds, it was difficult to identify the various risk exposures that they took, and most of their returns were considered as alpha. As academic research and transparency have progressed, hedge fund returns have been broken down into other sources of return and the portion of unexplained return, or alpha, has sharply decreased. However, alpha generation remains a corner stone in the hedge fund industry.

The capacity constraint issue first emerged with the need to identify managers able to generate alpha over a long period. Performance comparisons between hedge funds with a short track record and usually with small assets under management, and older funds with larger assets, highlight the overperformance of the former group of managers. Similarly, a manager will tend to generate higher return in the earlier years of his performance. However, those results should be put into context, as market conditions can significantly differ between the launch of a fund and its later maturity. Moreover, this does not imply that a manager with a long track record or large AUM is unable to continue to generate alpha.

Hedge funds managers usually define a maximum amount of AUM above which they consider they cannot fully implement their investment process and therefore generate alpha. As soon as this amount is reached, the fund is closed to new investment. Depending on the strategy, this amount can be limited to two hundred million dollars (e.g. ABL specialised hedge funds) or several billion dollars (e.g. global macro managers). From the investor's point of view, a closed hedge fund means not only a manager able to generate alpha on a consistent basis, but also a fund to which it is obviously almost impossible to gain access. Funds of hedge funds, due to the large range and long-term profile of their investments, are able to identify managers in their early years, while the alpha generation is at its maximum, and secure capacity when the fund reaches a more mature stage and is closed to new investment. Therefore, through their portfolios, funds of hedge funds are able to offer exposure to a long-term alpha-generating pool of managers.

Over recent years and with the declining returns of hedge funds, a new concern has emerged – that the capacity constraint shown at manager level has been extended to the overall hedge fund industry, with only a fixed amount of alpha available in the alternative universe. The large inflow of assets and the increased number of hedge funds would therefore reduce the alpha generated by each manager.

As described earlier, the pure alpha (i.e. stock selection) component accounts only for a limited part of a hedge fund return, while the active alternative beta timing constitutes the largest part of what is commonly called alpha. The overall amount of opportunities available in the market cannot be increased indefinitely and this could limit the production of pure alpha by hedge fund managers. However, regarding alternative betas, there is currently no clear evidence that new and existing managers are any less able than in the past. Even if the capacity of a manager to forecast trends and time factors can be affected by the market environment, it is not possible to conclude that this capacity has a tendency to decline with the increase

in the number of participants. The importance of beta timing as a way of generating excess return in the long term should be noted.

While the capacity constraint at the manager level is an issue for investors, the capacity constraint at the industry level is a myth. Funds of hedge funds can provide a solution to the capacity constraint at the manager level, by investing in new managers and securing investment capacity with closed funds. Nevertheless, the most important role of funds of hedge funds related to the capacity issue is the alternative beta identification and their ability to build portfolios diversified across the various risk exposures.

9| THE FUTURE

In the main, the future of funds of hedge funds depends on two factors: the continued growth of absolute returns in satisfying institutional requirements and the continued commitment from funds of hedge funds to adding value and constructing superior institutional portfolios.

The growth of institutional investment in hedge funds, directly or indirectly, seems set to continue at least at the same pace as in the past so long as the capacity for alternative and active investment styles continues to expand sufficiently and sustain growth in the AUM of multi managers operating in the alternative space. In other words, with close to 5% of the institutional pool of money invested today in alternative investments, the point of no return has been reached and the process of shifting from relative returns to absolute returns is irreversible. Such a trend is well illustrated by the increasing number of RFPs (requests for proposal) being despatched by institutions worldwide, and by the large influx of new types of clients, such as pension funds, entering the alternative space and contributing to its expansion.

As to the second, the commitment of funds of hedge funds in continuing to add value can be best reflected by the fact that, while they have so far been successful in generating absolute returns from decorrelated alpha, their ambition has, over the last five years, broadened to include market-related returns. Indeed hedge funds were the first to introduce market beta into their portfolio and capture market returns whenever appropriate. For example, several hedge fund managers have made it known that they will expand their long-only portfolio and reduce the proportion of their short positions. This evolution has not gone unnoticed by fund of hedge fund managers who, as a consequence, have had to integrate market directionality into their asset allocation model. In fact, the experience acquired in understanding and evaluating the role of skills in producing absolute returns, proved also of value when applied to the traditional space and contributed to broadening the added value of the multi managers' institutional proposition. Now that funds of hedge funds have become fully-fledged multi managers in their own right, they should be able to compete in the institutional sector and accept (as is their obligation) the responsibilities that go with that position.

Hedge funds: a central bank perspective

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The international financial system is undergoing a sustained process of structural change characterised by features such as the rapid growth of the hedge fund industry and credit risk transfer markets. In general, this development should generate positive effects for the efficiency of the financial markets. As the financial system is becoming more complex and less transparent, however, it is becoming a growing challenge for central banks to make an adequate assessment of the potential risks to financial stability.

From a monetary policy perspective, hedge funds are likely to influence the transmission mechanism as well as the international linkages between interest rates and exchange rates. However, it has proved difficult up to now to track these effects empirically. The main concern with regard to financial stability is that failures of one or more larger hedge funds might jeopardise the stability of major complex financial institutions and/or create market liquidity crises.

Probably the most important line of defence in containing potential risks to stability is adequate market discipline, which, in turn, requires hedge funds to be sufficiently transparent. There are doubts as to whether the purely market-driven process of recent years has produced sufficient progress in this respect. Therefore, given the key importance of market discipline exercised by the hedge funds' prime brokers, the recommendations of the Counterparty Risk Management Policy Group II (Corrigan Group) should, as a matter of principle, be implemented in full. These recommendations contain proposals on hedge funds' disclosure vis-à-vis *counterparties. Especially prime brokers should aim at tailoring credit terms, especially collateral and margin requirements, to the transparency and the risk profile of their respective hedge fund counterparties.*

The increasing investments of institutional investors such as pension funds, foundations, and insurance corporations are, on the whole, likely to help improve the quality of hedge funds' risk management and disclosure. Nevertheless, there are evidently still considerable differences in disclosure practices and the current recommendations of the hedge fund industry associations fall somewhat short of earlier international recommendations. Against this backdrop, it would be desirable if the hedge fund industry were to define more demanding sound practices of disclosure to investors. It would also be useful if such best practices were to be incorporated into a voluntary code of conduct. Finally, it might be worthwhile examining whether the current indirect approach to monitoring regulated financial institutions' substantial risk exposures to hedge funds should be further improved, for example, by strengthening the international cooperation among prudential authorities.

Central banks are committed to not impeding an efficiency-enhancing process of structural transformation that can be observed within the financial system. At the same time, however, a suitable framework needs to be put in place so as to ensure adequate market discipline and the appropriate degree of transparency. This would constitute a key safeguard against significantly increased macroprudential stability risks in the wake of any market adjustments in the hedge fund industry in a less favourable economic setting.

1| HEDGE FUNDS AS PART OF THE STRUCTURAL CHANGE IN THE FINANCIAL SYSTEM

The rapid growth of the hedge fund industry is one of the most striking aspects of the structural changes that have occurred in the international financial system during the past few years. "Hedge fund" is a catch-all term for a very heterogeneous and not clearly definable group of market players that pursue a wide array of differing strategies in which the use of leveraged instruments (such as loans and derivatives) is generally a key common feature.[1] The globally low interest rate setting and the ongoing search for yield in the financial markets have doubtless been important catalysts in this sector's expansion. There is, however, much to suggest that the burgeoning of the hedge fund industry should be regarded not as a cyclical phenomenon but rather as part of a sweeping structural change in the international financial system. In this sense, hedge funds appear to be both an indicator and a driver of fundamental changes in the market landscape.

In this dynamic environment, hedge funds are playing an important and essentially positive role in financial market developments. Owing to their buoyant trading activity, they generally help to increase liquidity in the financial markets and to support the price discovery process, i.e. they promote market efficiency. Hedge funds also contribute to the completion of the financial markets by investing in illiquid and novel financial instruments and by improving their tradability. This is highlighted, for instance, by the major role hedge funds are now playing in the use of credit risk transfer instruments. Hedge funds are thus integrally involved in the ongoing expansion of the derivatives markets.

The multiplicity of arbitrage strategies is bringing different market segments –such as the equity, credit and derivatives markets– closer together and is increasing their interdependence. At the same time, hedge funds' cross-border trading activities are increasingly interconnecting national financial markets –a phenomenon that may be understood as part of the globalisation of the international financial system.

In addition, hedge funds are involved in deep-reaching changes in the financial system's intermediation process. Two aspects deserve special mention here. First, there is a trend towards a partial shifting of risk from traditional financial intermediaries, such as banks, towards hedge funds and other entities. During the past few years there has been an observable tendency in the business model of the large, complex financial institutions towards risk intermediation. Innovative financial instruments have enabled financial institutions to actively manage and increasingly trade credit risks. In this context hedge funds are acting to a growing extent as risk takers (and guarantors), especially of riskier credit tranches, in their quest for attractive returns.

The second aspect is that investors find hedge funds attractive as specialised asset managers, not least because they are, in principle, not subject to any restrictions with regard to asset classes and instruments. The expectation of portfolio diversification and the attainment of alpha returns are major considerations in this context. Moreover, the evolution of new asset classes and the widening array of financial instruments, along with their increasing complexity, are placing growing demands on investors' asset and risk management. This is promoting the emergence of specialised intermediaries. As a result, the hedge fund industry is now managing a relatively small but growing share of the total financial assets of the global financial system and is now being seen as a new type of financial intermediary.

