

Update of the FSF Report on Highly Leveraged Institutions

Preface

This paper responds to a request from the G7 Finance Ministers and Governors at their February 2007 meeting in Essen for the Financial Stability Forum (FSF) to update its 2000 report on Highly Leveraged Institutions (HLIs).

The 2000 Report was published in the wake of the Asian financial crisis and the turbulence in global markets that accompanied the collapse of Long-Term Capital Management (LTCM) in 1998. The Report focused on three main concerns:

- the systemic risks arising from excessive leverage in financial markets or at individual HLIs;
- the impact on markets and regulated institutions of a sudden disorderly collapse of an unregulated HLI; and
- the market dynamics issues relating to HLI activities, including the role of large concentrated positions in amplifying market pressures in small and open economies.

To address these concerns, the report recommended a package of measures to constrain leverage, based largely on market discipline. The FSF did not recommend direct regulation of hedge fund leverage. Instead, recommendations centred on:

- strengthening of risk management practices by HLI counterparties and HLIs;
- greater regulatory oversight of HLI credit providers;
- improved disclosure by HLIs and counterparties of their risk profiles; and
- enhanced market surveillance by national authorities to identify rising leverage and possible concerns relating to market dynamics.

The FSF assessed progress in the implementation of these recommendations in 2001 and 2002 and has since followed these and related issues closely.

This update focuses on financial stability issues relating to hedge funds; it does not address investor protection issues associated with institutional or retail investments in hedge funds.

I. Executive Summary

Activity by hedge funds has expanded rapidly since the FSF's original report. Hedge funds now account for a significant share of turnover in many markets and of core financial institutions' dealing volume and trading revenues. This growth has happened in a period of rapid innovation and structural changes in financial markets, in which hedge funds have played an important role.

At the same time, a small number of core intermediaries have come to play an increasingly important role in some key areas of wholesale financial markets, such as over-the-counter (OTC) derivatives dealing and securities financing, clearing and settlement. The relationships between these core intermediaries and hedge funds, through prime broking and counterparty relationships, have thus become more central to the robustness of the financial system.

Since the LTCM crisis, risk management practices and capacity at core intermediaries have been substantially enhanced. Prudential supervision has been strengthened and become more risk sensitive. Risk management capacity at the largest hedge funds also has improved, driven in part by increased institutional investor interest. Hedge funds have devoted attention to enhancing liquidity risk management practices, as evidenced by the increased prevalence of margin locks obtained from lending counterparties and lengthier investor capital lock-up periods.

While risk management techniques and capacity have been improving, products and markets have become more complex. The resulting risk management, measurement and operational challenges, such as the valuation of illiquid and/or complex products, apply to a wide range of market participants. Awareness of these challenges is generally high.

The systemic risks that might arise from hedge funds involve both the "direct" risk to the core firms arising from their direct credit exposures to hedge funds, and the "indirect" risk that hedge fund actions (perhaps through the forced liquidation of positions) might cause a sharp deterioration in market liquidity and prices that causes distress at one or more of the core firms.

Supervisors report that dealer firms' direct current and potential credit exposures to hedge funds are modest in relation to their capital. However, their indirect exposures, such as via wider market liquidity erosion, are difficult to gauge. Moreover the diversity of methodologies and measures of risk used by counterparties and the challenges firms face in aggregating exposures to a single counterparty across all the business lines of the firm present further problems for supervisors in monitoring consolidated exposures within a firm and comparing them across firms.

There has been some erosion in counterparty discipline recently (such as declining initial margins), reflecting the strength of competition for hedge fund business. These complement other signs of complacency about risks in markets, such as the weakening of covenants in credit contracts, as well as the possible under-pricing of credit, market and liquidity risks. The materialisation of these risks could impose significant challenges for market participants.

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These market developments heighten the importance of further strengthening market discipline. Effective market discipline requires that counterparties and investors demand relevant information from hedge funds and act upon this information. Counterparties must act to contain leverage and its potential adverse effects on market dynamics.

The FSF welcomes recent public policy and private initiatives, which have encouraged:

- managers of hedge funds and other private pools of capital to have sound risk management and valuation systems, to provide investors, creditors and counterparties with sufficient and timely information, and to have appropriate market conduct controls;
- investors to evaluate the suitability of hedge fund investment in light of investment objectives, risk tolerance and portfolio diversification; and
- counterparties and creditors to enhance risk management practices and strengthen their robustness to wider market shocks.

In some areas, market discipline can be buttressed by supervisors and regulators setting expectations regarding strengthened counterparty risk management practices. Such work is underway that seeks the following actions from intermediaries:

- improved exposure measurement and ability to aggregate exposures across the firm's activities;
- improved margining and collateral management practices;
- improved stress testing practices, especially regarding market liquidity risks.

Rapidly changing products, rising trading volumes and closer market integration also underscore the importance of continuing attention to infrastructure improvements, especially in the areas of:

- robust documentation and settlement procedures for new products;
- capacity improvements to cope with volume expansions in stress conditions;
- connectivity between post-trade derivatives services and other systems.

Work is ongoing in many of these areas, involving active supervisory and regulatory co-operation.

Given the importance of strengthening protection against systemic risks, the FSF makes the following recommendations to support and where relevant build upon ongoing supervisory and private sector work. These recommendations are further developed in the following section:

1. **Supervisors should act so that core intermediaries continue to strengthen their counterparty risk management practices.**
2. **Supervisors should work with core intermediaries to further improve their robustness to the potential erosion of market liquidity.**
3. **Supervisors should explore and evaluate the extent to which developing more systematic and consistent data on core intermediaries' consolidated counterparty exposures to hedge funds would be an effective complement to existing supervisory efforts.**

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4. **Counterparties and investors should act to strengthen the effectiveness of market discipline, including by obtaining accurate and timely portfolio valuations and risk information.**
5. **The global hedge fund industry should review and enhance existing sound practice benchmarks for hedge fund managers in the light of expectations for improved practices set out by the official and private sectors.**

We underscore the importance of ongoing cooperation among financial authorities in taking forward these recommendations and in spreading good practices. We also note the importance of authorities' market surveillance activities and of dialogue with a range of market participants and actors to keep abreast of innovation and to continually assess the adequacy of practices and policy approaches in addressing risks to financial stability.

The FSF will monitor work on these recommendations, and other areas relevant to the potential systemic risks associated with hedge funds, and will report to the G7 Finance Ministers and Central Bank Governors on progress made, new developments and any judgements that the FSF makes about the need for further update of its overall assessment and recommendations.

The next section develops these recommendations in greater detail. The remaining sections provide supporting information. Section III outlines developments in the hedge fund industry and the financial market environment since 2000. Section IV discusses the potential impact of HLIs on financial stability. Section V examines recent developments in risk management and operational capacity in hedge funds. An Annex reviews some of the private- and official-sector initiatives that have been undertaken on these issues since 2000.

II. Recommendations

The following recommendations are based on the assessment of potential systemic risks in this report, including the financial stability risks posed by hedge funds, and the Forum's judgement about the actions most likely to be effective in mitigating those risks. Several of the actions recommended are intended not only to improve the robustness of risk management practices, transparency and market discipline with respect to hedge funds, but are applicable to enhancing practices in the wider financial system as well.

In putting these recommendations forward, the Forum recognises the valuable work that has been done by many groups, both in the official and private sector, and by individual market participants to improve practices and strengthen protections against systemic risk since the FSF's 2000 HLI Report. Important recent examples include the work of supervisors on risk management and stress testing practices, improvements in the clearing and settlement infrastructure for OTC derivatives, the US President's Working Group's principles regarding private pools of capital, the UK Financial Services Authority's (FSA's) prime brokerage survey, the International Organization of Securities Commissions' (IOSCO's) principles for hedge fund valuations, and the industry sound practice guidelines for dealer firms and hedge fund managers issued by Counterparty Risk Policy Management Group II (CRMPG II), Alternative Investment Management Association (AIMA) and the Managed Funds Association (MFA). These are just some examples; many other initiatives have been taken or are underway, in a wide variety of jurisdictions, and more detailed information on these is contained in the Annex. The recommendations below aim to support, and where relevant build upon, this ongoing work.

Going forward, the Forum will monitor the areas described below, and other areas relevant to the potential systemic risks associated with hedge funds, and will report to G7 Ministers and Governors on the progress made, new developments and any judgements the Forum makes about the need for further update of its overall assessment and recommendations.

1. Supervisors should act so that core intermediaries continue to strengthen their counterparty risk management practices.

Strengthening counterparty risk management practices is the most effective approach to addressing the systemic risks associated with highly leveraged institutions: relative to other alternatives, it provides the highest likelihood of achieving tangible gains. Areas of ongoing supervisory focus to address the direct counterparty risks include:

- Urging core firms to ensure the adequacy of internal risk management processes where complexity is high and products are evolving most rapidly. More specifically, supervisors are focusing on the adequacy of exposure methodologies for new and complex products and the ability of firms to aggregate the full range of counterparty exposures across their various business units.
- Encouraging firms to ensure that they are adequately monitoring, measuring and using collateral to mitigate current and potential exposures, and that remaining counterparty exposures to HLIs attract adequate levels of capital. In view of the

competitive pressure on margin levels, supervisors are evaluating the relationship between margin and the amount of capital allocated by firms to hedge fund counterparties.

