

24 June 1999

Mr David Hawker MP
Chairman
House of Representatives Standing Committee
on Economics, Finance and Public Administration
Parliament House
CANBERRA ACT 2600

Dear Mr Hawker

**INQUIRY INTO THE INTERNATIONAL FINANCIAL MARKETS EFFECTS ON
GOVERNMENT POLICY**

Thank you for the opportunity to make a submission to your inquiry.

We are particularly interested to take up your reference to the activities of highly leveraged institutions in financial markets and their implications for the stability of markets and the conduct of economic policies. These issues have been an important focus of the Bank's work over the past year. They have also been important in the work being undertaken in international fora. The Bank has been actively involved in this work through various Working Groups of the Bank for International Settlements and the Financial Stability Forum.

We have prepared two papers setting out our thinking on these issues. The first, *The Impact of Hedge Funds on Financial Markets*, describes Australia's experience with hedge funds and discusses the impact of their activities on market prices and the integrity of markets. It also provides a summary of work that is underway on these issues in the international arena.

The second paper, *Hedge Funds, Financial Stability and Market Integrity*, is a more general piece, and mainly looks at the issue from the point of view of the prudential risks that highly leveraged institutions pose for lenders and counterparties and, ultimately, financial system stability.

Broadly speaking, we are happy with the general direction of the work that is taking place internationally on this topic. The work has two broad strands. The first aims to encourage a more prudent relationship between banks and highly leveraged institutions by reviewing banks' risk management practices and the capital charges applied to some of the banks' market activities. The second aims to improve the degree of disclosure by market participants, particularly by highly leveraged institutions, so that counterparties and the authorities are better able to assess the implications of their activities. The work being undertaken at this stage does not envisage the imposition of direct controls on a greater range of market participants (particularly those operating in over-the-counter markets) but that

possibility could be considered if the approach currently being pursued does not prove to be successful.

I am conscious that the terms of reference of your inquiry are much broader than issues relating to highly leveraged institutions, covering, as they do, the international linkages affecting financial markets and the implications for the conduct of macro-economic policy. These issues are central to the Bank's main functions and they have therefore been the focus of much of the Bank's research and analysis over the years. In particular, in 1994, the topic of the Bank's annual economic conference was the *International Integration of the Australian Economy*. I am enclosing copy of the papers and proceedings of that conference, which include contributions not only by Bank staff but also domestic and international academics. I am also attaching a list of other research papers prepared in the Bank which may be relevant to the subjects you are considering. If you are interested in any of these we would be happy to provide copies.

Yours sincerely

Reserve Bank Research Papers Dealing with Issues of Globalisation

- 1 *What Moves Yields in Australia?*, Frank Campbell and Eleanor Lewis, Reserve Bank of Australia, Research Discussion Paper, July 1998
- 2 *External Influences on Output: An Industry Analysis*, Gordon de Brouwer and John Romalis, Reserve Bank of Australia, Research Discussion Paper, December 1996
- 3 *Australian Financial Market Volatility: An Exploration of Cross-Country and Cross-Market Linkages*, Tro Kourtian and James O'Regan, Reserve Bank of Australia, Research Discussion Paper, November 1996
- 4 *Towards an Understanding of Australia's Co-movement with Foreign Business Cycles*, Nicolas de Roos and Bill Russell, Reserve Bank of Australia, Research Discussion Paper, November 1996

THE IMPACT OF HEDGE FUNDS ON FINANCIAL MARKETS¹

1. Recent discussions on the impact of hedge funds on financial markets have mainly focussed on the prudential risks they pose to lenders and counterparties, or, in extremis, the risks they pose to financial system stability. (The paper, *Hedge Funds, Financial Stability and Market Integrity*, issued by the Reserve Bank in March 1999, presents an overview of these issues.) In contrast, the effects of hedge funds on particular market prices and on the integrity of those markets has received little attention to date.
2. The possibility that market participants can engage in profitable, yet destabilising behaviour, is now well recognised in the academic literature. This literature demonstrates that markets can display herd behaviour, in which participants follow “leaders”, and this can result in overshooting of prices in these markets. This undermines the traditional view that speculation must be stabilising. That view was based on the assumption that profitable speculation must involve buying when the price is low and selling when the price is high. But, in markets characterised by herd behaviour, selling when the price is already low can be profitable if it induces others to follow and thereby cause the price to fall further. The problem may be particularly acute where there are players large enough to exert a noticeable influence on the market.
3. Hedge funds have found themselves in a strong position to exploit such trading strategies following their success in the UK devaluation of 1992. The publicity generated by that event gave them enormous standing in financial markets and many traders adopted strategies which mimicked those of the hedge funds. In the foreign exchange market, in particular, banks and investment banks systematically keep their better clients informed of the hedge funds’ daily trading strategies. Combined with the willingness of some hedge funds to use leverage to build very large positions, this status places hedge funds in the position of market leaders, with the ability to influence the behaviour of others in markets.
4. The issues concerning the impact of hedge funds are of crucial importance to medium-sized economies, where markets are generally liquid but participants can build positions which are large relative to the size of markets. It would be wrong, however, to assume that the impact of hedge funds was limited to these markets. Hedge funds were major players in the ERM crisis in the early 1990s and in the US dollar/yen exchange rate last year.
5. The academic literature also recognises the potential for there to be circumstances in which a speculative attack on a currency may be self-fulfilling. The mechanism for this is that markets may anticipate that it would be simply too costly for the authorities

¹ This is a revised version of a paper submitted to the Financial Stability Forum Working Group on Highly Leveraged Institutions, for its meeting on 4 June 1999.

to resist heavy selling pressures on their currency, even if the initial level of the currency would have been sustainable in the absence of the attack. Thus, a speculative attack could move a currency to a new, lower level and, once there, the economic forces set in train prevent the exchange rate from returning to its previous level even after the speculators have left the market.² Again, it seems likely that the risk of such an event would be increased by the presence of position-takers who are large enough to move the market and who might expect to profit by precipitating a speculative attack.

6. In a free and competitive market, the presence of any participants meeting these criteria would bring into question the integrity of the market – ie the degree of certainty that the market price is a true reflection of fundamental determinants. This in turn raises questions about whether the level of transparency in markets, and the mechanisms for ensuring “fair trading” practices, are adequate.
7. In this respect, the activities of the “global macro” hedge funds are of most interest³. While there is only a small number of such funds, their investment approach of aggressive position-taking has the potential to exacerbate stresses in world markets. It should be of concern to policy makers that, as well as positioning themselves to take advantage of expected market developments (which is a perfectly legitimate activity), these funds at times also try to influence the course of those developments. Their ability to do this reflects not only the size of their position-taking relative to some of the markets in which they operate, but their influence on the behaviour of other market participants because of the reputation they enjoy. Most countries, in their domestic markets (particularly those conducted on exchanges), have rules to prevent such outcomes. But, in markets such as foreign exchange and over-the-counter (OTC) derivatives, where trading is decentralised and global in nature, individual countries can find it difficult to impose or police rules to ensure fair trading.