All this has made the financial system much more complex. The challenge of monitoring and analysing this structural change is heightened by the fact that the growing prominence of the hedge fund sector and the explosive growth of OTC derivatives and other credit risk transfer instruments is being accompanied by dynamic interactions and greater opaqueness in the financial markets.

1 *Other major features are that hedge funds are not subject to any restrictions with regard to the type of instruments and strategies employed and that the hedge fund managers generally receive performance-related fees. See also ECB (2005): "Hedge funds and their implications for financial stability", Occasional Paper Series, No 34.*

2| HEDGE FUNDS AND CENTRAL BANKS

The key issue for central banks is hedge funds' relevance to their core area of responsibility. There are virtually no direct points of contact between central banks and hedge funds. Hedge funds are not a counterparty in monetary policy operations, nor are they, as a rule, a counterparty in other market transactions.[2] Since hedge funds are not subject to any comprehensive direct prudential monitoring, there is no interface arising from central banks' banking supervisory function either. Even so, central banks have a twofold interest in the development of the hedge fund sector –with regard to the possible implications for, first, monetary policy and, second, financial stability– as the activities of hedge funds may also entail macroprudential risks.

The foremost monetary policy aspect is hedge funds' potential impact on the monetary policy transmission mechanism. One major analytical difficulty here, however, is that it is very hard to clearly distinguish the possible implications of hedge funds' activities from the aforementioned deep-reaching structural changes in the financial system. It may be assumed, however, that, as a result of hedge funds' activities, the relative importance of the individual monetary policy transmission channels is shifting further along the lines that were already noted more than a decade ago in connection with the growth of OTC derivatives markets.[3] The interest rate channel, for example, is likely to be strengthened given that hedge funds customarily borrow short-term funds to finance their (longer-term) investments. Moreover, it is to be expected that the international investment strategies often pursued by hedge funds generally increase the international linkages between interest rates. This is illustrated by the debate on the role of (cross-border) carry trades. In turn, this has probably strengthened the importance of the exchange rate channel, too. It is therefore not surprising that exchange rates are becoming increasingly sensitive to interest rate differentials –or to changing expectations of future interest rate differentials– between currency areas. It would undoubtedly be an exaggeration to ascribe such developments solely to the influence of hedge funds. It should be noted, however, that some banks (and possibly also other investors) seem to be pursuing investment strategies similar to those of hedge funds, thereby reinforcing such effects.

By contrast, the central bank's direct influence on the credit channel of the monetary policy transmission process is likely to be diminished further by hedge fund activities. The ability to pass on loans or loan tranches –especially riskier ones– to risk-seeking investors such as hedge funds, for example, is increasing banks' flexibility in lending. Overall, this broader allocation of credit risk within the financial system should tend to reduce credit restrictions and improve borrowers' access to debt financing.

3| RISKS AND RELEVANCE TO FINANCIAL STABILITY

The key link between hedge funds and central banks, however, is the relevance of hedge funds to financial stability, which is an integral part of the central bank's mandate. Given the role that hedge funds play in the international financial system, they are of considerable importance for other market participants as well as for price and liquidity developments in the financial markets. In particular, there is a risk that the failure of individual large hedge funds or the combined collapse of several medium-sized hedge funds might jeopardise the stability of major banks at the core of the financial system and/or trigger market liquidity crises.

3|1 Impact on markets

Hedge funds play a prominent role in the price discovery process in many markets. On some trading days in 2005, according to market estimates, hedge funds accounted for roughly half of the turnover on the New York Stock Exchange and the London Stock Exchange. The hedge fund industry has now also gained significant market shares in the transaction volumes of fixed-income instruments and derivatives. Major market positions in selected US market segments include credit derivatives trading (58%),

2 *In principle, central banks could themselves invest in hedge funds as part of their own portfolio management, especially of their foreign reserve assets. This has been proposed occasionally and also appears to be happening in isolated cases. Nevertheless, I do not regard this as opportune for the Bundesbank.*
3 *For earlier analyses of changes in the monetary policy transmission mechanism due to the growth of derivatives markets, see BIS (1994): "Macroeconomic and monetary policy issues raised by the growth of derivatives markets".*

emerging market bonds (45%) or leveraged loans (32%).[4] In European fixed-income markets, hedge funds accounted for around one-third of the trading volume in non-investment-grade bonds in 2006; they have likewise acquired significant market shares in investment-grade credit derivatives and structured derivatives products.[5] The impact of hedge funds, however, is not to be seen solely in the volume of their own trading business. Owing to their flexibility and rapid reaction rate, they are likely to perform an additional indicator function for other market players and could thus even induce herding.

Hedge funds have the potential to strongly influence market movements, possibly encouraging exaggerations, and thereby to have a destabilising impact. They have been partly blamed for developments during the Asian crisis (1997-98) and for the emergence of the technology bubble. The empirical evidence on this is mixed, however. Research has shown that hedge funds indeed held a large share of technology stocks in their portfolios before selling most of them shortly before the price meltdown.[6] Even if the hedge fund sector was not the prime cause of market overvaluation and collapse, this finding suggests that they may well have amplified such price developments. There is empirical doubt, by contrast, about whether hedge funds had a major impact during the Asian crisis.[7] More recently, many hedge funds were themselves caught off-guard by the financial market correction in May and June 2006 and –like other investors– posted negative returns. Market episodes such as these indicate that, while hedge funds may have intensified the crises in some cases, it would be wrong to make a blanket judgement on the strength of a small number of observations.

A similarly qualified assessment seems warranted by the industry's performance. A long-term comparison of the monthly returns of the CSFB/Tremont Hedge Fund Index with the returns of the MSCI World Index shows that, of 155 data points between January 1994 and November 2006, the respective returns showed a different sign in 31 months. In 20 cases the hedge fund index achieved a positive return when the MSCI index was negative.[8] Especially during the pronounced market correction in 2000-02, the hedge fund index repeatedly achieved a positive (albeit small) absolute performance. However, in recent years, the positive co-movement has clearly been more significant. Anecdotal evidence[9] suggests that, in the wake of the general market recovery that had been ongoing since spring 2003, hedge funds have been taking up more long-term positions in order to benefit from the (expected) positive price developments. The marked increase in the correlation between the hedge fund index and overall market performance confirms this impression. The moving 12-month return correlation between the CSFB/Tremont Hedge Fund Index and the MSCI World Index has increased substantially over time and has reached very high values above 0.9 recently. A high correlation could, in principle, indicate that hedge funds amplify the market dynamics, at least in the short run.

The use of leverage is a major factor in assessing the potential impact of hedge fund behaviour on markets.[10] In the event of market losses, a high degree of leverage could necessitate a rapid unwinding of risk exposures if, for example, hedge funds can no longer meet their margin calls. In periods of market reversals, this may tend to amplify the price dynamics, especially if several hedge funds, given similar trading strategies (crowded trades), were compelled to make rapid and similar adjustments to their portfolios. Such risks are heightened further by hedge funds' increasing investments in illiquid market segments. In this context, unfavourable market dynamics cannot be ruled out in the event of abrupt market shifts in which stress in some market segments spills over to other segments, leading to a general decline in market liquidity. The experience of the LTCM crisis is a reminder of the need for vigilance in this respect.

4 *See Greenwich Associates (2006): "US fixed income: the buy-side divide".*
5 *See Greenwich Associates (2006): "European fixed income: trade allocation strategies in the hedge fund era".*
6 *See Brunnermeier & Nagel (2004): "Hedge funds and the technology bubble", in Journal of Finance, No 59.*
7 *See Varamini, Segatti & Brown (1999): "The role of hedge funds and other factors during the 1997 financial crisis in Thailand", Elizabeth Town College Working Paper.*
8 *The overall ratio of relative outperformance and underperformance is almost balanced, however (outperformance: 74, underperformance: 81).*
9 *See Higashio, Terada & Shimizu (2006): "Changes in hedge fund behavior and the impact on financial markets", Bank of Japan Review.*
10 *In contrast to investment funds, hedge funds have the possibility of leveraging their investments. They do so by borrowing capital (balance sheet leverage) and taking on positions with a comparatively low capital input, say, by using derivatives and short positions (instrumental leverage).*

3|2 Links with large complex financial institutions and other financial intermediaries

From the perspective of financial stability it is, above all, the hedge funds' direct business relationship with the prime brokers that represents a potential conduit for systemic disruptions. Even in the case of collateralised lending, credit losses may result from the insolvency of a hedge fund if the market values of the collateral erode owing to substantial market price movements. Also, as a counterparty of hedge funds, especially in OTC derivatives trading, banks engaged in prime broking activities are exposed to considerable counterparty risks.[11]

The prime brokers are mostly large and complex financial institutions that perform a key role in the international financial system as counterparties in the interbank and OTC derivatives markets, in reallocating risks and providing liquidity. The global prime brokerage market is currently largely dominated by US financial institutions, although major European financial institutions, too, seem to be rapidly expanding their business links with hedge funds.[12] Generally, these financial institutions are currently enjoying exceptional profitability, and they employ highly sophisticated risk management techniques. Even so, it cannot be entirely ruled out that shocks affecting these players might lead to a withdrawal from market segments and spread rapidly across the international financial system.