2. Supervisors should work with core intermediaries to further improve their robustness to the potential erosion of market liquidity.

Supervisory efforts to address the indirect risks associated with counterparty exposures to hedge funds are centred on encouraging firms to fully develop processes that will provide them with the information necessary to conduct stress tests to estimate their exposure to an erosion of market liquidity and asset prices. Such prerequisites include the ability to: a) measure counterparty risk sensitivities on a portfolio-wide basis to identify where counterparties may have correlated risk positions (including the potential for such correlations to rise under conditions of market stress); and b) incorporate concentration risks in market liquidity stress testing and scenario analysis.

In their stress tests, firms should properly capture and aggregate all relevant exposures, and take sufficient account (in terms of limit setting, capital charging and other risk management policies) of low-probability events that could impose very large losses on them and other market participants.

Improvements in financial infrastructure should also continue to be made to strengthen the resilience of the system to withstand shocks from the failure of hedge funds and other highly leveraged institutions. As a particular example, the recently issued Committee on Payment and Settlement Systems report, *New Developments in Clearing and Settlement for OTC Derivatives*, recommended that market participants identify steps to mitigate the potential market impact of replacing contracts following the closeout of one or more major participants. Supervisors should encourage the core financial institutions to undertake this internal analysis.

3. Supervisors should explore and evaluate the extent to which developing more systematic and consistent data on core intermediaries' consolidated counterparty exposures to hedge funds would be an effective complement to existing supervisory efforts.

It is important to recognize the inherent limitations of summary data in capturing the complex counterparty exposures of major dealer firms to hedge funds. Nevertheless, it would be useful to review what information is provided currently and consider whether the collection by supervisors of systematic and consistent information on major dealer firms' global consolidated exposures to hedge funds would complement supervisory efforts aimed at strengthening counterparty risk management practices (including in the areas of exposure measurement and aggregation). It could be useful for supervisors to discuss with the private sector what information ought to be considered.

4. Counterparties and investors should act to strengthen the effectiveness of market discipline, including by obtaining accurate and timely portfolio valuations and risk information.

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Market discipline by counterparties and investors plays an important role in containing risks at individual hedge funds and hence within the system. For market discipline to work effectively, counterparties and investors need accurate and relevant information upon which to base their decisions. Investors should obtain information on risks and returns that enables them to make informed initial and ongoing investment decisions. Counterparties should adjust the amount of credit they supply and the terms under which it is supplied based on the amount and quality of information provided by hedge fund managers, both initially and on an ongoing basis. This should include information on valuation methods and risk management processes.

In this context, the FSF supports broad and effective implementation of the recent principles and guidelines regarding private pools of capital issued by the US President's Working Group on Financial Markets and the draft principles for the valuation of hedge fund portfolios issued by IOSCO. Both documents stress the role of investors and counterparties in setting appropriate expectations for hedge fund managers, including that they have information, valuation, and risk management systems that enable them to provide accurate and relevant information to investors, creditors and counterparties with appropriate frequency, breadth and detail.

5. The global hedge fund industry should review and enhance existing sound practice benchmarks for hedge fund managers in the light of expectations for improved practices set out by the official and private sectors.

Investors, counterparties, authorities and hedge fund managers have an interest in sound risk management practices and operational controls in hedge funds. Responding to these concerns, the hedge fund industry (AIMA, MFA) has developed various sets of sound practices and guidelines. Recently, both the official sector (US PWG, UK FSA, IOSCO) and the private sector (e.g., CRMPG II) have set out expectations for improved practices by hedge fund managers in a variety of respects. We encourage the global hedge fund industry to review these expectations and best practices, and to enhance existing sound practice benchmarks, in the areas of risk management, valuations and disclosure to investors and counterparties.

III. Changes in financial markets and in the HLI sector since 2000

Growth of the hedge fund industry

Since 1999, hedge fund assets under management have grown more than five-fold, and may now total \$1.6 trillion. The number of funds has steadily grown to more than 9000 today. In 2006, it is estimated that 1,518 new funds were introduced and 717 liquidated; both launches and liquidations are estimated to have been higher in 2005.

Increased inflows from institutional investors, such as pension funds, have played an important role in the overall growth of the hedge fund industry. Declining equity prices in 2000-2002 and low nominal yields in fixed-income markets prompted investors to diversify portfolios using alternative asset classes. Continued institutional investor interest and innovations in markets seem likely to lead to further growth in the size of alternative investments in years to come. As the share of institutional investors has risen, that of high-net-worth individuals has correspondingly declined from 61% in 1997 to 40% last year. Last year, the assets of the 100 largest hedge fund firms represented about 65% of the industry total, compared with 54% in 2003. The very largest global fund groups now manage \$20-\$30 bn or more each.

The rate of growth of hedge fund management has been more rapid in Europe and Asia than in the United States. According to one estimate, the share of hedge fund assets managed in Asia has risen from 5% in 2002 to 8% in 2006, while the share managed in Europe has doubled, to 24%, over the same period. While assets managed in the US have grown sharply in absolute terms, the US share of the global total has correspondingly declined, from more than 80% in 2002 to about 65% in 2006.

Hedge fund business accounts for a growing share of the revenue streams of regulated financial institutions. According to one recent estimate, in 2006 hedge fund business accounted for roughly 15-20% of all industry revenues in investment banking, of which only one fifth related to prime brokerage. According to Bank for International Settlements figures, bank claims on non-banks in the Cayman Islands, most of which are likely to be hedge funds, rose from \$156 bn in March 2000 to \$663 bn in September 2006 (note that these amounts do not correspond to credit exposures, since they are not net of collateral).

Hedge funds and financial markets

Hedge funds contribute to more efficient price discovery and have supplied additional liquidity to markets. Although their aggregate assets under management are small relative to those of more traditional institutional investors and to the total size of equity and debt markets, their share of trading volume in many market segments, particularly more complex ones, is much larger than their share of assets. For example, in 2005 the consulting firm Greenwich Associates estimated that while hedge funds accounted for 15% of trading volumes in US fixed income markets, this proportion rose to 45% of trading in emerging market bonds, 47% in distressed debt, and 58% in credit derivatives.

The growth of hedge funds has coincided with innovations in financial markets that have helped to spread market and credit risks more widely through the financial system and beyond. Hedge funds have facilitated the development of these transactions because of

their willingness to take on risky, complex or illiquid positions. By helping to diversify illiquid risk away from the core intermediaries, hedge funds may have increased the resilience of the financial system.

As the institutionalisation of the hedge fund industry has continued, more established funds have taken on some of the risk management, control and operational features of more traditional financial or asset management institutions. A few larger hedge fund groups have issued shares and debt on public markets, which are subject to associated regulatory disclosure requirements. Some hedge fund managers have broadened their activities and increasingly compete with other financial institutions in a variety of fields. Meanwhile, other asset managers, such as mutual funds, where allowed to by regulation, have begun to take on hedge-fund-like strategies and exposures. These developments may pose challenges for regulatory frameworks as the lines between different markets and institutional categories become blurred.

There are some signs that the expanded activity of hedge funds may have reduced the arbitrage opportunities that funds are able to take advantage of. As a result, hedge funds may find themselves less able than previously to provide consistently high risk-adjusted returns. Meanwhile, competing products have emerged which aim to replicate hedge fund performance for lower fees.

Developments in activities of large financial institutions

Since 2000, mergers and acquisitions in the financial sector have increased the importance of a small number of very large and complex institutions at the core of the global financial system. Consolidation has led to increased concentration in certain areas, such as OTC derivatives dealing and securities financing, clearing and settlement.

Since the LTCM crisis, risk management practices at these core intermediaries have substantially improved and prudential supervisory practices have been strengthened. The preparation and implementation of Basel II has played an important role in this regard. The financial strength of core intermediaries also has improved, as evidenced by high and relatively stable profits that have benefited from the benign macroeconomic and financial market conditions that have prevailed.

In recent years, the business model of core intermediaries has continued to shift from holding credit and market risks on their own books to originating and packaging risks that are transferred to, and held by, others. As a result, the relative importance of the counterparty, operational, liquidity and other risks surrounding trading and risk transfer has increased. Sound risk management of counterparty exposures and operational risks thus has become increasingly important to these intermediaries.

The evolving business models of core intermediaries and hedge funds have complemented each other. Banks have packaged credit products that have suited hedge funds' investment needs. Hedge funds have taken the subordinated risks which support the investment grade positions sought by a much broader pool of investors. Intermediaries have serviced hedge funds' positioning, hedging and operational requirements in credit markets, in their roles

as counterparties and as prime brokers. Both intermediaries and hedge funds have profited from these expanded opportunities.