Hedge Funds and Market Integrity: the Assessment

8. Opinion is divided on whether hedge funds played a significant role in the development of the Asian financial crisis of 1997. Although the statistics clearly point to the reversal of commercial bank lending to those countries as being a major external factor, most in the region believe that hedge funds played a significant role in enlarging the crisis and that this has been insufficiently recognised in the (admittedly limited) literature on the subject. Views in the major countries appear to have been influenced by an IMF report, *Hedge Funds and Financial Market Dynamics* (IMF 1998). Both the President’s Working Group on Financial Markets and a recent Bundesbank article (*Deutsche Bundesbank Monthly Report*, March 1999) cited the above report in reaching a sceptical view of the role of hedge funds in the Asian crisis. The evidence contained in that IMF report, however, is not very strong. The report downplayed the role of hedge funds in the Thai crisis on the grounds that they “...were at the rear, not the front, of the herd ...”. Data on the timing of hedge funds sales of Thai baht do not exist but, even if the IMF claim is correct, it is difficult to dismiss the role of hedge funds given that they had a short position in Thai baht equal to almost 5 per cent of Thailand’s GDP. Put another way, it seems hard to dismiss the role of hedge funds when their short positions would have put almost as much pressure on the currency as the Thai current account deficit (which has been widely seen as an

² This is known as the existence of “multiple equilibria”.

³ Attachment 1 describes the different types of hedge funds and sets out some of the facts that are known about them.

important factor in the currency crisis). In fact, some might regard the actions of hedge funds as described by the IMF as the ultimate in destabilising behaviour: they came into a market that was already under intense pressure and sold a large volume, pushing the currency over the brink. (See also the description of their activity in the Australian dollar below.)

9. The Report of the President's Working Group on Financial Markets also based its conclusions partly on an NBER paper (Brown, Goetzmann and Park (1998), *Hedge Funds and the Asian Currency Crisis of 1997*). This paper found that hedge funds' estimated short positions in Asian currencies did not seem to be correlated with movements in exchange rates. However, as data on these positions were not available, the authors constructed their own estimates using a methodology initially developed to analyse returns of mutual funds managers. This methodology, however, cannot readily be transferred to analysis of hedge funds as they follow a more diverse and variable trading strategy. In particular, the constructed data imply implausibly large estimates of short positions (see Attachment 2). These flaws in the data are on such a scale that they call into question the findings of the paper.
10. Overall, the Bank's view is that the role of hedge funds in the events of 1997 and 1998 in the Asia/Pacific region have been dismissed too readily.

The Experience of Australia

11. The experience of Australia in 1998 with respect to the exchange rate of the Australian dollar illustrates the destabilising impact which hedge funds can have. Hedge fund activity in the Australian dollar came in three stages:
 - They first emerged as large-scale players in the March and June quarters of 1998 when the exchange rate was around US65 cents – ie after it had already fallen by 15 per cent. During this period they quietly established large short positions in the Australian dollar. Reports from dealers suggested that the positions were in the order of \$A10-15 billion, equal to about 2½ per cent of Australia's GDP and therefore very significant. Essentially, this first stage involved spotting a trend that had been underway in the exchange rate and establishing a position which could capitalise on the trend-following behaviour of the market.
 - The second stage involved a more aggressive stance as the exchange rate approached its post-float lows around US60 cents, a time when the market was naturally quite sensitive. The key features of hedge funds' activities were the signalling to other market players that they were about to attack the \$A (a move which heightened uncertainty and deterred potential buyers from remaining in the market); lowering offer prices in the brokers even though they were able to sell all they had on offer at the existing price; and concentrating sales into periods of thin trading. One consequence was that exporters, who had been keen buyers of \$A at higher levels, not only stopped buying but began to sell in the expectation that the exchange rate would fall further – a classic example of herd-like behaviour.
 - The third stage involved the hedge funds taking advantage of other participants' desire to sell by quietly buying back, unwinding their short position, and thereby taking profits. Short positions established in the first half of 1998 were strongly in profit for a substantial period and thus there was ample opportunity for this to be completed. Despite that, it seems that only limited profit taking occurred, as hedge funds held on in the expectation of further falls. In fact, the Australian dollar did fall as far as US55.3 cents in August, but events then moved very quickly. In late September and early October, the near collapse of Long Term

Capital Management, a major hedge fund, caused banks to cut back on their funding to all hedge funds. Deprived of the credit used to fund their short positions, hedge funds were forced to cover those positions by buying in the market. This produced a sharp rise in the exchange rate, back to around US65 cents, roughly where it had been before the hedge funds' selling started six months earlier.⁴

12. Australia has fully open markets, and market participants are free to buy or sell as they see fit. Nonetheless, the size of the positions taken by hedge funds, in Australia (and even more so in Hong Kong and Thailand) and their apparent intention to then force a change in the price, raises concerns about the possibility of market disruption. Notably, they were not merely transacting to take advantage of expected events but were doing so in a way which seemed intended to try to influence the course of events, posing a risk to market integrity.
13. As said earlier, there is a tendency for the authorities in major countries to downplay the impact of hedge funds on financial prices. In the case of their own markets, perhaps this reflects a view that the markets are deep and liquid, and no participant or small group of participants can have a significant effect. While there is a lot of truth in this view, it should have been seriously challenged by extraordinary movements in the US dollar/yen exchange rate last year. This was one of the largest changes in a major country's exchange rate since the start of floating nearly 30 years ago – a move of about 25 per cent in a little over a month, of which 15 per cent occurred in 30 hours. The timing of the move and the feedback from the market makers both pointed directly to the central role of hedge funds, who were forced to liquidate formerly profitable positions to meet margin calls or because funding from banks was being cut back. It is surprising, therefore, that there has been so little public analysis not only of the move itself but of the role played by hedge funds.

Are Hedge Funds Different from Commercial Banks and Investment Banks?

14. Some claim that hedge funds are being made scapegoats for recent instability, and that in fact their activities are no different to those of other market participants such as commercial banks or investment banks. It is said, for example, that hedge funds are, on average, less highly geared than commercial banks and investment banks.
15. These conclusions about the gearing of hedge funds are based on figures reported by industry bodies such as MAR Hedge. They show that those hedge funds that do report gearing generally show figures of less than 3:1. In contrast, a typical commercial bank would run gearing of about 10:1, while investment banks have gearing closer to 20:1.
16. These comparisons are of very limited value because:
 - the bulk of hedge funds, particularly the global macro funds which are generally identified with the recent financial crises, do not report their gearing; and
 - the figures that are reported are based only on balance sheet totals. Since it is widely acknowledged that hedge funds rely principally on off-balance sheet techniques (futures, forward contracts etc) to obtain leverage, the reported figures are largely meaningless. (Note that the reported figures are not audited in any way.)

⁴ Discussions with the Hong Kong Monetary Authority and the South African Reserve Bank indicate that hedge funds used similar approaches in the attacks on the Hong Kong dollar, during August and September 1998, and on the rand, which lasted from May to August 1998.