Prime brokers' close relationship with the hedge funds is demonstrated by this business sector's relevance to the earnings of the large international banks, which has increased markedly during the past few years. The marked growth in commissions received by some internationally active financial institutions is likely to be due, not least, to their increased business dealings with hedge funds. Market estimates assume that currently around 15% to 20% of total investment banking revenues derive from business with hedge funds.[13]

In Germany, bank lending to hedge funds –like direct trading with hedge funds– is confined to a relatively small number of internationally active institutions. According to market information, the transactions are, moreover, conducted solely on a collateralised basis.[14] Outstanding debt both in trading and lending business is to be rated as small, with a share of the balance sheet total in the low single-digit percentage range. The risks to the German banking system, at least from its direct business relationships with hedge funds, would therefore appear to be relatively limited.[15]

Risks to financial institutions are, however, not confined to their direct exposure to hedge funds and their reliance on them as a source of income. The potential market weight of hedge funds also poses indirect risks to financial market participants' asset positions. Banks are often exposed to market risks similar to those of hedge funds, especially if, in their proprietary trading, they pursue strategies comparable to those of hedge funds. Thus, in the case of, say, crowded trades, they risk sustaining marked losses in the event of abrupt market shifts in the trading segments dominated by hedge funds. This is likely to affect, not least, market segments in which a withdrawal by a few key market makers could cause market liquidity to dry up. Market players should therefore take care to avoid any "liquidity illusion" and pay close attention to market liquidity risks in their risk management.

4| IMPROVING THE TRANSPARENCY OF HEDGE FUNDS

4|1 Strengthening market discipline

In a market economy, strengthening market discipline is a natural approach to containing potential risk to financial stability resulting from the failure, or the collective behaviour, of hedge funds. This is pertinent, not least, because the

11 *Besides the cited risks, there exist numerous other risks, such as operational risk or legal and reputational risk, which will not be dealt with here.*
12 *ECB (2005): "Large EU banks' exposures to hedge funds".*
13 *See Dresdner Kleinwort (2007): "Credit Suisse, Deutsche Bank, UBS – How important are hedge funds for the investment banking industry?".*
14 *It remains unclear, however, how the collateral assets will perform in stress situations. According to a survey conducted by the ESCB in 2005, stress tests at banks were conducted comparatively rarely on the performance of collateral assets and were restricted mostly to individual risks. See ECB (2005): "Large EU banks' exposures to hedge funds".*
15 *Banks' and insurance corporations' investment relationships with hedge funds may also harbour risks. However, investments in hedge funds in Germany at present are to be seen largely from a positive perspective as portfolio diversification.*

specific incentive structures of hedge funds can encourage an exaggerated risk propensity. One of the salient features of hedge funds, for instance, is the strongly performance-related remuneration of their managers.[16] Hedge fund managers tend to have an incentive to boost returns by taking on higher risks, say, in order to compensate for a period of weaker performance.[17] This appears to have played a certain part in the case of Amaranth, for example.

Market imperfections such as incentive problems, market clout and information asymmetries may, however, weaken the market's ability to discipline, say, the managers of hedge funds. An appropriate degree of transparency is an essential requirement for market discipline to be effective. Transparency helps the market players to make more efficient decisions because it improves the quality of information and reduces uncertainty.

In connection with hedge funds this gives rise to a number of specific challenges. These consist, first, in the high degree of complexity of the financial instruments and trading strategies employed by hedge funds. This problem is compounded by the speed with which hedge funds can change their risk positions. Second, the hedge funds justify their limited transparency by their understandable vested interest in not revealing their proprietary trading strategies –which represent their business model– to other market players and thus facilitating copycat strategies. Efforts to enhance transparency therefore have to take due account of the need not to impair the positive effects of hedge funds.

Given possible market imperfections, there are nevertheless some doubts from a macroprudential perspective as to whether the purely market-driven process of recent years has produced sufficient progress in hedge fund transparency.

4|2 Prime brokers

In terms of the currently practised indirect approach to containing potential systemic risks arising from hedge funds, market discipline exercised by the counterparties –above all, the prime brokers– is of crucial importance. Prime brokers offer a range of services to hedge funds. Key functions include the (collateralised) financing of hedge fund exposures and the execution of OTC derivatives transactions, partly through the prime brokers interposing themselves between hedge fund transactions with third parties.[18]

Safeguarding adequate risk management on the part of the prime brokers therefore remains a core objective. With this in mind, the recommendations made in July 2005 by the Counterparty Risk Management Policy Group II (Corrigan Group), which was set up as a private sector initiative, should be supported. The recommendations focus on the fields of risk management and risk monitoring and contain proposals on disclosure to counterparties. One particular aspect that deserves emphasising is that the credit terms, especially collateral and margin requirements for risk exposures (from credit and counterparty risks in the case of OTC derivatives), should be tailored to the counterparty's transparency and risk profile.

Concerns in this connection result mainly from two factors. First, there are worries that the fierce competitive pressure for lucrative prime brokerage mandates may have led to an erosion of credit standards.[19] Second, it is not entirely certain whether prime brokers take due account of potential stress scenarios in their margin requirements.[20] The lessons of the LTCM crisis in 1998 made clear that, in the event of market turbulence, a sharp short-term increase in margin calls can reinforce potential stress. Moreover, for prime brokers, risk concentrations might also arise from correlated exposures of different hedge fund counterparties and, not least, from proprietary trading. This underlines the need for prime brokers to be properly informed about the key material risks of their hedge fund counterparties.

To that extent, it is undoubtedly in the market participants' own interests to strengthen the risk management function. The regulatory authorities,

16 *In the case of single hedge funds, a fixed management fee of 1% to 2% of the assets under management and a 20% performance fee are internationally typical.*
17 *High watermarks have become established in the hedge fund industry as one of the instruments for partially counteracting this asymmetric incentive system. This means that performance-related fees become due only if the cumulative performance recovers any past shortfalls. Another instrument is the hedge fund manager's personal financial investment in the managed fund.*
18 *This is termed OTC derivatives prime brokerage.*
19 *For this reason, an investigation was launched last year by a number of regulatory authorities under the leadership of the Federal Reserve Bank of New York.*
20 *Specifically, the calculation of the margin involves the potential future exposure of OTC derivatives contracts.*

too, should monitor the implementation of the Corrigan Group's recommendations at the financial institutions in their jurisdiction. Even so, it is not possible to dispel all doubts as to whether due account is being taken of the cited risks. In this respect, it would in any event be desirable for the Corrigan Group to publish a progress report in the near future. In addition, the finance ministers and central bank governors of the G7 countries have likewise agreed to further pursue hedge fund-related issues and have asked the Financial Stability Forum to update its 2000 Report on Highly Leveraged Institutions.

4|3 Investors

Investors also exert a disciplinary effect on hedge funds. Investors should fundamentally be in a position to compare meaningful information on the risk/return profile of their hedge fund investment with that of competitors as well as with other investments in order to make appropriate investment decisions. In this connection, it may be assumed that the increasing involvement of institutional investors is exerting a positive effect on the quality of risk management in the hedge fund sector. According to estimates, pension funds, foundations and insurance corporations were responsible for more than 40% of all hedge fund investments worldwide in 2006 (in 2002 their share had been about 11%) and further growth is expected over the next few years.[21] Associated, more in-depth due diligence examinations by institutional investors are likely to help improve the quality of hedge funds' risk management.[22] This would seem to be called for since, according to a recent survey (which, however, was based on a small sample), a sizeable number of hedge funds do not appear at present to be following the risk management best practices of the hedge fund industry.[23] The valuation of illiquid assets also raises fundamental questions.[24]

The involvement of institutional investors is likely to increase the pressure on hedge funds to improve disclosure.[25] At present, disclosure practices within the hedge fund sector appear to vary widely in terms of their quality and, in some cases, depend on the market position of the respective hedge fund or investor. In order to safeguard adequate market discipline, it is essential that appropriate risk-related information is disclosed.[26] At all events, the current recommendations of the hedge fund industry associations on the disclosure of information to investors, which are included in the «Sound Practices»,[27] can hardly be termed "best practices" of the hedge fund sector.

Therefore, it would be desirable if the hedge fund sector were to undertake efforts to define more demanding sound practices of disclosure and to establish them as standards in the industry. These disclosure standards should cover all essential aspects in an aggregated form so that investors can assess the relevant hedge fund's financial situation and risk profile (this includes adequate risk-related information such as the exposure to market risks, based on Value-at-Risk figures and appropriate stress tests, to credit and liquidity risks and to risk concentrations). Earlier international recommendations on enhanced disclosure by the Fisher II Group[28] may serve as a guideline. Such efforts would gain particular credibility if the best practices were to be incorporated into a voluntary hedge fund industry code of conduct.