Some associated challenges

Systemic risk is the potential for financial distress to spread across financial institutions with potential effects on the real economy; it is propagated through defaults in interlocking counterparty credit exposures that affect core financial intermediaries.

A number of the changes that have taken place in financial systems since 2000 have reduced systemic risk. But other factors pose potential challenges:

- Recent innovations that have helped to diversify and distribute risk may have altered market incentives and induced greater risk taking. For example, the separation of the origination and packaging of debt from those bearing it may have reduced the incentives for thorough credit assessments.
- The greater complexity of financial risk intrinsic to recent structured credit and other product innovations poses challenges in risk management and monitoring even for the most sophisticated firms and risk managers. It has become more difficult to understand the risk profiles of firms and of the financial system as a whole.
- Because many innovative products remain untested under stress conditions, their correlations, volatilities and liquidity under such conditions are particularly uncertain. As a result, individual firms and markets are more exposed to the risk of “discovered exposures” in a stress scenario than in the past.
- Hedge funds provide a significant source of revenue for large dealer firms; the linkages between leveraged players and the major institutions are now tighter and deeper than they were. This means that the balance sheets and revenue streams of the large dealer firms are more exposed to problems in the hedge fund sector.
- A greater fraction of traded volume and hence liquidity in key financial markets is provided by hedge funds and other leveraged investors. A significant shock to these investors that forces them to curtail activities will likely have a greater impact on market liquidity than it might have in the past.
- The greater complexity of financial transactions and of firms’ risk profiles are likely to increase information uncertainty in times of stress. This heightens the importance of authorities being able to rapidly access relevant information about exposures in a crisis.
- Increased concentration of market-making in certain sectors makes it even more important for the system that the largest dealers have sound risk management policies.

Developments in these areas have been the subject of review and analysis by the public and private sectors. Work by individual agencies and by national and international groupings has resulted in important analytical contributions as well as useful recommendations.

IV. HLIs – the issues and their potential impact on financial stability

A. Relationship of hedge funds and HLIs to systemic risk

HLIs have played a significant role in the developments discussed above. They have become key players in the financial system and in the trading and distribution of risks. They add to market liquidity through these activities both in normal times and, potentially, in periods of stress by taking on risks that other entities are unwilling or unable to hold. On the other hand, it is also possible that during a market disruption they may seek to shed risk, whether for voluntary (because of a change in risk appetite) or involuntary (because of risk limits or collateral calls) reasons. Thus they help to determine the overall functioning of the markets and may affect systemic risk through their close relationships with financial intermediaries.

Assessing the degree of systemic risk that might arise from hedge funds in large part involves evaluating both the “direct” risk to the core intermediaries arising from their direct exposures to hedge funds. It also involves evaluating the “indirect” risk that hedge fund actions (perhaps through sudden changes in risk-taking behaviour or forced liquidations of positions) might cause a sharp deterioration in market liquidity and prices that causes severe distress at one or more of the core intermediaries.

B. Supervisory findings on how well the risk is contained

Supervisors have sought to address both the “direct” and “indirect” risks associated with hedge fund activity. Many of the relevant issues apply not only to core firms’ counterparty relationships with hedge funds, but also to their counterparty relationships with other financial market participants, including other intermediaries and non-leveraged investors. All of these entities need to be attentive both to counterparty credit risks and to potential adverse market dynamics in formulating their risk management frameworks.

The size of core firms’ direct exposures to hedge fund counterparties

Core firms’ direct exposures to hedge funds stem from a broad range of activities, including the provision of prime brokerage services, direct lending and investments in hedge funds.

The greatest share of firms’ hedge fund exposures derives from OTC derivatives trading and financing transactions (including equity margin lending, repurchase agreements and securities lending). The gross market risk exposures generated by these activities are mitigated by collateral and the application of “haircuts”.

There are two basic measures of credit exposure for OTC derivatives and securities financing transactions: 1) *current exposure* is the exposure at current market values, less the market value of collateral; and 2) *potential exposure* (PE) is an estimate of the maximum amount of exposure expected to occur on a future date with a specified degree of statistical confidence, less the market value of collateral. Variation margin (daily marking-to-market of exposures and making of collateral calls) prevents an increase in current exposure over time. Initial margin (collateral posted above the market value of the trade at inception) limits the dealer’s PE and, in the process, the hedge fund’s leverage.

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Data recently gathered by national regulators as part of their ongoing supervisory review of margin and collateral management practices suggest that current exposures to hedge funds in aggregate are negligible (generally less than 1% of Tier 1 capital), because of the widespread use of collateral agreements. Core firms' estimated PEs to hedge funds in aggregate are also quite modest compared to the core firms' capital (approximately between 3% and 10% of Tier 1 capital). In fact, the majority of counterparty exposure at core firms is generated by uncollateralized OTC derivatives transactions with highly rated corporate and sovereign entities.

While there is a range of uncertainty around these estimates, due to limitations in the methodologies and assumptions built into firms' potential exposure models, the size of direct exposure would not be alarming even if one assumed a wide margin of error.

An important area of direct interaction between dealers and hedge funds is through prime brokerage. Regular surveys of the hedge fund exposures of the top dealing banks in the London market have been conducted by the FSA since October 2004. While the survey's coverage is incomplete, the survey broadly indicates that core banks are managing their prime brokerage exposures prudently and it confirms that exposures arising from prime brokerage are smaller than those from OTC derivatives trading and secured financing transactions outside prime brokerage. The data suggest that leverage provided to hedge funds within the surveyed banks' prime brokerage business has remained largely steady since the survey started. Excess collateral within prime brokerage has also remained steady at 50-100% since the survey started, suggesting that prime brokerage exposures remain well covered.

Risks to intermediation from a decline in asset market liquidity

Market participants, and the intermediation process more broadly, also can be at risk from the indirect market liquidity effects resulting from the liquidation of positions by one or more major derivatives or securities financing counterparties, including hedge funds.

A particular risk here is that one or more leveraged counterparties (such as hedge funds) do not have sufficient funding liquidity to meet margin calls and dealers close out their positions. The closeouts and heightened risk aversion can then erode market liquidity and adversely affect prices in a broad range of financial markets.

A key issue in such circumstances is whether other leveraged counterparties, including large dealers and hedge funds, are willing and able to stabilize markets by taking contrarian positions or providing liquidity. If not, the resulting market illiquidity can adversely affect financial market participants in a number of ways. Large dealers would be affected through losses on the part of leveraged counterparties to which they have credit exposure and through losses on their own market risk exposures. Losses on these exposures in turn can lead to further risk aversion and liquidation of positions. Other participants will find the liquidity of their balance sheets reduced, which could lead to further fire sales or a reluctance to transact. Solvent but suddenly illiquid market participants may default on their obligations. If the disruption to markets lasts long enough, borrowing and lending for real investment could be curtailed.

Concern about the scale of this second order effect, and its potential implications for large firms and financial markets, was the principal reason that large dealer firms agreed to recapitalize LTCM in the fall of 1998.

There are two key determinants of the scale of these risks:

- The reaction functions of dealers and other market participants. These are difficult to predict. They depend on factors such as the availability of funding liquidity, the extent to which risk exposures are correlated across counterparties, and the degree of uncertainty about market fundamentals.
- The funding constraints on counterparty relationships in the event of a market shock. These are likely to be shaped by the presumed standing of counterparties after a shock, which will affect dealers' willingness to put their own capital at risk. The extent of liquidity erosion and risk aversion is likely to be driven by the leverage employed in markets at the time of the shock.

Because identifying concentrated risk positions across the population of major dealers and their major counterparties is extremely difficult, and because of the inherently unpredictable dynamics of market confidence, these second order effects are difficult to gauge.

Developments in financial markets in recent years may well have increased the potential adverse consequences of a sharp market liquidity erosion. It is not clear that market participants take adequate account of the consequences their individual and collective risk-taking can have for market liquidity in stressful circumstances, and through this, they impose externalities on others.

C. Implications for risk management practices and supervisory policies

The remainder of this section highlights potential areas of supervisory focus going forward. As such, this section does not – and is not intended to – provide a complete assessment or summary of the counterparty risk management practices and controls in place at core dealer firms.

Risk measures and limit setting

Core firms rely on models of PE to measure exposures and set limits on counterparties. Firms now use 5 to 10-day closeout assumptions to estimate hedge fund potential exposure rather than contractual maturity. This represents an improved measure of risk.¹ Moreover, many core firms are moving toward the adoption of limit-setting based on stress testing, and some already have implemented such stress-based limits, although the completeness of exposure capture and aggregation under this type of limit regime is not clear and generally has not been subject to supervisory review. Finally, several firms have

¹ Nonetheless, different approaches to calculating PE can result in significant variance in exposure estimates. For example, the selection of the desired confidence level and whether one calculates “peak” exposure or some measure of “average” exposure will affect the size of the exposure estimate.

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or are developing limits based on measures of concentration to identify risks that risk measures based on PE models or stress tests do not capture.