17. The fact is that no reliable or comprehensive data on the gearing of hedge funds are available. Data on the one fund for which information is available – LTCM – show a very high level of gearing. Even before the crisis – ie before it began losing capital – its balance sheet gearing was 25:1 and, in addition, it had gross futures, forward and options contracts outstanding equal to about 300 times its capital.
18. In any event, comparisons between hedge funds and commercial and investment banks based purely on gearing ratios are misleading, as they do not take into account the very different business approaches of the various types of institutions. The great bulk of commercial and investment bank balance sheets are devoted to supporting client businesses rather than position taking. To the extent that they do engage in position taking, it tends to be at a disaggregated level, by individual dealers. In contrast, hedge funds' positions are concentrated and centrally controlled. One consequence of this is that individual positions of banks tend to be smaller and less strongly held, and therefore less likely to have effects on markets. Also, banks are mindful of their wide-ranging relationships with governments and businesses in individual countries, and therefore less inclined to pursue trading strategies which could disrupt a country's markets and harm the bank's reputation. Hedge funds, in contrast, have no on-going relationships with most of the countries in which they trade and hence can be purely opportunistic.
19. It follows from the above that it is not valid to conclude that, because hedge funds' assets are much smaller than those of banks (or even mutual funds, pension funds and life offices), their impact on markets is less. For one thing, the extensive use by hedge funds of off-balance sheet instruments gives them more influence than their asset size would suggest. Perhaps more importantly, it is *changes* in positions that influence market prices, and in this respect hedge funds are much more active than banks (whose main business is not position taking) or mutual funds, pension funds or life offices (whose positions in markets are constrained by the benchmarks they follow).

Measures to Reduce the Risk of Instability

20. Measures which could reduce the risk of market instability fall into two groups: those that could be implemented by individual countries; and those that require international co-operation.
21. On the former, there is the obvious point that the likelihood of becoming subject to a speculative attack is reduced if a country's macro policies and economy are in good shape. But good fundamentals do not preclude the possibility of an attack; international events can dominate, as Australia's experience last year showed. The solid structure of the Australian economy did, nonetheless, make it better able to withstand the impact of the speculative pressure.
22. Structural factors affecting markets can also be important, although the claims by some commentators that small countries can minimise the chances of a speculative attack by developing deep and liquid markets seem overstated. While there are many good reasons for a country to develop deep and liquid markets, the evidence does not support the conclusion that they reduce the risk of speculative attack. In fact, the opposite seems to be the case. Before the crisis, Thailand and Hong Kong had by far the most liquid foreign exchange markets in Asia (except Japan); relative to GDP, turnover was well up with developed country standards. Similarly, the Hong Kong stock market was the most liquid market in non-Japan Asia, and the Australian dollar is the seventh most actively traded currency in the world. Yet it was these markets, rather than other less liquid markets in the region, that were attacked. Unfortunately, liquid markets are one of the characteristics favoured by speculators, because they give scope to establish and later reverse sizeable positions. In this respect, the activities of

hedge funds are more of an issue for medium-sized economies with active markets than small economies with illiquid markets. The real issue facing small countries is not the liquidity of their markets but the potential to be overwhelmed by the funds flows originating from the large economies. When a very small number of market participants can quickly establish a position in a currency that is a large percentage of the country's GDP, as was the case in Thailand and Hong Kong, the potential for market disruption is very high.

23. Because of the global structure of most markets, measures aimed at preventing market integrity are likely to require international co-operation, particularly the co-operation of the large countries whose firms dominate world financial markets. This was recognised in the Report of the Prime Minister's Task Force on International Financial Reform, which contained some proposals for curtailing the possible deleterious effects of hedge funds on financial markets
24. Most of the international effort in this area is being carried out in three working groups set up by the Bank for International Settlements. Details of these are given below. The international association of securities regulators, IOSCO, has also been examining various issues, particularly the counterparty risk management practices of firms operating in financial markets. In the US, the President's Working Group on Financial Markets has also produced a report looking at the implications of the LTCM episode. Recognising the range of work being undertaken in this area by the various bodies, the Financial Stability Forum, a G7 group comprising bank, securities and insurance regulators, has recently set up a Group to take stock of, and co-ordinate, the various strands of the work underway.

Summary of Work Underway on Highly Leveraged Institutions

Basle Committee on Banking Supervision Working Group (the Brockmeijer Group)

25. The report noted that most institutions with exposures to hedge funds appeared to have tightened their approaches to assessment, measurement and management of these exposures following the events of 1998. In order to ensure that these improvements are locked in over time, the report made recommendations for sound practices in the following areas:
- establishing clear policies and procedures for interactions with HLIs as part of the overall credit risk management environment;
 - employing sound information gathering, due diligence and credit analysis practices which address the specific risks associated with HLIs;
 - encouraging the development of more accurate measures of exposures resulting from trading and derivatives transactions;
 - setting meaningful overall credit limits for HLIs;
 - linking credit enhancement tools, including collateral and early termination provisions, to the specific characteristics of HLIs; and
 - closely monitoring credit exposures vis-à-vis HLIs, taking into account their trading activities, risk concentration, leverage and risk management processes.
26. The report noted that many of the systemic risks associated with the activities of HLIs could be addressed through better risk management, along the lines of these recommendations, at the counterparty level. Prudent internal risk management can have the effect of reducing the leverage of HLIs, and limiting the riskiness of HLI

portfolios, thereby also reducing the potential for systemic disruptions resulting from a rapid deleveraging or liquidation of positions.

27. This report was circulated to national banking supervisors in February. A stock-taking of progress that has been made in implementing these recommendations will be undertaken soon. As to the situation in Australia, APRA advises that, as a first step, it has written to Australian banks to bring the recommendations to their attention.

BIS Committee on the Global Financial System Working Group on Transparency Regarding Individual Positions (the Fisher Group)

28. This group completed its report in late March. The report was considered at the early April meeting of the Committee on the Global Financial System (CGFS) which endorsed the report's recommendations. The recommendations were as follows:

- that all financial institutions be encouraged to make available to clients and lenders a greater range of information on their risk profile. This would include data on the size of risks taken by institutions and their distribution (or concentration) across risk types (credit, market) and market groups (type of product, geographical region). A template for reporting these data was suggested. While the recommendations are intended to encompass all financial institutions, their main impact would be on non-banks since banks already disclose a lot of data;
- that a broader group, covering a wide range of (bank and non-bank) supervisors be set up to refine the template and work towards implementation. This new broader group is currently being formed. It will comprise representatives of bank, insurance and securities regulators;

29. It is not clear yet precisely how much reporting will be put in place. At this stage, however, it appears that the general thrust of the Fisher Group recommendations have been picked up in the recent US Report of the President's Working Group on Financial Markets. Given the importance of the US in these matters, the likelihood of some concrete measures emerging from this work looks quite high.

BIS Committee on the Global Financial System Working Group on Transparency Regarding Aggregate Positions (the Patat Group)

30. The mandate given to this Group was to look at what aggregate data on financial markets could be collected to enhance the efficient operation of markets.

31. Despite a wide divergence in initial views between the members on the type of data that could be usefully collected, the Group agreed on the following recommendations:

- collections should initially be focussed on the foreign exchange market since this is the market of most interest to the authorities and the market in which data are easiest to collect;
- collections should include more frequent data on market turnover and on the positions of major financial participants. Data would be published in aggregated form, with details limited to the category of institution rather than individual firms;
- data on credit exposures should be enhanced (by extending the current BIS banking statistics to include off-balance sheet funding by banks, more detail on the currency and maturity profiles of loans and, possibly, lending by non-banks).