4|4 Public authorities

It also seems worth discussing whether and, if so, how the transparency of the hedge fund industry *vis-à-vis* public authorities should be improved. One aspect of this issue is that the greater complexity of the financial system and the increasing transfer

21 *See Bank of New York (2006): "Institutional demand for hedge funds 2 - A global perspective".*
22 *See Deloitte (2007): "Precautions that pay off".*
23 *See Deloitte, loc cit. For some hedge fund managers it is also stated to be the case that "the sophistication of their risk management may not be keeping pace with the complexities of their strategies and investments".*
24 *See FSA (2006): "Hedge funds: a discussion of risk and regulatory engagement" - Feedback on DP05/4.*
25 *According to a survey in the USA, 29% of foundations cited a lack of transparency as an obstacle to hedge fund investments, see Greenwich Associates (2005): "Hedge fund market trends".*
26 *In the aforementioned Deloitte survey it is noted, for example, that only around 60% of the surveyed hedge funds are prepared to share their written risk management policy with their investors, and, moreover, that the principles "often lack sufficient breadth and detail".*
27 *See Sound Practices of the Managed Fund Association and of the Alternative Investment Management Association.*
28 *See Report of the Multidisciplinary Working Group on Enhanced Disclosure (Fisher II Group), 26 April 2001.*

of risk into unregulated areas are posing a growing challenge to the regulatory authorities in assessing potential systemic risk.

In this context, too, the regulated financial institutions remain the most important starting point. In-depth monitoring of the relationship between the regulated financial institutions, especially the prime brokers, and their hedge fund counterparties should give the regulatory authorities an insight into substantial risk exposures, as these represent a key channel for potential systemic risks. However, monitoring of this kind can provide no more than a partial insight into the hedge fund industry, especially where individual hedge funds may have financial relationships with financial institutions from different countries. Seen in this light, it would be worth assessing whether cooperation among regulatory authorities at the international level could bring about an overall improvement in the transparency of regulated financial institutions' significant counterparty exposures to hedge funds. The current collaborative venture between a number of central banks involving the exchange of information on shared borrowers' exposures to credit institutions might be regarded as an example of such an approach.[29] By contrast, further-reaching proposals for, say, a hedge fund position register face substantial political and practical objections.

5| OUTLOOK

Many market observers expect the hedge fund industry to continue growing at a rapid pace over the next few years.[30] It should be pointed out, however, that the current phase of expansion is taking place in a comparatively benign macroeconomic and financial market setting. In a more adverse environment the hedge fund industry might face increased pressure to adjust and consolidate.

Given receding opportunities to generate income and increasing competition from other market players, hedge funds are trying to gain a competitive edge by refining their strategies –whether by investing in less liquid instruments, making greater use of leverage or by tapping new geographical markets– and by finding new ways of raising financial resources. With regard to the debate on transparency, two developments are of particular importance. In the past few months, hedge funds and hedge fund managers have increasingly been turning directly to the stock and bond markets to procure equity and debt capital. So far, however, this has been limited to a small number of mostly large hedge funds. Recourse to the capital market changes the capital and maturity structures of hedge funds and enables them to continue expanding their investment strategies. In view of the minimum disclosure requirements connected with listing, this may have implications in the medium term for the willingness of the hedge fund industry as a whole to adopt greater transparency.

Second, retail investors are likely to step up their –mainly indirect– involvement in hedge funds. For this group of customers, investment opportunities in funds of hedge funds already exist in many countries.[31] But they also have a growing indirect stake *via* the investments by pension funds and other institutional investors in hedge funds. Hence the issue of investor protection is likely to enter into the transparency debate in many countries.

In the ongoing discourse on the hedge fund industry, public authorities should be guided by the objective of not impeding the dynamic transformation process in the financial system and the associated innovation thrust to make sure that the positive effects of competition are realised. At the same time, however, a suitable framework needs to be put in place so as to ensure adequate market discipline in the hedge fund sector through the necessary degree of transparency. An ongoing key objective of central banks is to take and support appropriate action to prevent a possible phase of market adjustment and consolidation in the hedge fund industry from culminating in an episode of financial instability. Finally, central banks will continue to closely monitor and analyse hedge funds' impact on the future development of the financial systems and the associated implications for monetary policy transmission. It is only in this way that the efficiency of the financial systems, on the one hand, and the effectiveness of a monetary policy geared to stability, on the other, can be safeguarded over the long term.

29 *See Memorandum of Understanding on the exchange of information among national central credit registers for the purpose of passing it on to reporting institutions of 20 February 2003; the legal basis in Germany is section 14 of the Banking Act, which provides for the collection of credit exposure data. It stipulates a general reporting requirement for exposures of EUR 1.5 million or more (including syndicated exposures).*

30 *The Bank of New York expects that the volume of assets managed by the hedge fund industry could reach around USD 2,000 billion in 2009, see Bank of New York (2006): "Institutional demand for hedge funds 2 – A global perspective".*

31 *In Germany, numerous investment certificates are also issued, the return on which depends on the performance of hedge fund indices.*

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RÉSUMÉS

Hedge funds, transfert du risque de crédit et stabilité financière

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Au cours de la dernière décennie, l'attention portée par les banquiers centraux et les autorités de surveillance aux *hedge funds* s'est accrue en raison du rôle de plus en plus important que ceux-ci jouent sur les marchés financiers mondiaux.

La croissance de ce secteur a renforcé de manière significative l'efficience de marché et la stabilité financière en accroissant la liquidité sur de nombreux marchés financiers, en améliorant le processus de découverte des prix et, enfin, en abaissant le coût du capital. Ces fonds et leurs stratégies d'investissement alternatives ont contribué à une expansion significative des marchés mondiaux et permis d'accélérer l'essor de produits tels que les dérivés de crédit, les CDO (*collateralized debt obligations*) et la titrisation d'une gamme croissante d'actifs traditionnellement peu liquides.

Toutefois, le manque de transparence et l'absence d'un système de surveillance de ces véhicules de placement ont conduit les autorités monétaires et de supervision à s'inquiéter des enjeux en termes de protection des clients et de risque systémique. Le présent article traite des questions clés auxquelles les superviseurs sont confrontés du fait de la croissance récente des fonds d'investissement privés et des changements rapides en matière de transfert du risque de crédit. Il examine en particulier les implications de ces évolutions pour la stabilité financière et le risque systémique.

Évolution et régulation des *hedge funds*

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Sur la période récente, les *hedge funds* ont suscité une attention croissante, liée, notamment, au fait que les investissements effectués dans ces fonds sont devenus monnaie courante. La faveur croissante que rencontrent ces véhicules de placement auprès des investisseurs est allée de pair avec une rapide augmentation de leur nombre de fonds et du volume des actifs gérés.

En partie, cet intérêt accru a également résulté des inquiétudes relatives à l'influence déstabilisatrice que les *hedge funds* pourraient exercer dans certaines circonstances. Compte tenu de l'augmentation de la part de marché de ces fonds et de leur plus grande « visibilité » sur le marché, des craintes ont été exprimées à propos du manque de transparence et de l'absence de réglementation du secteur.

Même si l'attention portée aux *hedge funds* est récente, leur origine remonte à plus de cinquante ans. Il est généralement admis que le premier de ces fonds a été créé en 1949 aux États-Unis par Alfred Winslow Jones. Le terme de *hedge fund* (fonds de couverture), qui n'a été forgé qu'ultérieurement, a été retenu parce que le style de placement du fonds d'origine était conçu pour rester neutre aux évolutions générales des marchés en combinant des positions courtes et longues. De cette manière, les fonds pouvaient chercher à réaliser des rendements absolus dans des conditions de marché variables. Sur la période plus récente, toutefois, le terme de *hedge fund* est appliqué à tout véhicule de placement collectif privé destiné à des investisseurs « sophistiqués », peu réglementé et ayant recours à l'effet de levier.

Depuis les années cinquante, le nombre de *hedge funds* a constamment progressé, tout comme le volume d'actifs gérés. Des statistiques précises font défaut, compte tenu de l'absence d'obligation de déclaration et des difficultés qu'il y a à définir un champ de couverture exhaustif des institutions concernées. Toutefois, la croissance la plus rapide a probablement été observée au cours de la période écoulée depuis 1990, avec une interruption en 1998-1999 liée à la quasi-faillite de *Long Term Capital Management* (LTCM).

L'attention des régulateurs pour les *hedge funds* remonte à une dizaine d'années, à l'affaire LTCM et à la crise financière asiatique survenue à peu près à la même période. Les problèmes rencontrés par LTCM ont mis en évidence la taille de certains fonds et leur capacité, par l'intermédiaire de leurs positions à effet de levier auprès d'un certain nombre de contreparties, à générer des répercussions systémiques. La crise asiatique a, selon certains, montré que le pouvoir de marché de ces fonds pouvait, dans certaines circonstances, saper les politiques des autorités. À la suite de ces épisodes, une série de rapports officiels relatifs aux activités des *hedge funds* et aux questions concernant le principe et les modalités de la régulation de ces fonds ont été publiés.

Dans cet article, je commencerai par analyser les caractéristiques qui distinguent les *hedge funds* des autres instruments d'investissement. Je poursuivrai en examinant les tendances récentes du secteur et les évolutions potentielles futures. J'évaluerai ensuite certaines des interrogations exprimées à propos de leur régulation et conclurai par quelques remarques sur les approches alternatives en la matière.

Quelle forme de régulation pour les *hedge funds* ?

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En raison de la croissance ininterrompue des actifs qu'ils gèrent et de la nature non régulée et opaque de leur activité, les *hedge funds* sont devenus une source de préoccupation majeure pour les autorités. Alors que, jusqu'à présent, les *hedge funds* sont restés largement non régulés, les appels à la régulation se multiplient, tant pour des raisons microprudentielles que macroprudentielles.

À nos yeux, ces démarches sont essentiellement fondées sur une perception erronée de l'efficacité des régulations financières et un défaut de compréhension de la contribution des *hedge funds* au système financier.