Notwithstanding these developments, there is considerable variation in firms' ability to accurately measure PE, with some firms modelling virtually all of their exposures while others rely on proxies for a significant portion of their exposures. Not surprisingly, the firms tend to rely on proxies for the newest and most complex structures or products. Moreover, nearly all firms face challenges in aggregating all of the exposures to a single counterparty that emanate from the various lines of business within the firm.

Therefore, in addition to monitoring the evolution of the newer approaches to risk measurement and limit setting, potential areas of additional supervisory focus include evaluating in greater depth the PE methodologies for the most complex products and pressing firms to strengthen exposure aggregation practices.

Margining practices

Although the amount and quality of information provided to core firms by hedge funds have improved since 1999, it is not sufficient to make a full assessment of a fund's creditworthiness in various market environments. Core firms compensate by transacting with hedge fund counterparties on a collateralized basis.

As such, the firms rely heavily on daily variation margining of current exposures backed by high quality collateral (primarily cash and government securities) to manage their hedge fund exposures, and most set as their goal an initial margin that covers their estimate of PE. However, initial margin requirements are under competitive pressure. In some cases, core firms are offering large hedge funds the ability to engage in some repurchase and OTC derivatives transactions without requiring initial margin. Any uncollateralized potential exposure resulting from the absence of initial margins is charged against the counterparty's internally monitored credit limit.

Obtaining a more detailed understanding of the transactions for which no or little initial margin is required, along with the compensating controls that firms adopt in place of initial margin, is a potential area of additional supervisory focus going forward. It is important to ensure that exposure measurement and margining practices are appropriate to the assets to which they are applied. In addition, by lowering initial margins core firms are making a risk-return trade-off, choosing between hedge fund margin and dealer capital as alternatives: core firms can lower margin and bear the increased risk with their own capital. As such, evaluating the relationship between margin and the amount of capital allocated by firms to hedge fund counterparties is another potential area of supervisory focus.

Efforts by supervisors to stimulate improvements in counterparty risk management by core intermediaries are a critical part of ensuring that hedge-fund-related risks remain well contained. This calls for a focus both on ensuring that the development of internal risk management methodologies keeps pace with the increasing complexity of markets and instruments, and encouraging firms to make sure that current and potential exposures are adequately covered by collateral and by their own capital (**see recommendation 1**).

Stress testing

Stress testing is a key risk management process for identifying a firm's potential vulnerabilities. Practices in this area exhibit varying levels of maturity: market risk and funding liquidity risk stress testing practices are the most cohesive and advanced, while credit risk stress testing is less well developed. The integration of asset market liquidity into stress testing regimes is challenging.

Firms use credit stress testing techniques to highlight potential losses in specific portfolios stemming from certain stylized events, evaluate existing loan loss reserves against expected losses, and provide inputs to their economic capital processes. Credit stress tests typically involve ad hoc scenarios (e.g., housing bubble, rising oil prices, rising interest rates, an industry-specific shock), although the results from wholesale and retail portfolios usually are not aggregated.

The transformation of more traditional credit exposures into derivatives and/or other counterparty exposures has led to new exposures that may not always be fully represented in firms' traditional measures of credit exposure and which can pose significant risk measurement challenges. This highlights the importance of counterparty stress testing. Most firms perform stress tests on exposures to selected counterparties, but only a minority of firms is able to run stress test scenarios on their full portfolio of counterparties to identify common drivers of increases in exposure. As a result, the ability of firms to identify counterparty exposures that most correlate with their proprietary positions is underdeveloped.

Fully incorporating considerations of asset market liquidity into stress tests remains a key challenge for firms. In general, some assumption about the behaviour of asset market liquidity under stress is implicit in the assumptions about the degree of spread widening used in the construction of scenarios. Firms also may model market liquidity effects by using different holding periods for positions with different liquidity levels. However, any assumptions made about holding periods or spreads are usually based on the experiences drawn from past events. Forward-looking estimates of market liquidity are necessarily judgmental.

Recent supervisory reviews of stress testing practices suggest several areas in which supervisors may consider setting forth more explicit expectations. First, firms need to enhance their ability to measure counterparty risk sensitivities on a portfolio-wide basis, identifying where their counterparties have positions that are highly correlated. Second, it is important for firms to relate the market risk sensitivities of their own positions with those of their counterparties' positions, and having done so begin to consider the effect on the liquidity assumptions underlying these estimates. Progress in these two areas will provide firms with information that can be used to enhance their ability to estimate the "indirect" risks discussed earlier in this note. Thirdly, firms' credit risk stress-testing practices should be strengthened by ensuring that all relevant exposures are properly captured and aggregated.

Finally, a recurring concern about stress-testing is whether firms take sufficient account of low-probability events that would impose very large losses on them and other market

participants. Internal incentives may work against firms taking full account of such events in limit setting, capital charging and other risk management policies. Another factor is that firms may expect that markets or institutions will receive external support in very severe collective circumstances.

Active, creative use of stress-testing by core intermediaries is a valuable tool for addressing the “indirect” systemic risks associated with hedge funds, such as potential erosions of market liquidity that may result from the disorderly unwinding of positions. Developing effective stress-tests that address these risks requires input on the part of the firms (who have the best understanding of their positions and the markets in which they are active) and supervisors (who may need to act to encourage the development of sufficiently robust processes) (see **recommendation 2**).

Data on firms’ exposures to hedge funds

It is helpful for supervisors to understand the levels and trends in the exposures of intermediaries to hedge funds, just as they attempt to track exposures to other institutional categories and asset classes. Given the complexity of hedge funds’ position-taking activities in financial markets, and the speed with which these positions can be adopted or modified, there is clearly little point to an effort to track such exposures at a high frequency or a high degree of granularity. However, the periodic collection of broad data on levels and changes in the *credit* exposures of core institutions to hedge funds could potentially help in the calibration of priorities for supervisory work, point to emerging problems and suggest areas for further supervisory review. Against this, it might be argued that the collection of incomplete or imprecise data in itself may create risks, since it could offer a false sense of security or point to nonexistent problems while the data collection diverted supervisory resources away from bilateral work with firms to improve risk management processes.

Since October 2004, the UK FSA has been collecting data from a core set of prime brokers in the London market on a voluntary basis, using a template devised in consultation with industry representatives. Figures on total current and potential counterparty exposures to hedge funds, and the largest individual exposures, have been collected and returned on an aggregated and anonymised firm-level basis to reporting firms semi-annually. While necessarily incomplete, the FSA reports that the data have offered them useful insights into the scale of exposures and their evolution over time. The survey results have been used to gauge risk appetite (of funds and banks), to identify outliers among respondents for the purpose of bilateral supervision, to identify the potential emergence of large and highly leveraged funds, to assess banks’ ability to aggregate counterparty exposure across business lines, and to build a prime brokerage “soft network” for public-private sector dialogue.

While both sides of the argument about the usefulness of exposure data have merit, the continuing growth of the hedge fund industry and its increased importance to the business of core intermediaries call for efforts by supervisors to develop more systematic and consistent information sources. Such an effort would have to be multilateral in nature, given the global activities of hedge funds and large complex financial intermediaries.

However, more work needs to be done to establish which data would be useful and how they would be collected and used (**see recommendation 3**).

D. Infrastructure issues

Supervisors also have been concerned about systemic risks that may arise from or be amplified by weaknesses in the clearing and settlement infrastructure that supports the trading activities of core intermediaries, hedge funds and other counterparties. As often happens in fast-growing markets, trading in a number of markets has exceeded firms' abilities to appropriately update their infrastructure and processes. More generally, the growth of trading volumes has increased the capacity needed in many messaging, trading and settlement systems to cope with peak volumes and therefore ensure reliable market functioning at times of stress and reduce the risk of physical outages.

In the early years of this decade, supervisors became aware of a number of problems in the clearing and settlement infrastructure for OTC derivatives, particularly for credit derivatives, following routine counterparty credit risk management reviews. Subsequently, in July 2005 a private-sector group, the CRMPG II, issued a report noting (1) a growing backlog of unsigned trade confirmations and (2) an increasingly common practice among dealers to accept assignments of trades by one counterparty without the prior consent of the other, despite trade documentation requirements for such consent.

In September 2005, fourteen major derivatives dealers met with a group of supervisors to address these issues. The dealer group quickly recorded substantial progress. By January 2007, the fourteen dealers had nearly eliminated unauthorized assignments; reduced total credit derivative confirmations outstanding for more than 30 days by 94 percent; and raised the portion of credit derivative trades confirmed electronically from 47 percent to 85 percent. The 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 that is now ready to be used during the next credit event.

Another result of these meetings was the creation in 2006 by the Depository Trust and Clearing Corporation 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.

The dealer group, which is adding new members, met again in September 2006 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. Improvements in this area are likely to be particularly useful in reducing the risks associated with hedge funds, given that hedge funds tend to account for a large share of activity in these markets. Exchange-traded credit derivatives products recently introduced in some markets may also have benefits for reducing operational and legal risks.