32. These recommendations were endorsed at the June meeting of the CGFS, and discussions are now to take place with private sector participants and non-bank regulators to assess the feasibility of implementing the desired collections.

33. The Bank strongly supports the report's recommendations.

Financial Stability Forum

34. The Financial Stability Forum has established a working group to take stock of, and coordinate, work already underway, and assess any supervisory or regulatory actions which might minimise instability. Australia is a participant in this working group. The full terms of reference and membership of the working group are in Attachment 3.

35. In recognition of the inadequate assessments available to date of the role of hedge funds in the recent financial crises, the working group has commissioned a new study, to be led by the IMF, of the activities of hedge funds in the Asian Pacific region in the 1997/1998 period.

Overall Assessment

36. If implemented, measures proposed by the various Groups would make a helpful contribution to reducing the potential for market disturbances arising from the activities of highly leveraged institutions, both by putting the relationship between hedge funds and lenders on a more prudent footing and increasing the degree of transparency in markets. There is no predisposition at this stage to go to the next step, which would involve closer regulation of OTC markets, but as the President's Working Group notes, if measures currently being proposed are not effective, these other options may need to be considered.

Reserve Bank of Australia
SYDNEY

June 1999

SOME BASIC FACTS ABOUT HEDGE FUNDS

There is no standard definition of a hedge fund. Their typical characteristics are: they are limited partnerships whose main function is investment management; they are generally run out of the US, though legally are domiciled in offshore tax havens; they do not solicit funds directly from the public or advertise, but attract investors by word of mouth; and they have high minimum investment levels, ranging between US\$100,000 to US\$5 million, with US\$1 million common. These latter characteristics allow them to gain exemptions from various US federal securities laws, such as Securities and Exchange Commission (SEC) reporting, regulatory restrictions on leverage and trading strategies, and investor protector legislation.

Hedge funds may be grouped into four broad categories, defined by investment strategy:

1. *market-neutral* or *relative-value* funds which invest in fixed income and/or equity instruments and adopt strategies which do not depend on the general direction of markets. Managers exploit market inefficiencies, looking for disparities in pricing relationships between instruments with similar pricing characteristics (including fixed interest arbitrage, convertible bond arbitrage and mortgage-backed securities arbitrage, and derivatives arbitrage, and where the price anomalies are generally driven by government intervention, policy changes or forced selling).⁵ These funds had traditionally been regarded as the most conservative of hedge funds because they limit their operations to arbitrage, which was seen as a low-risk activity. However, the episode involving Long-Term Capital Management, which was counted in this group of funds, showed that such activities can be very risky if they are funded by a high level of leverage. According to the IMF (1998), market-neutral funds comprise about 25 per cent of funds and 20 per cent of assets.
2. *event-driven* funds which are also active in fixed interest and equity markets but base their strategies on the actual or anticipated occurrence of a particular event, such as a merger, bankruptcy announcement or corporate re-organisation. According to the IMF (1998), event-driven funds comprise about 15 per cent of funds and 10 per cent of assets.
3. *long/short* funds which invest in fixed interest and, especially, equity markets, combining short sales with long investments to reduce, but not eliminate, market exposure. This may entail, for example, borrowing securities the hedge fund judges to be overvalued from brokers, and then selling them on the market in the expectation that the price will be lower when the fund has to buy the securities back to be able to return them to the brokers. These funds can take positions along the whole risk-return spectrum and try to distinguish their performance from that of the asset class as a whole. According to the IMF (1998), these funds account for only a very small part of the market, but they are given much more prominence in the report by Goldman Sachs and Financial Risk Management Ltd.

⁵ This is not the traditional definition of arbitrage, which is based on risk-free transactions. In contrast, the transactions undertaken by hedge funds are in fact speculative and are described by the Economist (17 October 1998) as “expectations arbitrage” since they are based on an expectation that deviations from historical relationships between financial prices will be corrected. The OECD reports that the first hedge fund was set up by Alfred Winslow Jones in 1949 to balance short and long positions held by him in the equity market to reduce overall risk.

4. *tactical-trading* funds, including most *macro* and *global* funds, which speculate on the direction of market prices of currencies, commodities, and equities and bonds on spot or futures markets. Global funds invest in emerging markets or specific regions, of which Tiger Fund is probably the most famous. The most famous macro fund group is probably George Soros's Quantum Group. Management of tactical funds is described as either systematic or discretionary. Systematic managers follow trends identified by technical analysis using proprietary computer models, while discretionary managers use a less quantitative approach, relying on both fundamental and technical analysis. Tactical-trading funds are the most volatile of the different types of funds. According to the IMF (1998), these funds account for 54 per cent of funds and 67 per cent of assets.

There is no authoritative source of information about hedge funds. Any information is provided voluntarily by the funds themselves and without due diligence, so data are sketchy and should be used with caution. Hedge funds are not allowed to advertise and so they depend on "word of mouth" to generate investor funds. One way that they do this is to provide information to various industry groups, like Van Hedge Fund Advisors, Hedge Fund Research, and MarHedge. For a fee (in thousands of US dollars), these groups provide investors with statistics on earnings and some basic figures on balance-sheet size and leverage. These figures are not subject to scrutiny and no assurance is given that definitions are applied consistently and that data are comparable. For example, groups like MarHedge do not specify a definition of leverage, but rather leave it to the discretion of the fund to report leverage statistics on whatever basis it chooses.

There is even considerable uncertainty about the number of hedge funds and the size of their assets. Goldman Sachs and Financial Risk Management Ltd (July 1998) estimate, for example, that there are 1,300 hedge fund management groups which operate over 3,500 hedge funds (with different risk and investment characteristics). Total capital is estimated to be about US\$200 billion and total assets at about US\$400 billion. Van Hedge Fund (July 1998), a data collection group, says there are 4,000 funds, while The Economist (17 October 1998) estimates that there are about 3,000 funds. These numbers are considerably larger than those set out in IMF (1998), which reports that there were about 1,000 fund managers with about US\$110 billion in assets in 1997. Even reasonable estimates of the number of hedge funds can vary by a factor of up to four!

On an aggregate level, the actual funds invested with hedge funds may appear fairly small relative to total funds in the financial sector. For instance, the Bundesbank in its March 1999 report estimates that capital invested with hedge funds in 1995 was around US\$300 billion, or 1.3 per cent of the US\$23,400 billion in total funds invested with traditional institutional investors in the OECD countries. Such a comparison, however, does not necessarily offer a good insight into the potential market impact of hedge funds, due to the effect of leverage and 'herd behaviour'.

In spite of their relatively small size, hedge funds are significant market players. Their trading strategy of eschewing benchmarks and seeking maximum absolute returns in a range of asset classes means that their investment positions can change rapidly and by large amounts, thereby having an impact on market prices. Investors find them attractive because of their generally low correlation with overall market performance. As the OECD's recent report states "hedge funds have become an integral component of the new financial landscape and are considered by most observers to be a permanent feature" (OECD 1999 p.7). In relation to this point, the Bundesbank noted that because many hedge funds depend upon the exploitation, and thus the elimination, of market imperfections, it is likely that at some point diminishing returns may set in. This might then result in hedge funds taking on riskier, more highly leveraged positions than previously, in an attempt to maintain their high rates of return.