L'élargissement de la clientèle fait naître de réelles interrogations sur la protection des investisseurs. Cependant, il serait peu judicieux d'assouplir les critères de qualification des investisseurs particuliers. Les placements effectués par des institutions régulées, en particulier les fonds de pension, dans les *hedge funds*, soulèvent des questions plus importantes. Dans la mesure où ces institutions bénéficient d'une protection publique directe ou indirecte, leurs investissements dans les *hedge funds* doivent être réglementés. Or, de telles régulations sont plus efficaces si elles sont mises en œuvre du côté de la demande, par le régulateur des fonds de pension, que si elles s'appliquent directement aux gérants des fonds.

Les *hedge funds* apportent des avantages considérables, non seulement à leurs clients et gérants mais surtout à l'économie dans son ensemble, en raison de leur contribution à la découverte des prix, à l'efficience des marchés, à la diversification et par leur aptitude à limiter l'ampleur d'une crise, rôle que les institutions régulées ne peuvent aisément jouer du fait de leurs contraintes de fonds propres, de performance relative et d'autres facteurs.

Il serait néanmoins imprudent de soustraire les gérants de *hedge funds* à toute forme de régulation, dans la mesure où la défaillance d'un fond d'importance systémique peut créer une incertitude telle qu'elle entrave les transactions des marchés et, pire, nuise à l'économie réelle.

Ces questions ne peuvent pas être résolues par une méthodologie réglementaire classique fondée par exemple sur la publication d'informations et l'exercice restreint de certaines activités. En réalité, les superviseurs ont intérêt à ne pas réglementer les *hedge funds* dans leur gestion quotidienne. Néanmoins, le régulateur doit être en mesure de mettre fin à l'incertitude en termes de disponibilité de l'information, qui résulterait de la défaillance d'un *hedge fund* d'importance systémique. Dans ce cas, les sociétés de courtage (*prime brokers*) et les autres banques clientes seraient, *de facto* ou *de jure*, tenues de contribuer à supprimer rapidement toute incertitude de cette nature. À cette fin, l'organisation de consultations ciblées et la mise en place de plans de secours sont essentielles.

Hedge funds et stabilité financière

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Beaucoup a été fait jusqu'ici pour limiter les risques que font peser les *hedge funds* sur la stabilité financière, tout en évitant les restrictions inutiles qui fausseraient le jeu des forces du marché et empêcheraient ces fonds de continuer de jouer leur rôle sur les marchés actuels. Néanmoins, dans un contexte de changement permanent de l'environnement des marchés financiers, les intervenants de marché et les autorités de supervision ne doivent pas relâcher leur attention afin de bien appréhender les évolutions de marché en cours et remédier rapidement à toute insuffisance des systèmes de gestion du risque de contrepartie ou de la discipline de marché.

Les opérateurs semblent aujourd'hui globalement assez bien protégés contre les risques de contrepartie directement liés à des défaillances de *hedge funds*, mais l'efficacité des dispositifs d'appels de marge en cas de forte détérioration des conditions de liquidité et de marché mérite un examen plus approfondi. Les conséquences financières plus larges, du type perturbation de la liquidité de marché et des prix, d'un choc affectant les *hedge funds* et d'autres institutions à effet de levier restent difficiles à mesurer. Cette situation souligne l'importance d'une amélioration des exercices de simulation de crise (*stress test*) et d'analyse des scénarios. Un défi essentiel à cet égard consistera à améliorer l'évaluation et réduire l'ampleur du risque de perte extrême pour tous les participants clés du système financier, afin que des anticipations irréalistes en matière de transfert des risques ne créent pas un aléa moral et des risques plus élevés pour le secteur financier.

Hedge funds et risque systémique

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Un *hedge fund* peut être défini comme un fonds de placement collectif bénéficiant d'un cadre juridique très souple, qui lui permet de mettre en oeuvre des stratégies de gestion portant sur une grande diversité d'instruments financiers (titres, *futures*, options, obligations et devises). Les *hedge funds* font l'objet d'une attention croissante de la part des responsables de la politique monétaire, des intervenants de marché et du grand public en raison de leur croissance rapide et de leur poids significatif, de leur importance en tant que clients des banques et de l'incidence de leurs activités de négociation sur les marchés financiers mondiaux. Leur progression rapide et les perturbations causées sur le marché par la déconfiture de *Long-Term Capital Management* (LTCM) en 1998 ont amené certains analystes à penser que les *hedge funds* étaient sources de risques systémiques. Cela est toutefois peu probable. Un examen approfondi des canaux par lesquels les *hedge funds* pourraient créer des problèmes systémiques montre que, même si ce secteur peut être à l'origine d'une perturbation majeure, il n'en résulterait pas de très fortes turbulences sur les marchés financiers. Après l'affaire LTCM, les autorités de régulation ont incité les banques à mieux surveiller leur clientèle de *hedge funds* en limitant leur endettement. Jusqu'à présent, cette approche a été efficace, comme le montre la défaillance récente du fonds *Amaranth*. Cette défaillance, la plus importante jamais enregistrée, n'a pratiquement pas eu de répercussions sur des marchés financiers devenus plus larges.

Les *hedge funds* renforcent la robustesse des marchés de différentes façons. Ils offrent des opportunités de placement attrayantes et améliorent la dispersion des risques dans l'ensemble de l'économie. En outre, ils favorisent la stabilité des marchés financiers en assumant des risques que d'autres opérateurs ne sont pas prêts à (ou en mesure de) supporter, en apportant de la liquidité et en effectuant des transactions qui rapprochent les prix des actifs incorrectement valorisés de leurs valeurs « fondamentales ». Bien sûr, le rôle dominant des *hedge funds* sur certains marchés, leurs stratégies de négociation actives, leur recours à l'effet de levier et leur manque relatif de transparence pourraient poser problème. Les contreparties doivent dès lors être conscientes des risques auxquels elles sont exposées du fait des *hedge funds*. De même, les régulateurs doivent continuer à promouvoir une meilleure gestion des risques et une transparence accrue de la part des *hedge funds* à travers la réglementation qu'ils appliquent aux contreparties, tout en restant vigilants vis-à-vis des risques systémiques pouvant émaner de ce secteur. Toutefois, les *hedge funds* renforcent globalement la stabilité du marché et il est peu probable qu'ils soient à l'origine d'une crise systémique.

Stratégies de réplication des *hedge funds* : conséquences pour les investisseurs et les régulateurs

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Au cours de la dernière décennie, la recherche académique a mis au point un certain nombre de stratégies de réplication qui permettent d'atteindre 40 % à 80 % du rendement moyen fourni par plusieurs stratégies très répandues chez les *hedge funds*. Les investisseurs commencent à s'intéresser à ces stratégies de réplication, parce qu'elles reposent sur des règles transparentes et qu'elles peuvent être mises en œuvre à un faible coût. Grâce à cette possibilité d'obtenir de manière passive des rendements équivalents à ceux des *hedge funds*, les investisseurs peuvent négocier des contrats de commission sur performance (*incentive fee*) rémunérant la part de rendement fondée sur les compétences des gérants (l'alpha) différemment de celle liée à l'évolution des indices de marché (le bêta). Cela peut accroître les barrières à l'entrée dans l'industrie des *hedge funds*, dans la mesure où les gérants doivent démontrer leurs compétences afin qu'une part du profit leur soit distribuée. Il devrait en résulter un moindre risque de comportement grégaire des gérants alors que, dans le cas contraire, ceux-ci seraient plutôt tentés par des contrats les rémunérant en fonction de performances alignées sur le marché.

Hedge funds et *prime broker dealers* : éléments de proposition en matière de « bonnes pratiques »

PHILIPP M. HILDEBRAND
*Vice-Chairman Elect**
Governing Board, Swiss National Bank

La croissance rapide du secteur des *hedge funds* s'est traduite par des avantages considérables pour les marchés financiers. Cependant, les *hedge funds* peuvent, dans certains cas, créer un certain nombre de risques. À l'instar de la période qui a suivi la crise asiatique et la quasi-faillite du fonds Long-Term Capital Management, les gouvernements, les autorités de régulation et les banques centrales ont été invités à évaluer la nécessité de nouvelles initiatives réglementaires pour limiter ces risques.

On peut citer trois objectifs potentiels pour un renforcement de la régulation : la protection des investisseurs, la protection de l'intégrité du marché et la protection du système financier. Le lien entre *hedge funds* et stabilité financière tient au risque d'une répercussion, sur une ou plusieurs grandes banques opérant au plan international, de pertes importantes subies par un ou plusieurs fonds.