V. Risk management and operational capacity in hedge funds

Since 2000, market discipline from investors and counterparties, bolstered by industry good practice guidance, has led to improvements in risk management and operational practices, especially in larger hedge funds. Both investors and counterparties have an interest in requiring sound practices by the hedge funds that they deal with. Supervisors and regulators have acted to complement these trends by focusing on market conduct and investor protection issues.

For market discipline to work effectively, investors and counterparties need accurate and relevant information on which to base their decisions. They have sought to improve the quality of information disclosed by hedge funds, both on a bilateral and a public basis. The due diligence resulting from the activity of funds-of-funds and increased institutional investor interest has been an important driver of improvements. A few large hedge fund managers have started to access public debt and equity markets and are taking on the structures and practices of traditional asset managers. Several other very large hedge funds are located within major banks with highly sophisticated risk management and oversight capacity. Nevertheless further progress is needed to enhance market discipline. Investors and counterparties are best placed to determine the information that they need to make sound decisions with respect to hedge funds, and to exert pressure on the funds to provide this information by restricting investment and financing to those that are not sufficiently forthcoming (see **recommendation 4**).

Recent surveys of hedge funds have found that improvements have been made in the understanding and management of all the major risk categories. There has been welcome attention by larger hedge funds to improve their liquidity profiles and the predictability of their financing (e.g., investor capital lock-ups and margin locks). The issuance of private or public securities by a few larger managers has allowed them to raise more permanent capital or longer-term financing.

At the same time, areas of continuing weakness in many funds have also been identified. These include: pricing and valuation of illiquid securities (see below); analysing market correlations; lack of stress testing, absence of concentration limits, over-reliance on statistical value-at-risk measures; inadequate tracking of liquidity; insufficient use of electronic platforms, and the need to further standardise industry documentation.

Risk management capacity is less developed in smaller fund managers and in those that do not seek institutional money. For smaller funds, this reflects in part the low entry barriers to setting up a fund. While these shortfalls may raise important issues for counterparties and investors in those funds, they are not likely to raise systemic concerns, as long as they are not taken to be characteristic of the sector as a whole. Many smaller funds close down each year, most of them through an orderly wind-down of activities in which investors and creditors recoup at least some of their exposures.

Progress in managing operational risk has also been uneven. For example, issues exist about the accuracy and independence of valuations at hedge funds. Unreliable valuations can handicap the operation of market discipline. On the one hand, valuation practices at the largest hedge funds have improved, in the same way that other aspects of controls

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have. On the other hand, the difficulty of making valuations has grown with the increasing complexity of some products. It may be difficult for an external valuation agent to value illiquid, tailored instruments. But there are incentive problems and conflicts of interest where the manager itself does the valuation.

Finally, there has been a practice among some hedge fund managers to grant preferential terms to some (typically large) investors; for example, by granting preferred investors better access to their funds 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 fund investors.

The hedge fund industry has developed guidance on sound practices in a variety of areas. AIMA issued a guide in 2002, and the MFA published updated recommendations in 2005. Both intend to issue updated guidance during 2007. AIMA has also issued recommendations on asset pricing and fund valuation, addressing issues such as governance and documentation.

More recently, the official sector has suggested guidance or principles that would further buttress market discipline by raising expectations about hedge fund practices:

- Recent supervisory reviews of hedge fund managers by the UK FSA have identified the following areas as most in need of further attention by hedge fund managers:
 - Transparency to investors about valuation practices and their independence; the existence of side letters with material terms; findings from external reviews of managers' systems and controls; and the risk policies the funds adopt.
 - Market conduct controls. Fund managers must meet the typical sorts of standards that apply to more traditional institutional investors in areas such as controls on handling price-sensitive information. This concern has grown as hedge funds have become more involved in loan markets and in the market for corporate control.
- The US President's Working Group on Financial Markets recently released principles and guidelines that will guide US financial regulators as they address public policy issues associated with the rapid growth of private pools of capital. These are intended to reinforce progress since the group's 1999 report, to foster market discipline, and to encourage continued efforts by private pools of capital themselves, investors, counterparties and creditors, and regulators and supervisors.
- IOSCO has released for public comment draft principles also focused specifically on valuation. These are directed toward hedge funds and investors and have particular relevance to illiquid and complex instruments. Amongst other aims, they are intended to mitigate the conflicts of interest that arise when managers' remuneration is linked to the size and performance of an investment portfolio.

It is important that the hedge fund industry, in revising their own guidance, consider how these official sector principles can be reflected and concerns can be acted upon.

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There have been indications that some of the larger hedge fund groups and managers themselves would be prepared to play a role in raising the bar for industry practices, including disclosure. Given the nature of the hedge fund industry, any such industry guidelines may most appropriately and effectively be set forth on a voluntary and international basis. Several of these large funds have already played an important role in private sector initiatives, for example the CRMPG II. The public sector can play a role here in encouraging the continued review and enhancement of these benchmarks, including in response to further market developments and innovations (**see recommendation 5**).

Review of initiatives that address the recommendations of the 2000 HLI Report

The FSF's 2000 report on HLIs included a number of recommendations for action by supervisors, other national authorities, hedge funds and other financial institutions. This annex reviews work that has been undertaken or is currently underway in the public and private sectors in the areas to which the recommendations relate. It is intended to illustrate key areas of progress rather than to be comprehensive. Several of the reports and work programs listed dealt with issues in more than one area.

A. Stronger counterparty risk management

The 2000 report stated "All financial institutions acting as counterparties to HLIs should review their counterparty risk management practices against the recommendations promulgated by the Basel Committee, IOSCO and the Counterparty Risk Management Policy Group". Apart from the actions by individual financial institutions to improve their practices, including in response to market changes and innovations, there have also been some important initiatives by private and public sector groupings to make recommendations or set guidelines. Supervisors have been able to use these guidelines as benchmarks against which to evaluate the counterparty risk management practices of regulated firms (see section C).

CRMPG II (2005)

The Counterparty Risk Management Policy Group II (CRMPG II), a private sector body established in 2005 and chaired by E. Gerald Corrigan, examined what additional steps should be taken by the private sector to promote the efficiency, effectiveness and stability of the global financial system. The report was intended to address the stability implications of developments in financial markets, in particular the increasing use of credit derivatives and other complex financial products, since the publication of the first CRMPG report in 1999. It noted that market developments required risk management policies and procedures that went beyond the first report's recommendations, and set out 47 new or updated recommendations. In relation specifically to counterparty risk management practices, the report suggested that management of risks had improved markedly in recent years. However, there were signs that some firms might have relaxed counterparty market discipline to attract hedge fund business. Among large financial institutions it found that, of the original CRMPG recommendations, progress had been most significant in the areas of exposure calculations (including the use of more advanced potential exposure and stress testing models) and in providing more comprehensive management reporting. In contrast, progress had been slow in developing liquidity-adjusted metrics.

B. Stronger risk management and operational practices by hedge funds

The 2000 report noted that hedge funds, too, needed to enhance their risk management and operational practices. Work has been done since then, both in the private and public sectors, to outline sound risk management and operational practices and to monitor funds' compliance. In some cases, promotion of better internal risk management and controls has been part of broader work on the regulatory framework for hedge funds, such as through the registration of hedge fund managers or the licensing of "authorised" hedge funds that meet certain requirements. In other cases, sound risk management practices by hedge funds have been set out as part of the overall framework for shared responsibilities in the private and the public sector to address systemic risks and investor protection. One example of this of this is the work of CRMPG II described above. Another is the recently issued U.S. President's Working Group principles regarding private pools of capital.

US President's Working Group Principles and Guidelines Regarding Private Pools of Capital (2007)

In 2007 the President's Working Group on Financial Markets, which comprises the Secretary of the Treasury and the heads of the Federal Reserve, Securities and Exchange Commission (SEC) and Commodity Futures Trading Commission, published a set of fundamental principles intended to inform their approach to private pools of capital, including hedge funds. While noting that the current regulatory structure is working well, the statement sets forth expectations for investors, creditors, counterparties, pool managers and supervisors in meeting the challenges posed by the growing role of private pools of capital. These challenges include issues related to investor protection and systemic risk.

US SEC staff report on the implications of the growth of hedge funds (2003)

In September 2003, the staff of the US SEC published a report entitled "Implications of the Growth of Hedge Funds, Staff Report to the United States Securities and Exchange Commission." The report described the operation of hedge funds, discussed the current regulation of hedge funds and their advisers, and discussed a number of investor protection concerns related to hedge funds and their advisers. The report made a number of suggestions to the Commission regarding possible regulatory initiatives.

UK FSA supervision of high impact fund managers (2006-)

Under UK regulation, hedge fund managers must be authorised by the Financial Services Authority (FSA), and are subject to supervision by the FSA, though it does not directly supervise hedge funds themselves. The FSA conducts firm-specific and thematic supervision of hedge fund managers, and relationship managers are assigned to conduct the supervision of the 30 largest hedge fund managers in the UK, covering approximately 50% of UK-managed hedge fund assets. The FSA's concerns with respect to hedge fund managers are focused on two areas: (i) transparency to investors, including valuing positions in illiquid assets, adequate disclosure of side letters with material terms, external reviews of manager systems and controls, and adequate documentation of the risk policies the funds adopt; and (ii) market conduct controls.