The OECD reports that, while the bulk of investment in funds come from market-savvy wealthy individual investors (about 80 per cent), investment by institutional investors, particularly university foundations and endowments, has expanded in recent years, accounting for about 30 per cent of new funds. Some of these investments have been very large; for example, according to the OECD, Cornell University now invests over 10 per cent of its total \$2.3 billion endowment in hedge funds, while the Yale University endowment invests roughly one-quarter of its total assets in these funds.

The events of late 1998 have not led to the demise or fundamental weakening of the hedge fund industry. Table 1 contains details of asset flows into and out of the approximate 1,200-odd hedge funds which choose to report to Mar/Hedge. These funds represented around US\$110 billion of funds under management as at the end of December 1998. The categories have been expanded from those mentioned above.

While investors in hedge funds did withdraw assets in 1998, the size of the withdrawals were small (about 5 per cent). Not surprisingly, global funds, and the large global macro funds in particular, saw the largest redemptions, as these are perceived to be the riskiest category (that is, while they have had the highest returns, they also demonstrate the greatest volatility of returns). The Soros funds, for instance, experienced an outflow of US\$566 million in December. This was soon reversed, however, with the next two months seeing inflows of US\$783 million and US\$231 million.

Table 1: Flows into and out of hedge funds⁶

	October	November	December	January	February	March
	US\$ m	US\$ m	US\$ m	US\$ m	US\$ m	US\$ m
Event driven	-227	-11	-77	-1,461	36	-20
Global emerging	-	-63	-44	-41	-3	-20
Global established	392	81	64	-2,254	124	244
Global international	-386	-203	-635	3,785	483	-7
Global macro	998	-3,625	-690	217	-163	-50
Market neutral	-81	-420	-407	-718	64	405
Short sellers	70	-31	-30	-12	34	24
Fund of funds	-437	-353	-322	-1,975	542	21
	330	-4,625	-2,141	-2,459	1,116	735

Source: Mar/Hedge Monthly reports.

February represented something of a turning point following the crisis, with a net inflow into hedge funds of over US\$1 billion. There are also reports that an increasing number of both pension/superannuation funds and educational endowments are now considering investing in hedge funds as part of their risk diversification strategy. Reports of increased interest in hedge funds have also noted the rapid pace of startups and the healthy state of the employment market in hedge funds, with many traders from mainstream financial institutions joining the trading desks of hedge funds.

⁶ According to Mar/Hedge's terminology, event driven funds focus on opportunities arising from one-off situations; global emerging funds focus on less mature financial markets; global established funds focus on established markets in the US, Europe and Japan; global international funds focus on non-US stocks; global macro funds invest opportunistically in all markets; market neutral funds attempt to neutralise market risk through the use of long and short positions; short sellers attempt to sell overvalued securities, then buy them back at a lower level; and funds of funds allocate capital among different funds.

Not only are hedge funds attractive to investors, but they are also attractive to commercial and investment banks as clients because they generate a lot of market turnover and therefore income for banks' dealing rooms. The OECD notes that: "because some hedge funds often transact in enormous size, there are specialist derivatives desks dedicated solely to hedge fund clients" and hedge funds are very big users of swaps and credit derivatives provided by banks (OECD, p 8-9). In addition, a growing number of banks are either running in-house funds or managing funds of funds. Formal and informal staff connections are also important, with staff moving between banks and hedge funds.

Hedge funds make use of a wide range of financial instruments. Many take long or short positions, or both, in equity or fixed income securities. They may also use exchange traded futures contracts or over-the-counter derivatives, while others are active in the foreign exchange or commodities markets. The President's Working Group notes that "in general, hedge funds are more active users of derivatives and of short positions than are mutual funds or many other classes of asset managers". Often there is better liquidity to be found in the derivatives markets than in the underlying instrument, and costs are usually lower. Additionally, derivatives offer a method of obtaining leverage, beyond that of simply borrowing money from other financial institutions.⁷

The use of leverage by hedge funds varies tremendously, although assessments are complicated by inadequate reporting requirements, the absence of a standard definition of leverage, and by the treatment of off-balance sheet activities. The OECD argues that "the use of leverage is a mainstay of some hedge fund strategies, with the degree of leverage a function of the manager's appetite for risk, the riskiness of the bets involved, and the "costs" of leveraging" (page 8). The IMF (1998, pages 7-8) estimates that 30 per cent of hedge funds do not use any leverage, and that only 16 per cent of hedge funds have a borrowing to capital ratio in excess of 1. In contrast, Goldman Sachs and Financial Risk Management Ltd suggest that average leverage is about 2. Information gained from Commodity Pool Operator⁸ (CPO) filings indicate that most reporting hedge funds have balance sheet leverage ratios (total assets to capital) of less than 2-to-1. The President's Working Group notes exceptions to this. According to September 1998 filings, at least ten hedge funds with capital exceeding US\$100 million had leveraged their capital more than ten times, with the most leveraged fund displaying leverage of more than 30 times. Due to the presence of economic or off-balance sheet leverage, none of these sets of statistics, or others that are available, necessarily provide a reliable guide to the exposure of hedge funds to changes in financial prices (although one might assume a fund with balance sheet leverage of 30 times is more likely to take aggressive positions).

Table 2 sets out monthly median returns for the different categories of hedge funds and for the Standard and Poors 500 index. Over 1998, no category of fund managed to outperform the S&P500 index (while hedge funds typically do not benchmark, preferring to measure their performance in absolute terms, the S&P500 at least provides an indication of overall market performance). Not surprisingly, emerging market funds produced by far the worst returns over the year, on average losing around 31 per cent of their asset values, and no

⁷ The President's Working Group defines leverage in two ways; as balance-sheet leverage, which refers to the ratio of assets to net worth; and economic, or off-balance sheet, leverage, which is a measure of economic risk relative to capital. Economic leverage can be obtained through the use of repurchase agreements, short positions, and derivatives contracts.

⁸ Sponsors of hedge funds that trade on organised futures exchanges and have US investors are usually required to register with the Commodity Futures Trading Commission (CFTC) as Commodity Pool Operators, and are subject to periodic reporting, record keeping and disclosure requirements.

category managed to post returns above 5 per cent. In 1999, results have been mixed, with quite few funds still experiencing negative returns. Two of the most well known funds, George Soros's Quantum Fund and Julian Robertson's Tiger Management, posted large negative returns (-13.8 per cent and -8.5 per cent respectively) over the first four months of 1999. Nonetheless, as noted earlier, this has not prevented a resumption of investor subscriptions.