Le présent article examine les avantages et les risques associés aux *hedge funds*. Il explique comment élaborer des normes de bonnes pratiques qui viseraient à renforcer la relation de crédit entre les prestataires de services de courtage (*prime broker dealers*) et les *hedge funds*. L'objectif précis d'une telle norme, acceptée au plan international, serait de réduire au minimum le risque que les relations de crédit entre *prime broker dealers* et *hedge funds* ne se dénouent de façon désordonnée dans des périodes de fortes tensions sur les marchés. La proposition comporte les éléments suivants :

• les *prime broker dealers* devraient faire en sorte de disposer d'un diagnostic complet des risques afférents à chacun des *hedge funds* les plus importants auxquels ils sont exposés ;

• les *prime broker dealers* devraient s'assurer qu'ils allouent des ressources suffisantes aux systèmes de gestion du risque des collatéraux de façon à consolider leurs systèmes de gestion des risques de marché ;

• les *prime broker dealers* devraient assurer un suivi permanent des variations de marge, des marges initiales classiques et des marges initiales fondées sur le risque global d'un portefeuille ou sur la VaR. En outre, ils devraient procéder périodiquement à des exercices rigoureux de simulation de crise ;

• des appels de marge portant sur l'ensemble des expositions devraient être simulées de manière régulière entre les *prime broker dealers* et les *hedge funds* les plus importants, en prenant appui sur une large palette de scénarios de crise régulièrement mis à jour ;

• les *prime broker dealers* et leur clientèle de *hedge funds* les plus importants devraient profiter des conditions favorables du marché pour élaborer des procédures claires d'appels de marge applicables à différents scénarios reposant sur des conditions de marché défavorables prolongées ;

• le profil de liquidité sous-jacent des *hedge funds* devrait être un élément important pour les appels de marge lors des simulations de crise, ainsi que pour la définition de procédures d'appels de marge lorsque les conditions de marché sont défavorables.

* *À partir du 1er mai 2007*

Exigences de transparence et *hedge funds*

CALLUM MCCARTHY
Chairman
UK Financial Services Authority

La régulation de toute institution financière ou catégorie d'actifs doit nécessairement refléter les objectifs réglementaires associés à ladite institution ou catégories d'actifs. S'agissant des *hedge funds,* le présent article identifie ces objectifs comme étant la confiance des marchés et la stabilité financière, l'intégrité des marchés et la protection des consommateurs. Au regard de ces objectifs, l'article examine quel type d'information les gérants de *hedge funds* devraient, ou non, fournir :
• aux investisseurs,
• aux créanciers et aux contreparties,
• au grand public,
• aux régulateurs.

L'article décrit également les travaux d'enquête menés par la FSA, en rapport avec son objectif de confiance des marchés et de stabilité financière, auprès des principaux opérateurs de marché, afin de suivre leurs engagements vis-à-vis des *hedge funds*, ainsi que la surveillance fondée sur les risques exercée par la FSA sur les gérants de *hedge funds* au Royaume-Uni.

Risques et rendement des activités bancaires liées aux *hedge funds*

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Chief Executive Officer
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Chairman of the Board
Lyxor Asset Management

On dénombre quelque 10 000 fonds d'investissement spéculatifs (*hedge funds*) dans le monde, gérant des actifs de plus de 1 500 milliards de dollars. Les activités de banque d'investissement sont de plus en plus imbriquées avec les *hedge funds*, dans la mesure où ceux-ci obtiennent des financements bancaires par le biais de services de courtage (*prime brokerage*) et sont clients ou contreparties de banques pour toutes les catégories de produits. Ainsi, le développement des *hedge funds* a créé de nombreuses opportunités pour les banques d'investissement.

Les banques tirent directement profit des opérations des *hedge funds* dans la mesure où ceux-ci sont leurs clients. Toutes les activités de marché en bénéficient, des services de courtage aux produits dérivés en passant par la recherche. Les services de courtage sont devenus une source croissante de revenus. L'offre de dérivés, qui va des produits standards à des produits plus complexes, sur mesure et exotiques représente un segment d'activité important pour les banques. Les *hedge funds* sont également des sous-jacents possibles pour des produits dérivés. De nombreuses banques, y compris la Société générale, ont développé des activités de vente d'options sur *hedge funds* ainsi que de financement de produits à levier sur fonds de fonds (*funds of funds*).

Les banques d'investissement ne tirent pas seulement un profit direct des opérations des *hedge funds*. Elles en bénéficient également indirectement à travers l'augmentation des activités de négociation : sur certains marchés spécialisés spécifiques, tels que celui des produits dérivés structurés complexes, il n'y aurait pas de marché sans l'existence de *hedge funds* qui sont prêts à assumer les risques.

Ensemble, ces deux partenaires imbriqués que constituent les *hedge funds* et les banques d'investissement ont accru la diversification et l'efficience des marchés de capitaux. Les avantages que ce système apporte à l'économie dans son ensemble sont largement admis.

Les *hedge funds* apportent non seulement des avantages importants à l'économie en général, mais leurs risques sont gérables.

Les risques pour les investisseurs sont surestimés. Quelle que soit la mesure du risque, les *hedge funds* apparaissent nettement moins risqués que les actions. S'agissant des risques opérationnels, le marché lui-même est capable de créer des solutions de protection. Des travaux de recherche ont montré que l'on pouvait traiter le problème des risques opérationnels de la façon la plus complète en utilisant les plate-formes de comptes gérés, telles que la plate-forme Lyxor.

Les risques pour les banques sont maîtrisés et la recherche d'une optimisation du niveau des appels de marge (*risk-based margining*) a considérablement amélioré leur gestion du risque. En général, les banques affectent des ressources importantes au suivi des *hedge funds* qualitativement par le biais des obligations de vigilance (*due diligence*). Elles mettent également en place différents types de limites afin de couvrir les différents aspects du risque, limites nominales, limites calculées à partir des simulations de crise, limites sur le delta, limites sur le vega, limites sur l'espérance de perte extrême (*expected tail loss*). En outre, elles régulent leurs exigences de fonds propres en utilisant non seulement la valeur en risque, outil habituellement utilisé par les banques pour couvrir les risques de marché, mais aussi les pertes simulées sur la base des scénarios les plus défavorables. Ces modèles très sophistiqués sont tout à fait convaincants. Il n'y a aucune raison de croire qu'ils ne fonctionneront pas en situation de crise.

Certains développent des considérations générales sur l'existence d'un risque systémique propre, qui ne serait pas lié au risque bancaire, mais ils ont peu d'arguments concrets à l'appui de cette thèse.

Le développement des *hedge funds* est essentiellement, le résultat d'une amélioration significative des techniques de gestion d'actifs. Ces améliorations doivent être tenues pour acquises quelle que soit l'évolution de l'environnement réglementaire, étant donné que ces techniques seront de plus en plus partie intégrante de la gestion d'actifs traditionnelle. Les *hedge funds* sont de plus en plus institutionnalisés. Ils finiront par se fondre dans la gestion d'actifs « classique », certains compromis entre les *hedge funds* et la gestion d'actifs traditionnelle, tels que les fonds de rendement absolu ou les fonds 130-30, étant de plus en plus courants. Les *hedge funds* constituent simplement une nouvelle évolution intéressante des marchés de capitaux qui comme toutes les évolutions antérieures sur ces marchés, sera irréversible et contribuera à une efficience accrue du système financier.

La supervision indirecte des *hedge funds*

DANIÈLE NOUY
Secrétaire général
Commission bancaire

Face aux nombreux risques liés aux *hedge funds* (fonds d'investissement spéculatifs), existe le recours à des mesures indirectes visant leurs contreparties et leurs créanciers, qui sont pratiquement tous des entités régulées, entreprises d'investissement et banques. Nous examinerons ici comment la supervision indirecte a été rendue plus efficace au fil du temps et comment en pratique elle pourrait l'être davantage encore.

Au plan théorique, la contribution des *hedge funds* à l'efficience et à la stabilité des marchés est incontestable mais elle ne se concrétise pas toujours dans les faits. Afin de préserver cette efficience et cette stabilité, nous devons par conséquent promouvoir une discipline de marché efficace et durable. Il est exclu de ne pas agir étant donné la croissance du secteur des *hedge funds* et le fait que ceux-ci se comportent souvent comme d'autres institutions financières, pour lesquelles l'histoire a montré la nécessité d'une supervision. La gestion du risque doit en permanence s'adapter à l'innovation financière. Cela constitue un défi pour la supervision indirecte des *hedge funds* mais justifie également le pragmatisme de cette approche.

La coopération internationale est nécessaire afin d'inciter les banques à accorder suffisamment d'importance à une gestion saine des risques. Sans égalité de traitement au niveau international, les pressions concurrentielles à court terme entre les banques réduiraient très vraisemblablement nos efforts à néant. Cela incite fortement les contrôleurs bancaires à avoir une action efficace. En outre, la coopération entre les contrôleurs bancaires et les régulateurs des marchés de valeurs mobilières doit se poursuivre pour permettre le renforcement et l'ajustement de la supervision indirecte à mesure que les caractéristiques des activités des *hedge funds* évoluent.

Quelle que soit l'institution, la première façon de se prémunir contre les risques associés aux *hedge funds* réside dans la robustesse des systèmes internes de gestion des risques. Dès lors, une attention particulière est nécessaire en ce qui concerne l'accès des banques à une information plus complète sur leurs contreparties à fort effet de levier, une meilleure prise en compte dans les politiques de garantie de la transparence et de la qualité de la signature des contreparties, des progrès effectifs dans la mesure des positions en risque sur les produits complexes (prise en compte du risque de modèle), des améliorations en termes de *stress tests* (exercices de simulation de crise) notamment en ce qui concerne le risque de liquidité. En outre, la supervision indirecte doit être soutenue par une amélioration de la transparence globale des *hedge funds* vis-à-vis du marché. Les *stress tests* devraient en effet permettre aux banques d'évaluer leur exposition totale à un ensemble suffisamment large d'aléas défavorables, ce qui recouvre non seulement leur exposition directe sur un *hedge fund* donné mais aussi leur exposition globale au risque de dislocation des marchés qui pourrait être associé à la défaillance d'un ou plusieurs fonds (effets de second ordre).