BaFin registration and oversight of hedge funds (2003)

Since 2003, German hedge funds have been regulated as “funds with additional risks”, according to the Investment Act. BaFin oversees national single hedge funds and funds of hedge funds, as well as foreign funds of hedge funds that are publicly distributed in Germany. The registration/licensing includes an examination of the sales prospectus, the terms of the investors’ contracts, the accounting, depository and administrative setup (involving in particular the sound calculation of the net asset value and the proper inclusion of prime brokers), and the evaluation of the individual portfolio manager’s competencies with regard to the defined hedge fund strategy. BaFin also audits German hedge funds. With regard to risk controlling, the audits involve examinations of the involved people, processes and systems, including in particular the competence and independence of the risk controller.

Australian financial services licensing requirement for collective investment vehicles (2001)

The Financial Services Reform Act 2001 introduced uniform regulation of all financial products and a licensing framework for providers of financial services. Providers of ‘managed investment schemes’, including hedge funds, had to meet new licensing arrangements and disclosure requirements. Licensing obligations include minimum competence and financial resource requirements; and conduct rules, especially in dealings with retail clients. Disclosure rules also focus on protecting retail investors.

Canadian Securities Administrators’ proposed provincial registration of fund managers, including hedge funds (2007)

In February 2007, a proposal by provincial securities commissions requiring the registration of fund managers, including those of hedge funds, was released for public comment. The registration requirements for fund managers would focus on ensuring that fund managers: have the resources to carry out their functions, or to properly supervise the functions if they are contracted to a third party, and to provide proper services to investors; manage their conflicts of interest; have adequate capital and insurance to provide protection for investors and minimize the risk of loss and disruption to them; and have sufficient proficiency and integrity to carry out their functions.

Italian hedge fund manager registration, including prudential and disclosure requirements (2003 and 2005)

In Italy, a ministerial decree in 2003 and central bank regulation in 2005 set out the main features of hedge fund regulation, which include the following: managers are registered under the authorization of the Bank of Italy; hedge funds are subject to prudential requirements (e.g., initial and ongoing capital, organisational and internal control structure); there are also requirements concerning the information released to the investors and to the market and concerning conduct of business; and the number of investors is limited to 200, with a minimum threshold for investment of 500,000 euros.

IOSCO's survey on the regulatory environment for hedge funds (2006)

In 2006, the International Organization of Securities Commissions (IOSCO) published a report entitled "The Regulatory Environment for Hedge Funds: a Survey and Comparison" which noted that there was no comprehensive, legal definition of the term "hedge fund". However, it reported that 18 of the world's 20 largest financial markets for asset management had a regulatory framework for the management or the distribution of hedge funds in one way or another. Few jurisdictions reported any significant "retailisation" of hedge funds at that point in time, although some anticipated that this was changing or might do so in the future.

IOSCO's survey on funds of hedge funds (2007)

IOSCO recently decided to initiate a survey on funds of hedge funds (FOHFs). The purpose of this work is to: examine the existing regulations or proposed regulations of FOHFs in IOSCO jurisdictions; identify, with the help of industry representatives, the issues of potential concern in this area; and potentially develop elements of international regulatory standards on FOHFs based on best market practices. The work will include examining the due diligence process conducted by the manager of the FOHF for the selection of underlying funds.

MFA's (2005) and AIMA's (2002) sound practices for hedge fund managers

The Managed Funds Association (MFA) published updated Sound Practices for Hedge Fund Managers in 2005, building on the sound practices that it first published in February 2000 and revised in 2003. The sound practices address key management policies and internal trading controls; responsibilities to investors; valuation; risk measurement and monitoring; regulatory controls and compliance; transactional practices in the relationship with market counterparties; and business continuity and disaster recovery planning. The MFA intends to issue an updated version of its sound practices guide during 2007.

In August 2002, the Alternative Investment Management Association (AIMA) released a "Guide to Sound Practices for European Hedge Fund Managers". The guide sets out sound practices for: creating and managing a hedge fund business; the investment process and portfolio risk management; portfolio administration and operational controls; raising capital and investor relations; and hedge fund structures and organisation. The guide has subsequently been adapted to create guides for Canadian and for Asian hedge fund managers. AIMA has also published a set of due diligence questionnaires: as a guide for institutional investors in selecting hedge fund managers, fund of hedge fund managers and administrators; and for hedge fund managers in selecting prime brokers and administrators. AIMA intends to issue an updated version of its sound practices guide for European hedge fund managers in May 2007.

Rating of hedge funds' operational and credit risks by credit rating agencies (2006-)

Some credit rating agencies have begun to assess operational risks in hedge funds, in response to increased interest in such risks on the part of both institutional investors and hedge fund managers. Such ratings are based on areas as: valuation processes; service

providers; accounting controls; regulatory compliance; risk reporting and control; legal and financial structure; and human resources.

Recently, several credit rating agencies have announced criteria for assigning credit ratings to hedge funds or hedge fund management companies for use in connection with debt instruments and other credit relationships.

Mercer Oliver Wyman review of risk taking and risk management practices in the hedge fund industry (2006)

In 2006, Mercer Oliver Wyman held discussions with risk managers of both hedge funds and their broker-dealer counterparts on their current risk management practices. Mercer Oliver Wyman evaluated practices related to risks, including: counterparty credit risk; market risk; legal and documentation risk; and collateral management risk. It found that funds and broker-dealers had continued to strengthen the quality and scope of risk management capabilities across a wide spectrum of practices. As far as hedge fund practice were concerned, it noted a strengthened ability to manage funding and asset liquidity risks, including through margin locks obtained from lending counterparties and lengthier investor capital lock-up periods. Funds had also made efforts to put in place standardised International Swaps and Derivatives Association (ISDA) documentation across counterparties. It also reported challenges and variations in practices among funds, such as wide variations in the content of monthly risk reports provided to counterparties and investors.

Deloitte survey of risk management and valuation practices (2007)

Deloitte Research conducted a survey of the valuation and risk management practices of 60 hedge fund advisers worldwide. The survey results indicated that, while many of the basics of risk management are in place, improvements still need to be made in order to reach a level suitable for the strategies being followed and assets being held. It identified nine “red flags” where a sizeable number of hedge funds were not following hedge fund industry risk management best practices. It also noted that, while some valuation best practices had been widely adopted by hedge funds, others such as the use of third parties for independent pricing validations had been less widely adopted.

C. Enhanced regulatory and supervisory oversight of HLI credit providers

The FSF’s 2000 Report noted that supervisors and regulators should determine the extent of HLI credit providers’ compliance with sound practices and take appropriate actions where they identify deficiencies. Since 2000, supervisors have stepped up their monitoring of risk management by the financial intermediaries that deal most closely with hedge funds, looking both at how they manage their direct hedge fund relationships and at how they manage risks in financial markets in which hedge funds tend to be especially active. A number of supervisory bodies have looked at credit providers’ overall hedge fund exposures, either on a one-time or ongoing basis.

Consolidated supervisory review of counterparty risk management practices

Recently, supervisors have begun to work collaboratively to assess the risk management practices of the financial intermediaries that deal most closely with hedge funds. For example, the Federal Reserve, SEC, UK FSA, BaFin and Swiss Federal Banking Commission (SFBC) currently are engaged in an ongoing review of the management of counterparty exposures by core intermediaries, especially as these relate to hedge funds.

Joint Forum assessment of readiness to deal with marked changes in the economic and financial environments (2005)

In 2005, the Joint Forum undertook, at the request of the FSF, a review of financial institutions' readiness to deal with marked changes in the economic and financial environments. This work helped to facilitate a dialogue between national supervisory authorities about related issues, including regulated firms' exposure to hedge funds, the dynamics of structured credit markets and the impact of hedge funds and private equity activity on market developments. The review found that supervisors could take some comfort from the significant advances in firms' risk management and stress testing practices over the past few years and from firms' generally strong earnings and capital levels. Nonetheless, it was observed that the rapidly changing financial environment, the entrance of new market participants, and firms' changing business activities highlight the need for continued improvements in risk management and stress testing practices, particularly in the areas of firm-wide aggregation of risk exposures, assessing the interaction of correlated risk factors under stress, and assessing market liquidity dynamics under stressful conditions.

BCBS/IOSCO Review of Issues Relating to HLIs (2001)

Subsequent to issuing sound practice standards in 1999, the Basel Committee on Banking Supervision (BCBS) and IOSCO issued a joint report in 2001, entitled *Review of Issues Relating to Highly Leveraged Institutions*, in which they assessed implementation of their respective guidance. The review noted improvements in risk management practices vis-à-vis the hedge fund sector, but also recommended that banks and securities firms improve their stress testing capabilities for counterparty exposures, including the ability to assess the combined impact of large market moves, counterparty exposures and collateral values. It also recommended that firms ensure that they apply an appropriate package of risk monitoring and management tools that takes account of a firm's internal exposure measurement and management reporting processes and that balances such factors as the adequacy of information flows against the credit terms offered and the limits set on exposures to HLIs.