Table 2: Hedge Fund Returns

	1998	1998			1999			March	
	Annual	Oct	Nov	Dec	Jan	Feb	Mar	5th %ile	95th %ile
Event driven	3.1	0.8	1.7	1.7	1.3	-0.2	0.5	9.9	-2.4
Global emerging	-31.1	0.9	4.9	-0.7	-1.2	0.1	4.3	23.4	-3.4
Global established	7.3	2.3	4.5	4.0	2.7	-2.6	1.4	13.1	-6.9
Global international	4.3	0.2	3.4	2.3	2.0	-0.1	1.8	9.1	-8.4
Global macro	3.7	-2.1	2.8	2.6	1.2	-0.7	-0.2	8.3	-9.4
Market neutral	5.1	0.0	1.3	1.2	1.2	0.7	0.2	6.0	-5.9
Short sellers	4.3	-9.6	-6.0	-4.0	-5.3	9.8	-0.4	4.0	-21.1
Fund of funds	0.4	-0.4	1.5	1.3	1.4	-0.2	0.8	6.2	-2.6
S&P500	26.7	8.0	5.9	5.6	4.1	-3.2	3.9		

Source: Mar/Hedge reports. See Table 1 for a definition of categories.

COMMENTS ON BROWN, S.J., W.N. GOETZMANN, AND J. PARK, "HEDGE FUNDS AND THE ASIAN CURRENCY CRISIS OF 1997" NBER WORKING PAPER 6427

Brown, Goetzmann and Park argue that, while the Asian currency positions of the macro hedge funds have fluctuated substantially at times, these positions do not appear to be related to changes in the exchange rates of Asian currencies. Hence, they downplay the significance of hedge funds in the Asian currency crisis.

The authors regress monthly changes in the exchange rate on the estimated long/short exposures of ten macro hedge funds. Data on hedge fund exposures are not available and so the authors use a method to infer exposures based on monthly returns data of hedge funds. Conceptually, this involves two steps: first, regressing each fund's returns on the returns from hypothetical passively-managed portfolios of asset classes; and, second, multiplying each fund's net asset value by the co-efficients from the previous regression to estimate the fund's total dollar exposure to each asset class.

The estimation, however, is subject to a number of criticisms. The main results are obtained by including only one currency – the Malaysian ringgit – in the hypothetical portfolio which is used to 'explain' hedge funds' performance. Technically, this procedure can only be valid if the excluded assets (ie, all other possible currencies and asset classes) are all uncorrelated with the ringgit, which is clearly not the case. If, for example, hedge funds sought to manage their risks by simultaneously taking positions in a range of correlated assets, the impact of ringgit movements on fund returns would reflect the interaction of all these positions, and could not validly be attributed just to the fund's ringgit exposure.

Another problem is that a lack of data precludes the estimation of position changes over short time periods. In fact, the method purports to estimate a series of average positions in ringgit held over periods of four months duration. This means that changes in hedge fund returns attributable to shorter-term changes in positions cannot be picked up.

Overall, the results produce estimated positions which are very large. The estimates for positions in Malaysian ringgit at times reach over US\$200 billion (for example, US\$225 billion in February 1996). They also fluctuate sharply from month to month, between being short and long the ringgit. The authors find that while the positions of hedge funds can be highly correlated with each other, they are not correlated with exchange rate movements in the ringgit.

The authors repeat the exercise for an unweighted basket of ten Asian currencies. The same restrictive assumptions are applied, this time implying that the only position of hedge funds is in Asian currencies. This again produces large positions – eg short positions reaching about \$US400 billion in January, February, September and October 1996 and a long position of US\$1,500 billion in December 1995. Again they found is no correlation between exposures and exchange rates.

The basic criticism of the paper is that the methodology assumes that movements in specific currencies over fixed time intervals were the sole source of returns for the hedge funds. Movements in share prices, interest rates and capital values of emerging market debt (eg Russia), as well as returns attributed to intra-period trading, are ignored. A zero return would yield a result of "no exposure", while it could in fact have represented a net outcome of several large exposures. It is not surprising, therefore, that the estimates of positions that are generated fail the "common sense" test. Consider the Malaysian results. A ringgit position of US\$200 billion amounts to 2½ times the country's GDP and close to a whole year's turnover in the foreign exchange market. It is inconceivable that such positions could be built up and liquidated in a month.

FINANCIAL STABILITY FORUM

3 May 1999

WORKING GROUP ON LEVERAGE/HLIs**Proposed terms of reference**

The working group on HLIs should help ensure a timely and co-ordinated response to the various concerns raised by institutions employing a high degree of leverage in financial markets. To this end, it should:

1. Assess the challenges posed by HLIs to financial stability in both developed and developing countries.
2. Take stock of work that has been completed or is underway in the groupings represented in the Forum or elsewhere on these issues.
3. Establish what is being done to implement recommendations already made and consider the need for further impetus to enhance implementation.
4. Make recommendations, where necessary, to improve co-ordination between existing organisations working in this area.
5. Identify issues that have not been covered in existing work and propose suitable procedures for dealing with them.
6. Foster a consensus on substantive supervisory or regulatory actions which would minimise the destabilising potential of HLIs.
7. Provide a status report to the Forum's next meeting.

**FINANCIAL STABILITY FORUM
CH-4002 BASLE, SWITZERLAND****Membership of Working Group on
Highly Leveraged Institutions**

Howard Davies (chair)	Financial Services Authority, London
Ric Battellino	Reserve Bank of Australia, Sydney
Jan Brockmeijer	De Nederlandsche Bank, Amsterdam
David Brown	Ontario Securities Commission, Toronto (Chair, IOSCO Task Force on Hedge Funds and Other HLI's)
Norman Chan	Hong Kong Monetary Authority, Hong Kong SAR
Peter Fisher	Federal Reserve Bank of New York, New York (Chair, CGFS Working Group on Enhanced Public Disclosure by Individual Institutions)
Jean-Pierre Patat	Banque de France, Paris (Chair, CGFS Working Group on Aggregate Market Information)
Charles Adams	IMF, Washington DC
Takashi Oyama	Bank of Japan, Tokyo
Dietrich Jahn	Ministry of Finance, Bonn
Edwin Truman	US Treasury, Washington DC
Giovanni Sabatini	CONSOB, Rome

HEDGE FUNDS, FINANCIAL STABILITY AND MARKET INTEGRITY⁹

1. Introduction

Over the 1990s hedge funds have emerged as major players in financial markets. These funds have taken very large positions in particular markets, with some funds apparently being prepared to use high leverage to do so. This has led to concerns that hedge funds are contributing to financial instability and impairing the efficient operation of markets, although, on the other hand, there are also those who point to the greater depth of markets that has resulted from the higher turnover that hedge funds generate. Criticisms of the undue influence that hedge funds can have on markets have been around for some time, but the recent event which brought the issue to centre stage was the threatened collapse of Long-Term Capital Management. This incident not only seemingly led the US Federal Reserve to widen the “too important to fail” test to include a hedge fund, but brought home to the authorities the risks that some funds posed to the stability of the financial system.

Developments in 1998 have also led to renewed concerns that some hedge funds are able to use their market power to manipulate prices to their advantage. In addition, there are concerns that the trading strategies used by some hedge funds have led markets to overshoot, and that the rapid building-up and liquidating of large positions by some funds has added to market volatility. These concerns have tended to be most pronounced in medium-sized, relatively liquid, currency markets.