La deuxième ligne de protection contre les risques liés aux *hedge funds* réside dans une surveillance efficace, notamment de la part des autorités de contrôle bancaire, des relations entre les *hedge funds* et leurs contreparties. À cet égard, le pilier 2 du dispositif Bâle II (à savoir le processus de surveillance prudentielle qui s'appliquera à tous les risques bancaires au-delà de ceux couverts par les exigences de fonds propres réglementaires du pilier 1) intégrera certains des risques particulièrement liés aux positions sur des *hedge funds* : risque de liquidité, risque de concentration, risque extrême, risque de modèle, etc. Il semble également aujourd'hui crucial de s'assurer de la capacité des systèmes internes d'information des banques à bien appréhender l'intégralité de leurs positions sur les *hedge funds*.

Enfin, les autorités de surveillance exigent des banques qu'elles détiennent des fonds propres réglementaires en guise de coussin de sécurité en regard des risques qu'elles prennent. Cette exigence d'adéquation des fonds propres constitue la troisième ligne de défense contre les risques auxquels une institution financière est exposée lorsqu'elle traite avec des *hedge funds*.

Dernier point et non le moindre, les objectifs microprudentiels et macroprudentiels convergent lorsque les autorités de surveillance prudentielle exigent de chaque établissement des simulations de crises plus complètes et, en corollaire, des décisions appropriées en matière de gestion des risques, y compris contre les effets de second ordre, c'est-à-dire contre le risque systémique d'instabilité financière.

Quelles sont les principales questions liées aux *hedge funds* ?

CHRISTIAN NOYER
Gouverneur
Banque de France

La santé et le dynamisme des marchés financiers modernes dépendent largement de la présence d'institutions et d'investisseurs innovants et disposés à prendre des risques. Les *hedge funds* contribuent fortement à favoriser l'efficience et la stabilité des marchés.

La valeur ajoutée que les *hedge funds* apportent en théorie peut toutefois ne pas se matérialiser pleinement dans la pratique, comme l'indique l'analyse de leurs performances, mais les investisseurs doivent être en mesure d'apprécier cela par eux-mêmes.

Le rôle et l'influence propres des *hedge funds* sur les marchés sont susceptibles d'accroître les risques de manipulation et d'abus de marché. Cependant, les *hedge funds* ne diffèrent pas fondamentalement, sur ce plan, des autres investisseurs : la mise en œuvre rigoureuse et efficiente des règles et des procédures existantes devrait suffire à préserver l'intégrité des marchés.

Il y a une interrogation sur la nécessité d'introduire, pour les *hedge funds* qui collectent indirectement l'épargne des petits investisseurs, des exigences plus fortes en matière de « gouvernance », sous la forme de codes de bonne conduite pour la profession, en renforçant les mécanismes de marché par un processus de « notation » ou encore par des réglementations plus contraignantes. L'un des points à considérer est de savoir dans quelle mesure il conviendrait d'inciter les *hedge funds* à mettre en œuvre la panoplie de bonnes pratiques proposées par l'Organisation internationale des commissions de valeurs (OICV) en matière de valorisation des actifs.

Les activités des *hedge funds* peuvent créer un risque systémique, à travers d'éventuelles pertes pour les créanciers bancaires et *via* l'incidence possible sur les banques de dynamiques de marché défavorables. Les moyens envisageables pour contenir ce risque doivent prendre en compte ces deux aspects. Premièrement, il est essentiel que les autorités de supervision interviennent de façon appropriée auprès des *prime brokers* afin qu'ils demandent aux *hedge funds* et obtiennent d'eux des informations complètes, et qu'ils instaurent un dispositif exhaustif de gestion des risques attachés à l'ensemble de leurs expositions vis-à-vis des *hedge funds*. Deuxièmement, les autorités peuvent sans doute encourager une organisation des infrastructures qui permette d'améliorer les informations disponibles sur les marchés où opèrent les *hedge funds*. Enfin, les autorités peuvent examiner comment accéder, au cas par cas, aux informations pertinentes sur les engagements et les positions des *hedge funds*.

La surveillance des *hedge funds* : un point de vue de stabilité financière

LUCAS D. PAPADEMOS
Vice-President
European Central bank

Les capitaux investis dans les *hedge funds* ont été élevés au cours des dernières années et continuent de l'être. Par conséquent, la présence et le rôle de ces fonds d'investissement sur les marchés financiers mondiaux est devenue de plus en plus importante, et même beaucoup plus que le montant des fonds qu'ils gèrent ne pourrait le laisser penser. Cela s'explique par le fait que les *hedge funds* peuvent financer, et de fait, financent leurs placements en s'endettant. Dans certains cas, le volume de leurs actifs à effet de levier est même comparable à celui des actifs des grandes banques. La participation croissante et active des *hedge funds* à un grand nombre de marchés financiers implique que le fonctionnement de ces marchés pourrait être sensiblement affecté si le secteur des *hedge funds* connaissait de fortes tensions.

La contribution positive des *hedge funds* à l'efficience et à la liquidité des marchés financiers mondiaux est largement reconnue, mais n'occulte pas les inquiétudes quant aux risques que leurs activités pourraient faire peser sur la stabilité financière en période de tensions. Le manque de transparence et la rareté des données publiques disponibles sur leurs bilans et leurs activités impliquent de grandes difficultés pour l'analyse de la stabilité financière. S'il est possible de recourir à une multitude de sources d'informations pour analyser les activités des *hedge funds* (presse financière spécialisée, bases de données commerciales, rapports trimestriels, indices de rendement, études universitaires, données prudentielles et surveillance des marchés), ces sources ne suffisent pas à réaliser un suivi adéquat et une évaluation solide sous l'angle de la stabilité financière.

Trois types d'indicateurs seraient très utiles à l'analyse de la stabilité financière : les indicateurs relatifs à l'exposition des banques aux *hedge funds* ; les indicateurs permettant d'évaluer l'importance des positions similaires ; ceux qui facilitent l'appréciation des vulnérabilités endogènes de

ces fonds. Le dernier type d'indicateurs concernerait les mesures du risque de liquidité des financements, de l'effet de levier et des expositions au risque de marché. La construction de ces indicateurs serait grandement facilitée si un minimum d'informations relatives aux bilans des *hedge funds* à effet de levier était disponible. À défaut, on doit recourir à différentes méthodes d'estimation.

Une analyse de ce qui est souhaitable ou disponible montre où se situent les plus grandes lacunes en matière d'information, mais elle ne cherche pas à formuler des recommandations pour améliorer en pratique la transparence des *hedge funds* . Elle propose, en revanche, trois éléments qui y contribueraient idéalement : premièrement, davantage d'informations synthétiques à la disposition des intervenants de marché ; deuxièmement, un cadre de collecte largement normalisé qui faciliterait de réels progrès en matière de transparence ; enfin, des informations permettant une analyse conjointe des activités agrégées des banques, des *hedge funds* et d'autres institutions à fort effet de levier, en vue d'une description complète des risques pesant sur le fonctionnement régulier des marchés financiers.

Le monde des *hedge funds* : préjugés et réalité

La contribution de l'AMF au débat sur les stratégies de gestion alternative

Michel PRADA
Président
Autorité des Marchés financiers

Même s'il n'existe aucune définition uniforme et juridique du terme « *hedge fund* », il est généralement admis, parmi les régulateurs de valeurs mobilières, que les *hedge funds* présentent potentiellement un certain nombre de caractéristiques communes : absence de règle de diversification des actifs, utilisation illimitée des produits dérivés et de techniques financières complexes, recours intensif à l'endettement, fortes commissions sur performance, et parts peu souvent remboursables sans délai.

Au niveau international, les *hedge funds* ne peuvent plus être considérés comme un « trou noir » de la sphère financière, étant donné le nombre croissant d'autorités de régulation ayant déjà mis en place des systèmes de supervision de ces fonds. Néanmoins, il reste de toute évidence beaucoup à faire dans ce secteur en constante mutation, dont la régulation est d'autant plus complexe qu'il est actuellement l'objet de préjugés qui sont parfois source de confusions. « L'activisme actionnarial » des *hedge funds* est à la fois critiqué et salué comme un mécanisme de création de valeur. Leur prise de risque suscite des inquiétudes pour la stabilité financière mais peut fournir la liquidité nécéssaire aux marchés. La transparence de leurs opérations est jugée insuffisante alors que leurs stratégies leur confèrent la faveur d'un nombre croissant d'investisseurs.

L'identification des risques spécifiques aux *hedge funds* est donc un préalable à la définition des priorités d'action des régulateurs. L'AMF a retenu cinq domaines principaux qui peuvent requérir des initiatives supplémentaires au plan international :

• le risque systémique lié à la faillite potentielle d'un *hedge fund* de grande taille ou d'une série de plus petits fonds nécessite que des améliorations soient apportées à l'évaluation du risque de crédit des *hedge funds*, par exemple grâce à la notation de ces fonds ;

• le risque d'abus de marché appelle des moyens d'améliorer la transparence des activités des *hedge funds* sur les marchés de gré-à-gré ;

• le risque de gouvernance des sociétés cotées et de comportement abusif met en cause certaines pratiques, comme les prêts d'actions lors des assemblées d'actionnaires ;

• le risque opérationnel de valorisation incorrecte d'actifs peu liquides ou complexes a poussé l'OICV à prendre des initiatives en matière de valorisation des actifs et de contrôles internes des *hedge funds* ;

• le risque de vente abusive à des investisseurs mal informés justifie l'adoption de nouvelles normes nationales et internationales en préalable de toute avancée en matière d'exposition des particuliers aux produits alternatifs.