UK FSA prime brokerage survey (2004-)

Since October 2004, the UK FSA has surveyed prime brokers' counterparty exposures to hedge funds as part of its oversight of hedge fund credit providers. The survey is intended to gauge risk appetite, identify outliers among respondents for the purpose of bilateral supervision, identify the emergence of large and highly leveraged funds, and assess banks' ability to aggregate counterparty exposure across business lines. The survey has two main

data requests: the first looks at credit exposures to hedge funds across the main businesses including OTC derivatives and secured financing (respondents are asked to provide their aggregate and their ten largest current exposures, unsecured exposures, and potential exposures), and the second request focuses on prime brokerage (respondents are asked for aggregate and ten largest exposures by margin requirement and cash balances). Although recent survey results broadly indicate that core intermediaries are managing their exposures prudently, the survey has shortcomings due to its incomplete coverage; not all respondents report aggregate or top 10 exposures on a global basis.

Commission Bancaire examination and questionnaire on large banks' exposures to hedge funds (2007)

Since the end of 2004, the Commission Bancaire has carried out thematic on-site examinations of the hedge-fund-related risks in the major French banking groups. The Commission Bancaire has recently introduced a questionnaire to be completed semi-annually by the 8 French banks that are most involved in the hedge funds business. This will provide regular data on banks' exposures to hedge funds and more detailed information on their risk management of the exposures. It will also contribute to a closer dialogue with the banks on the evolution of hedge fund business practices. The Commission Bancaire has also stepped up its monitoring of progress regarding derivatives confirmation backlogs, in particular regarding equity derivatives.

DNB monitoring of large banks', pension funds' and insurers' exposures to hedge funds (2005 and 2007)

In 2005, De Nederlandsche Bank (DNB) conducted a survey into the hedge fund exposures of the largest Dutch banks, pension funds and insurance companies, the results of which were published in DNB's "Overview of Financial Stability in the Netherlands" in June 2005. The survey showed that pension funds had the highest exposures (relative to capital) to hedge funds, followed by larger conglomerates and banks. In 2007, DNB published for comment draft high-level principles for the assessment by supervisors of institutional investors' risk management for alternative investments, with respect to risk/return characteristics, portfolio policies, due diligence, contract terms and communication.

ESCB Banking Supervision Committee report on large EU banks' exposures to hedge funds (2005)

The Banking Supervision Committee (BSC) of the European System of Central Banks (ESCB) investigated the links between large EU banks and hedge funds, given the important role that the former play in hedge fund operations. The main policy conclusions of the BSC study can be summarised as follows: (i) The survey results indicate that recent developments in the hedge fund industry may not necessarily pose a direct threat to financial stability in the EU through banks' direct exposures to hedge funds. Nonetheless, banks may be affected indirectly, for example, if hedge fund activities cause strains for major non-EU prime brokers with spillover effects to EU banks; (ii) The main recommendations put forward by public authorities in the aftermath of the LTCM case, according to which hedge-fund-related risks are best addressed through appropriate risk

management by hedge funds' bank counterparties, remain relevant for large EU banks; and (iii) Risk management guidance developed by supervisors and the capital adequacy regime provide the appropriate framework for dealing with risks resulting from banks' interactions with hedge funds.

APRA survey of banks' exposures to hedge funds (2007)

In early 2007, the Australian Prudential Regulation Authority (APRA) surveyed Australian and foreign banks operating in Australia about their exposures to hedge funds. APRA is still assessing the information provided but has not seen any major areas of concern.

OSFI review of major banks' exposures to hedge funds (2006)

As part of its regular assessments of financial institutions, in 2006 the Canadian Office of the Superintendent of Financial Institutions (OSFI) reviewed major banks' exposure to hedge funds, and their management of that exposure. The review indicated that the exposure of Canadian banks to hedge funds was relatively small, and that risk management practices were adequate. Canadian banks were found to be taking a cautious approach to hedge funds.

MAS survey of bank' exposures to hedge funds (2005)

In 2005, the Monetary Authority of Singapore (MAS) conducted a survey of the hedge fund exposures of banks and merchant banks. Locally-owned banks reported exposures on a group level, while foreign banks reported exposures booked in their Singapore offices. The survey found that the banking industry did not have a significant exposure to the hedge fund industry.

SFBC periodic monitoring of large banks' exposures to hedge funds and controls

In Switzerland, the SFBC periodically requests information from its supervised entities regarding their exposure to hedge funds and the controls surrounding this exposure, including due diligence, risk management and operational processes. The information is analysed and specific areas of concern discussed with senior representatives of the large banking groups.

D. Greater risk sensitivity in capital adequacy regulation

The 2000 report supported work by the BCBS to strengthen the incentives of regulated institutions to take an appropriately prudent approach towards leverage extended to HLIs. It also encouraged ways to induce securities firms to take a commensurately prudent approach towards the interaction of risk and leverage.

Basel II

In June 2004 the BCBS released the document *International Convergence of Capital Measurement and Capital Standards: a Revised Framework* (commonly referred to as 'Basel II'). It was followed by the joint BCBS-IOSCO framework of July 2005 covering

trading-related risks, which created a consistent capital framework across banks and securities firms, including for HLI-related exposures. The supervisory standards that banks and securities firms must meet to qualify for the advanced approaches of the framework provide strong incentives to improve their risk measurement and management systems surrounding both direct and indirect exposures to HLIs.

Direct exposures to HLIs

The Basel II framework significantly strengthens the capital treatment for the main sources of firms' direct exposures to HLIs. These include counterparty credit exposures related to derivatives, securities financing, prime brokerage and unsettled trades; direct lending activities; and equity investments in hedge funds.

For counterparty credit exposures, Basel II enables firms to model their potential future exposure using portfolio simulation methodologies that reflect netting and collateral. Measured potential exposure that exceeds initial margin is subject to risk-based capital requirements. Moreover, firms that can demonstrate that their models adequately measure the dependence between a counterparty's potential credit exposure and the default risk of that counterparty can qualify for a reduction in their capital requirement, creating incentives to measure exposure to market and credit risk in an integrated manner under their simulations. Firms must meet both qualitative and quantitative standards to have their models approved by the supervisor. Taken together, these represent substantial enhancements to the simple add-on approach of the Basel I framework.

Basel II also captures the risks associated with firms' extensions of credit to, or investments in, HLIs in a more risk-sensitive manner compared to Basel I, which assigns a uniform 8% capital charge for all exposures to HLIs regardless of whether the exposure takes the form of an extension of credit or an equity stake. Basel II, through its internal ratings-based approach, bases capital charges for credit exposures on a firm's estimate of the counterparty's credit quality. Equity stakes in HLIs under Basel II are subject to a more risk-sensitive treatment, resulting in considerably higher capital requirements than under Basel I.

When calculating their capital requirements for HLIs and other types of counterparties, firms must demonstrate to supervisors that their systems are able to aggregate exposures to a given counterparty, whether these exposures result from traditional lending, derivatives, securities financing or unsettled trades.

Indirect exposures to HLIs

The Basel II framework introduces enhancements that should strengthen firms' resilience to withstand periods of economic and financial stress, including those resulting from market-based events or problems at HLIs. In particular, the capital treatment for trading-related exposures has been strengthened, requiring that firms improve the way that market risk models capture risks associated with complex and illiquid products. In addition, firms must develop methodologies that capture the default risk embedded in credit-sensitive trading exposures.

The Basel II framework sets high operational standards for the measurement and recognition of credit risk mitigation in capital calculations, thereby providing a strong incentive for firms to improve their risk management and credit risk mitigation processes. In addition, as compared to Basel I, the framework introduces explicit, risk-sensitive capital requirements for securitization-related exposures. Moreover, the Basel II framework for the first time introduces a capital requirement for operational risk, including operational risks associated with complex derivatives and capital markets activities.

Finally, the framework requires that firms conduct stress tests of their aggregate credit-related exposures to ensure that they maintain an adequate regulatory capital base across various economic and financial market conditions.

E. Building a firmer market infrastructure

The 2000 report noted that improvements in market and legal infrastructures was a critical step in providing counterparties with a timely and effective way of dealing with failing HLIs and improving financial markets' ability to contain the risks of large leveraged players. Since then the private sector has developed and implemented appropriate solutions in many areas. Recently, market infrastructures have been challenged by the rapid innovation in OTC credit derivatives products and markets. In certain cases, the authorities have acted to enhance infrastructure or to address collective action problems and encourage necessary progress by the private sector.