The emergence of hedge funds as major players in financial markets has raised the question of whether some form of public-policy response is required. This question is examined below. The central conclusions are that:

- i. a strong “in principle” argument exists for the regulation of *some* types of hedge funds on the grounds that they pose a risk to the stability of the financial system and to the integrity of financial markets;
- ii. the “in principle” case for *hedge-fund specific* regulation is weakened by the likelihood of other institutions, with similar risk profiles, developing outside an expanded regulatory framework;
- iii. in view of the above, the most effective approach would involve three elements: improving standards of disclosure; improving the risk monitoring practices of institutions that ultimately provide hedge funds with the ability to generate large positions; and removing distortions in the Basle capital framework; and finally
- iv. standards of disclosure could be improved by the application of higher capital charges to banks’ exposures to institutions that do not meet specified minimum disclosure standards.

For improvements in disclosure and risk management to be fully effective, international coordination and agreement is important. In a number of areas this is already happening.

⁹ This paper was presented at the EMEAP Deputies Meeting in Melbourne on 25 March 1999.

The Basle Committee on Banking Supervision has developed a set of sound practices for banks' interactions with highly leveraged institutions and the BIS Committee on the Global Financial System is studying how disclosure standards can be improved. However, notwithstanding the need for a coordinated approach, regulators in individual countries, particularly those in the United States, have scope for unilateral action. By improving their own disclosure requirements and supervision practices, they would not only contribute to improving the stability of the United States financial system, but would also make a contribution to improving the stability of financial systems in other countries.

This paper is divided into two main sections. The first examines the case for a public-sector response, and the second discusses what form a response might take. Three appendices to the paper set out, respectively: some basic facts about hedge funds; examples of how leverage is used in financial markets; and the Basle capital standards as they currently apply to financial market activities.

2. Why Something Needs to be Done

There are three possible reasons for a public-policy response to the emergence of hedge funds as major players in financial markets. These are:

- the protection of investors;
- the need to maintain the stability of the financial system; and
- the need to maintain the integrity of markets.

2.1 Investor Protection

The case for regulation of hedge funds on investor protection grounds is weak, and this is the major reason why hedge funds have been subject to minimal regulation in the past. Typically, investors in hedge funds are both sophisticated and wealthy, and have the resources to monitor and assess risk (although recent events suggest that they have not always done this effectively). In the absence of other considerations, such investors should be able to manage their investments without government regulation. If investors are dissatisfied with the amount of information they are receiving, they should either put pressure on the fund manager to provide more information, or they can place their funds elsewhere.

2.2 Financial Stability

The need to enhance the stability of the financial system is the second possible reason for a public-policy response. Until recently, this was not considered a strong reason, but this situation changed last year when the US Federal Reserve organised a rescue for Long-Term Capital Management (LTCM). In explaining the Federal Reserve's actions, Dr Greenspan said before the US Congress (Greenspan (1998), page 1046):

“Had the failure of LTCM triggered the seizing up of markets, substantial damage could have been inflicted on many market participants, including some not directly involved with the firm, and *could have potentially impaired the economies of many nations, including our own*” [emphasis added].

Clearly, in the Federal Reserve's judgement, the activities of LTCM posed a threat to the stability of the financial system, and ultimately, to the health of the world economy. This was a remarkable assessment given the conventional view that hedge funds did not pose such risks. This conventional view was well summarised in the IMF's Report, *Hedge Funds and*

Financial Market Dynamics, which was released less than six months before the LTCM problems. The Report concluded that (page 12):

“... regulators seem generally satisfied that they [hedge funds] pose no special problems of systemic risk.”

If the Federal Reserve’s judgement was right, then the conventional view was mistaken and the existing arrangements are deficient. The health of the world economy was put at risk by the actions of a few investors managing a private portfolio. When private investment decisions pose such risks, there is a strong and legitimate case for some form of public response to reduce and contain those risks.

The emergence of hedge funds as systemically important institutions arises largely from the fact that their activities can result in damaging fire-sales of financial assets. In turn, this possibility stems from the large market positions that some hedge funds have been able to obtain, and is increased when those positions are highly leveraged. Such positions are not only risky for investors in the fund, but also for the system as a whole. When prices move adversely, liquidity problems can arise as institutions attempt to meet margin calls, with solvency becoming an issue if the positions are highly leveraged. These problems can force the rapid fire-sale of financial assets by the troubled institution, triggering a wave of selling in other markets through a cascading process of liquidation of positions. The difficulties are compounded when financial institutions have large credit exposures to hedge funds and exposures to the markets in which the fire-sales are occurring. The end result could be a seizing up of even the largest financial markets.

The need for public policy to prevent, or at least reduce the probability of, damaging fire-sales of assets is a long-standing one. It was an important consideration in the early development of central banks’ lender of last resort operations (and later, bank regulation). The idea was that if a bank was forced to sell its *loans* at distressed prices, solvent banks could quickly become insolvent and the process of financial intermediation could be disrupted. In a world in which much intermediation is conducted through markets, the bigger threat to the stability of the system arises from the fire-sale of financial *instruments*, not the fire-sale of bank loans. If institutions are forced to sell these instruments at distressed prices, solvent institutions can quickly become insolvent, undermining financial intermediation through both markets and institutions.

While the activities of hedge funds have the potential to cause these types of problems, it is important to recognise that only some types of funds pose such risks. Many funds do not have extremely large positions and are not highly leveraged, and many restrict their activities to equity markets, attempting to take advantage of small anomalies in market prices (see Appendix 1). In many cases, this type of trading adds depth to, and improves the efficiency of, the relevant markets. The recent threats to financial stability have come from a relatively small number of *large* funds.

It is also worth noting that hedge funds are not the only institutions whose activities can cause cascading fire-sales of financial assets. Other large financial institutions could cause similar problems if they were forced to rapidly liquidate positions in a period of financial stress. These other institutions are, however, subject to some form of regulatory oversight. Large hedge funds stand out as the only currently systemically important institution not subject to some form of regulation.

2.3 Market Integrity

The need to protect the integrity of markets is the third possible rationale for a public-policy response to the emergence of hedge funds as major players in financial markets. The

previous section has explained how large, highly leveraged, position taking can lead to increased volatility in asset prices without any market participant setting out to achieve that result. This section looks at increased volatility that can result from a conscious decision to achieve that result.

If financial markets are to perform the important tasks of efficiently allocating resources and transferring risk, not only does the financial system need to be stable, but no single institution should be able to affect the market price. In addition, the activities of speculators should be stabilising in the sense that they contribute to prices moving towards values supported by underlying economic fundamentals.

These conditions have not been met in a number of markets. Some large hedge funds have been able to affect the market price, either through the sheer size of their positions, or by employing trading strategies that affect the behaviour of other market participants. By manipulating market prices, they have prejudiced the integrity of some markets. In addition, the hedge funds' trading strategies have amplified movements in market prices, as have their actions in rapidly unwinding large positions in stressed market conditions.