Conditions financières, gestion alternative et risques politiques : tenter de comprendre notre époque

Raghuram G. RAJAN
Professor
University of Chicago

Les évolutions du secteur financier se sont traduites par un renforcement de sa capacité à disperser les risques. L'augmentation de la robustesse des économies ainsi que de la prise de risque effective a conduit à l'apparition de transactions financières qui n'étaient pas possibles auparavant, et a permis un accès beaucoup plus large des

entreprises et des ménages aux financements. Au total, le monde s'en porte mieux. Toutefois, on a parallèlement assisté à l'émergence de toute une catégorie d'intermédiaires, tels les *hedge funds*, qui sont incités à une plus grande prise de risque, particulièrement dans les périodes d'abondance de liquidité et de grande stabilité. Par conséquent, sous certaines conditions, les économies peuvent être davantage exposées que dans le passé à des perturbations provenant du secteur financier. L'article souligne les préoccupations relatives aux répercussions politiques d'une telle instabilité.

Les *hedge funds* sur les marchés émergents

William A. RYBACK
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Hong Kong Monetary Authority

Le présent article décrit les activités des *hedge funds* en Asie et à Hong Kong à partir de données de la *Securities and Futures Commission* de Hong Kong et d'instituts d'études privés spécialisés dans les *hedge funds*.

En termes de croissance, de stratégies d'investissement, de recours à l'effet de levier et d'investisseurs, les *hedge funds* de Hong Kong présentent des caractéristiques analogues à celles des fonds opérant sur les marchés émergents d'Asie. Les expositions des différents secteurs financiers aux *hedge funds* restent faibles dans la région et on observe que certains marchés asiatiques sont à la pointe d'un mouvement international visant à renforcer la surveillance des activités de ces fonds.

Néanmoins, l'article souligne la nécessité pour les autorités de régulation d'être attentives aux problèmes que peuvent susciter les activités des *hedge funds* : risque systémique au plan de la stabilité financière, défis en termes de protection des investisseurs et risque de défaillance en matière de règlement. Enfin, il propose de renforcer l'efficacité de la régulation des activités des *hedge funds* dans la région par le biais d'une vigilance continue en ce qui concerne la gestion du risque de contrepartie, d'un enrichissement de la collecte de données, d'une amélioration du partage de l'information ainsi que de la coopération en matière de régulation, tant au plan international qu'entre différents marchés.

Les fonds de *hedge funds* : origine, rôle et perspectives

Patrick STEVENSON
Chief Executive Officer
Atlas Capital Limited

L'émergence des fonds de *hedge funds* résulte d'un processus naturel d'évolution des *hedge funds* et du succès rapide de ces derniers, consécutif aux rendements absolus qu'ils ont pu offrir alors que la quasi-totalité de l'épargne mondiale était investie dans des supports n'offrant que des rendements relatifs. Toutefois, le manque de transparence, l'importance des mises de fonds minimales et quelques « accidents » précoces particulièrement notoires ont conduit à limiter l'accès de ce type de placement principalement à des particuliers fortunés. Afin de surmonter ces inconvénients, la technique des fonds de *hedge funds* est apparue, même si initialement les investisseurs institutionnels y ont davantage vu un moyen de générer de l'alpha, au demeurant mal défini, qu'un instrument de placement répondant à une stratégie particulière.

Nés de cette simple motivation, les fonds de *hedge funds* ont ensuite évolué pour devenir aujourd'hui des fonds de multi-gestion à part entière. Ce changement s'est produit naturellement à mesure que le besoin croissant d'identifier de façon plus rigoureuse les types de risque associés aux performances des *hedge funds*, et la nécessité pour les gérants de démontrer leur valeur ajoutée, ont amené les fonds de *hedge funds* à clarifier leur fonctionnement au plan de la gestion du risque, de l'allocation d'actifs et des informations qu'ils déclarent. Le manque de recul historique conjugué à la complexité des risques auxquels les *hedge funds* sont exposés ont mis en lumière l'importance d'une évaluation du risque préalable à tout choix de placement, et la nécessité d'une gestion et d'un suivi des risques tout au long de la durée d'un placement.

En dépit d'une meilleure appréhension des expositions au risque et des déterminants de l'alpha, la construction d'un portefeuille de multi-gestion bien diversifié demeure ardue. Cependant, grâce à leur connaissance approfondie des stratégies de gestion alternative et à un processus de décision d'investissement qui combine une allocation tactique d'actifs, fondée sur l'analyse macroéconomique (*top-down*), et une sélection des gérants, en fonction de leurs qualités intrinsèques (*bottom-up*), les fonds de *hedge funds* ont pu construire des portefeuilles robustes, générant des rendements absolus de façon durable. En outre, leur aptitude à agréger et à interpréter les informations provenant de plusieurs gérants de *hedge funds* leur permet de produire des rapports pertinents pour leurs clients.

Sur la période récente, l'importance des capitaux investis dans ce secteur a pu donner à penser que sa capacité à dégager de l'alpha viendrait à disparaître. Toutefois, cette préoccupation s'est estompée (mais il est vrai que des contraintes de gestion s'y sont substituées) et les fonds de *hedge funds* ont pu accroître leur rôle en garantissant de l'alpha aux investisseurs et en étant capables d'identifier, de suivre et de dater les facteurs de risque.

Appliquées à la gestion traditionnelle, la compréhension et l'évaluation des compétences utiles dans la réalisation de rendements absolus ont également eu des effets bénéfiques et ainsi contribué à accroître la valeur ajoutée des offres faites aux institutionnels. Les fonds de *hedge funds* sont devenus des fonds de multi-gestion à part entière et sont désormais en mesure de concurrencer les fonds de multi-gestion classiques.

Hedge funds : un point de vue de banque centrale

Axel A. WEBER
President
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Le système financier international est engagé dans un processus durable de mutation structurelle marqué notamment par la croissance rapide de l'industrie des *hedge funds* et des marchés de transfert du risque de crédit. Cette évolution devrait normalement renforcer l'efficience des marchés financiers. Néanmoins, le système financier devenant plus complexe et moins transparent, il est de plus en plus difficile pour les banques centrales d'évaluer correctement les risques potentiels menaçant la stabilité financière.

Au plan de la politique monétaire, les *hedge funds* exercent probablement une certaine influence sur le mécanisme de transmission, ainsi que sur les liens internationaux entre taux d'intérêt et sur les taux de change, bien qu'il ait été difficile, jusqu'à présent, de retracer empiriquement de tels effets. Au plan de la stabilité financière, la principale crainte est que la défaillance d'un ou de plusieurs grands *hedge funds* ne fragilise de grandes institutions financières complexes et/ou n'entraîne une crise en termes de liquidité de marché.

Pour contenir les risques potentiels pour la stabilité financière, la principale ligne de défense passe probablement par une discipline de marché adéquate, ce qui requiert une transparence suffisante des *hedge funds*. Seuls les mécanismes de marché ont joué à cet égard au cours des dernières années, mais on peut douter que cela ait produit des résultats suffisants. L'exercice d'une discipline de marché par les sociétés de courtage (*prime brokers*) des *hedge funds* étant d'une importance majeure, les recommandations émises par le *Counterparty Risk Management Policy Group II* (Groupe Corrigan) devraient, par principe, être intégralement mises en œuvre. Ces recommandations comportent un volet relatif aux obligations d'information des *hedge funds* à l'égard des contreparties. Les *prime brokers*, en particulier, devraient s'attacher à moduler leurs conditions de crédit, et notamment leurs exigences en termes de garanties et de marges, en fonction de la transparence et du profil de risque des différents *hedge funds*, qui sont leurs contreparties.

Les placements effectués de plus en plus par les investisseurs institutionnels tels que les fonds de pension, les fondations et les sociétés d'assurance sont, dans l'ensemble, de nature à entraîner un renforcement de la qualité de la gestion des risques et de la transparence des *hedge funds*. Néanmoins, des différences considérables persistent à l'évidence en matière de pratiques d'information et les recommandations actuelles des associations de *hedge funds* sont quelque peu en retrait par rapport aux recommandations internationales préexistantes. Dans ce contexte, il serait souhaitable que la profession définisse de saines pratiques d'information des investisseurs, qui soient plus contraignantes. Il serait également utile d'intégrer ces bonnes pratiques dans un code de bonne conduite volontaire. Enfin, il conviendrait d'étudier la possibilité d'améliorer l'approche indirecte actuellement utilisée pour la surveillance des expositions au risque élevées des institutions financières régulées vis-à-vis des *hedge funds*, en renforçant par exemple la coopération internationale entre autorités prudentielles.

Les banques centrales doivent éviter d'entraver le processus en cours de mutation structurelle du système financier, qui est un facteur de plus grande efficience. Parallèlement, il n'en est pas moins nécessaire de mettre en place un cadre approprié permettant d'assurer une discipline de marché adéquate et le degré de transparence idoine. Cette démarche fournirait une protection essentielle contre des risques macroprudentiels, qui se renforceraient nettement, en cas de correction des positions de marché des *hedge funds*, dans un contexte économique qui deviendrait moins favorable.

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