Documentation and settlement of OTC derivatives

The 2005 review of Credit Risk Transfer by the Joint Forum and the CRMPG II report both drew attention to the backlog in confirmations and the problems associated with the assignment of credit derivative contracts. Starting in the second half of 2005, the New York Fed and the UK FSA called on market participants to address these problems. Since then, as a result of these initiatives, major market participants have made good progress in strengthening the infrastructure supporting credit derivatives markets, including a substantial reduction of confirmation backlogs, in ending the market practice of assigning trades without obtaining prior consent of the counterparties and in increasing the automation of trade processing. Authorities have asked for the industry to expand the use and further develop an electronic trade information warehouse (see below) to further standardise and automate credit derivatives trade processing; They have also asked for similar improvements in the infrastructure for equity derivatives, where the creation and publication of additional master confirmation agreements and other industry-agreed standard trade documentation is seen as the most significant immediate priority. Going forward, supervisors may focus on other OTC derivative asset classes as well.

CPSS report on clearing and settlement arrangements for OTC derivatives (2007)

In March 2007 the Committee on Payment and Settlement Systems (CPSS) released a report entitled "New developments in clearing and settlement arrangements for OTC derivatives". It analysed existing arrangements and risk management practices in the OTC

derivatives market and evaluated the potential for risks to be mitigated by greater use of, and enhancements to, market infrastructure. The report concluded that, since its earlier report on settlement procedures and counterparty risk management for OTC derivatives in 1998, the clearing and settlement infrastructure of OTC derivatives markets had been significantly strengthened. However, further progress was needed in some areas, including extending the work to reduce confirmation backlogs in credit derivatives to other OTC derivative products, using automated systems whenever possible; and identifying steps to mitigate the potential market impact of replacing contracts following the close-out of major participants. In addition, as market infrastructure moves further in the direction of centralised processing of trades and post-trade events, several issues would assume greater importance, including the need for providers of essential post-trade services for OTC derivatives to provide open access to their services; and the need for central banks and supervisors to consider whether some standards should be extended to providers of clearing and settlement services for OTC derivatives that are not already subject to them.

DTCC Trade Information Warehouse (2006)

In November 2006 the Depository Trust and Clearing Corporation (DTCC) launched a Trade Information Warehouse. The Warehouse will store data on the legal and economic terms, payments due, and post-trade events (cash flows, novations, credit events and terminations) of the contracts submitted to it. At the moment it covers credit derivatives, but there are plans to extend the service to other derivative categories (interest rate, foreign exchange, equity and commodity).

ISDA's standard protocol on credit default swaps

Progress is being made in dealing with the settlement of contracts in cases where a credit event has occurred and claims on underlying debt securities exceed deliverable securities. In conjunction with recent default events, such as those of Delphi and Dura, auction procedures have been developed for determining appropriate cash settlements. An addendum to the standard ISDA credit default swap protocol outlining these procedures has gained broad market acceptance.

F. Enhanced disclosure by HLIs

As markets and hedge fund activities have evolved, efforts of regulatory authorities and the private sector on hedge fund disclosure have largely focused on information that should be provided to investors, creditors and counterparties. For example, the principles and guidelines issued by the US President's Working Group on Financial Markets, mentioned above, note that investors, creditors and counterparties should undertake appropriate and effective due diligence before making an investment in or extending credit to a private pool of capital and on an ongoing basis thereafter. Moreover, the information provided by managers of private pools to their creditors, counterparties and investors should adhere to the sound practices articulated in industry guidance. Managers of private pools of capital should provide information frequently enough and with sufficient detail that creditors, counterparties, and investors stay informed of strategies, the amount of risk being taken by the pool, and any material changes.

IOSCO's principles for the valuation of hedge fund portfolios (2007)

These principles, which were published for consultation in March 2007, seek to ensure that hedge funds' financial instruments are appropriately valued, and in particular that these values are not distorted to the disadvantage of fund investors. The draft principles state that the arrangements for valuation of the hedge fund's investment portfolio should be transparent to investors and describe some of the relevant information that should be made available to investors upon request, including on the roles of all the parties and pricing services involved in the valuation. They also describe the techniques that should strengthen the valuation process, including addressing the challenges that arise when valuing illiquid or complex financial instruments. They emphasise the importance of clear written procedures that are consistently operated and regularly reviewed, and which provide for an appropriate degree of independence to deliver effective checks and controls.

AIMA recommendations for asset pricing and valuation (2005 and 2007)

AIMA published recommendations for sound hedge fund valuation practices in 2005, following a global survey of hedge fund managers, investors and fund administrators. These were revised and streamlined in March 2007 in its Guide to Sound Practices for Hedge Fund Valuation. This report sets out 15 recommendations, which are intended as principles-based guidance and cover: governance; transparency; procedures, processes and systems; and sources, models and methodology. The transparency recommendations encourage hedge funds to disclose: the party to whom responsibility for the calculation, determination and production of net asset value has been delegated; and whether there has been any material involvement by the investment manager in the pricing of underlying portfolio positions.

In addition, industry groups have issued guidelines in certain jurisdictions on information to be provided to investors. For example, the AIMA has issued guidelines on disclosure and promotion of alternative investment funds in Australia (2002) and Canada (2005) and the MFA's Sound Practices for Hedge Fund Managers (2005) includes summaries of information to be provided to investors and related regulatory requirements in the US.

Disclosure requirements linked to sales to retail investors

A number of jurisdictions impose disclosure requirements that apply to hedge fund products that are authorised for marketing to retail investors. These are motivated by investor protection concerns, and have often been introduced in conjunction with other investor protection measures. Generally, documents on these products are expected to give retail clients the information they would reasonably require to make a decision about whether to invest in a financial product. Often issuers or distributors are required to warn investors about their products' heightened risks. Other items that investors are informed about in different jurisdictions include:

- Information about exposures, investment strategies, and the nature of the underlying assets, including derivatives;
- Procedures for measuring and monitoring risks, including operational risk;

- Information about valuations and fee structures;
- Potential conflicts of interest, and procedures in place to address such conflicts;

In addition, some jurisdictions require regular (annual, semi-annual or quarterly) reports, and/or regular calculation of purchase and redemption prices. Some jurisdictions require an indication as to whether certain information is unaudited, such as the analysis of the portfolio and most recent net asset value per security.

While a number of these measures are in place in more than one jurisdiction, there are also important differences across jurisdictions on fundamental definitional issues, such as whether different rules apply to hedge funds (or risky funds in general) compared with other investment vehicles, or whether a lower level of disclosure is permitted for products that are not registered with the authorities or not openly marketed to retail investors.

G. Enhanced disclosure practices generally

The 2000 report supported better public disclosure by all types of regulated financial institutions and by hedge funds. In the years since, there has been some progress in disclosure by intermediaries. While disclosure frameworks and principles have also been developed for hedge funds, the evidence of progress with respect to public disclosures by hedge funds is less clear.

Multidisciplinary Working Group on Enhanced Disclosure (2001)

The Multidisciplinary Working Group on Enhanced Disclosure (MWGED), sponsored by the BCBS, CGFS, International Association of Insurance Supervisors and IOSCO, issued in 2001 a report recommending improvements to the disclosure practices of all types of financial institutions, including hedge funds. The report made recommendations concerning disclosures that should be provided by financial intermediaries with a material level of the relevant financial risks, through periodic reports to their shareholders, creditors and counterparties. These disclosures should be expressed in ways consistent with firms' internal risk management practices, and include: intraperiod high, median and low, and period-end value-at-risk of actively managed or marked-to market exposures; substantive qualitative discussion of funding liquidity risk that includes some quantitative information supporting the discussion; and information about credit exposures broken out by type of exposure or business line, credit quality, and maturity. The MWGED recommended that the sponsoring organisations encourage hedge funds to provide this information when material, on a routine, periodic basis to their investors, creditors and counterparties. To the extent that funds do not disclose this information, the MWGED recommended that the relevant supervisory and regulatory authorities consider requiring such disclosures, to the extent appropriate and consistent with the applicable regulatory regime. The information when material should also be considered to be a minimum of what would be expected in bilateral disclosures when judging the adequacy of counterparties' risk management arrangements for dealing with such firms.

Joint Forum assessment of disclosure practices (2004)

The Joint Forum released in 2004 a report entitled “Financial Disclosure in the Banking, Insurance and Securities Sectors: Issues and Analysis”. The report examined the progress made by larger financial firms in adopting the recommendations contained in the report of the MWGED and the efforts of regulators and other standard setters in the area of financial disclosure. The report found that the extent of adoption of the recommendations varied widely. While many financial firms had adopted some of the recommendations, at least a few particulars of the recommendations were not adopted by a significant number of firms, such as quantitative disclosures of risk and return and of funding liquidity risk. The Joint Forum working group that developed this report was unable to obtain the cooperation of sufficient numbers of hedge funds to provide a meaningful basis for review of hedge fund disclosure.

H. Enhanced national surveillance of financial market activity

The 2000 Report recommended that 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.

In recent years, central banks, supervisors and regulators have enhanced national surveillance of financial market activities as a means to help provide useful early warning signals about pressures building up in financial markets. Surveillance methods have included regular contact with market participants, reviews of risk management practices and methodologies, and enhanced public dialogue on financial stability issues, including through the publication of regular financial stability reports or reviews.