A variety of strategies have been used by hedge funds. Some of these strategies have been designed not just to take advantage of expected price movements, but to *cause* price movements. The strategies might start with a fund quietly establishing a position in a particular market, say a short position in a given currency. Having established the position, the fund makes it clear to other market participants that it intends to aggressively sell the currency. This "public announcement" of its intentions leads to a widespread expectation of a depreciation, with the market becoming one-sided as other market participants withdraw. In other cases, hedge funds have placed a succession of large orders in a short period of time during periods when market activity is particularly light. In doing so, they have been able to use their market power to generate price movements that enhance the profitability of their underlying positions. In addition, these strategies, by contributing to the development of "one-way" sentiment in markets, have led to exaggerated movements in prices.

It is worth noting that any abuse of market power by hedge funds occurs only periodically. It is not the case that hedge funds have the ability to consistently manipulate prices to their own advantage. Rather, their use of market power has been restricted to certain episodes, particularly periods in which markets are already under strain for other reasons. During such periods, market participants are unusually uncertain about the immediate outlook and liquidity may be less than normal. In this environment, aggressive trading strategies can have a significant effect on market prices.

It is also important to recognise that, just as not all hedge funds pose systemic risks, not all hedge funds are able to use market power in this way. Indeed, most funds are not large enough to move the prices in the markets in which they are transacting. It is primarily the large *global macro* funds that have been able to obtain and use market power.

The ability of these funds to periodically manipulate markets stems largely from the strong reputations that they built up over the 1990s, particularly following the role that they played in the Bank of England's decision to float the pound in 1992. The reputations were reinforced by a sequence of high-return years and by the hiring of staff with extremely strong market reputations.

The strong reputations of hedge funds gave them the ability to influence the activities of other market participants. Some participants sought to copy the positions of the funds, hoping to emulate their success, while others, who would normally have been on the other side of the market, withdrew and awaited more advantageous prices. The strong reputations also led to a dilution of normal credit assessment standards by counterparties. Hedge funds

were able to generate extremely favourable margining requirements and generous trading lines on the basis of their reputations and the market insights that came from knowledge of their trading activities. Moreover, banks were keen to conduct business with hedge funds, for as the recent OECD Report (1999, page 7) states, “the global-macro funds ... tend to trade enormous volumes in order to maintain returns, and in so doing, are a key source of commission business for bankers”. The banks desire to conduct large volumes of business with hedge funds contributed to the lax credit standards and made it easier for the funds to attain very large market positions.

While the issue of market power is relevant to all financial markets, it is particularly acute for liquid, medium-sized markets. It is these markets that offer the right combination of liquidity and opportunity. They are sufficiently liquid that in normal times positions can be established and closed without affecting prices, but, if the intention is to affect prices, they are not so large as to make this impractical.

Perhaps surprisingly, the abuse of market power tends to be less severe in small markets, for while a large player can push prices in its favour, it can also move prices against itself when it closes out positions. In contrast, in a large deep market, like the United States, positions can generally be closed out without affecting the market price, but a single institution, or a few institutions acting together, are unlikely to have enough market power to move market prices, even in unsettled market conditions. The currency markets in Australia, South Africa and Hong Kong all fall, to some extent, into the medium-sized liquid category, and over the past year, all three markets have seen highly leveraged hedge funds have some success in moving market prices.

While other institutions, such as investment banks, securities firms and corporate treasuries, can also take extremely large positions, they have not, in general, employed the same type of trading strategies used by hedge funds. Typically, investment banks have on-going multi-dimensional relationships with market participants and government authorities. These other relationships reduce the incentive to undertake trading strategies that violate standard market conventions, for such strategies undermine other (more important) aspects of the relationships. In contrast, hedge funds typically have a single-product business with the sole focus of maximising returns from trading in financial markets, and as such are subject to fewer constraints than other institutions. Hedge funds are also able to have more concentrated portfolios than other institutions, so that for a given portfolio size, they are able to obtain larger positions in individual markets, and to change those positions more quickly. The result is that they can be completely opportunistic when it suits them.

The use of leverage

The threats that *macro global* hedge funds pose to financial stability and market integrity have their roots in the large market positions that these funds have been able to obtain. Market participants regularly attribute these large positions to the extensive use of leverage. Unfortunately, it is difficult to determine with any precision the use of leverage by hedge funds because comprehensive figures are not available, largely as the result of the general inadequacy of disclosure arrangements for hedge funds.¹⁰

¹⁰ For example, the Brockmeijer Report (Basle Committee on Banking Supervision, 1999) estimated that at the start of 1998, LTCM's ratio of balance-sheet assets to equity was about 25:1, but concluded that this was “only a very incomplete measure of leverage” and that “it is not clear how large LTCM's true leverage was”. While LTCM was much more leveraged than most hedge funds, the lack of relevant data makes it difficult to build up a comprehensive picture of the true risks being taken by hedge funds.

Some publications by industry consulting bodies do report leverage ratios for hedge funds, but their reliability is well below what would normally be required of official statistics. The publications leave the definition of leverage up to the reporting hedge funds, which can choose whatever definition or time period suits them. Some of the better-known macro hedge fund managers also only report for a sub-set of the funds they manage.

Perhaps the biggest shortcoming is the handling of off-balance sheet exposures through the use of derivatives. Derivatives have allowed hedge funds to take on much larger exposures to market movements than would be possible using on-balance sheet transactions. As the OECD Report (1999, pp. 10-11) states “The leverage provided for hedge funds ... typically is created through repurchase agreements (repos) and swaps, though options, futures and other structured products are also used. Depending upon the size of the haircut, traders could easily establish a \$1 billion position in a given security with only \$10 million in capital”. Similarly, the absence of an up-front funding requirement on foreign currency swaps has allowed very large and leveraged positions to be generated in the foreign exchange market. If these positions had to be funded through on-balance sheet financing, rather than through derivatives, they would imply much higher leverage than the commonly quoted figures.

Given the risks identified above there is clearly a need for better information on the use of leverage by hedge funds.

3. Public-Policy Responses

The risks that some hedge funds pose to the stability of the financial system and the integrity of markets create a strong “in principle” case for a public-policy response. The issue is what form of response is appropriate.

There are three broad options:

- the direct regulation of hedge funds;
- the development of more comprehensive disclosure requirements; and
- improving bank supervision and the supervisory framework.

These options are discussed below.

3.1 The Direct Regulation of Hedge Funds

In essence, a hedge fund is a form of mutual fund. As such, there is an argument that hedge funds should be subject to the same form of regulation as mutual funds. While the form of this regulation varies across countries, it often involves licensing and the setting of standards for the issuing of prospectuses. Importantly, in many countries there are also restrictions on the use of derivatives and debt by mutual funds.

The primary reason for this type of regulation is to protect the interests of investors. It is generally argued that such regulation is appropriate for mutual funds, since small investors do not have the ability and resources to fully understand and monitor the risks being incurred by the fund. This argument, however, does not apply to investors in hedge funds. As was argued above, these investors have both the ability and resources to monitor risk, and it would be inappropriate to extend regulation based on the need to protect investors to the hedge fund industry.

An alternative is to design regulations that apply specifically to hedge funds and that are designed to enhance the stability of the financial system and the integrity of markets. Despite the “in principle” appeal of this approach, there are considerable practical difficulties.

The first is that hedge funds may be able to circumvent regulation by basing their activities in non-regulated offshore jurisdictions. This possibility would be reduced if governments and others put pressure on offshore centres to implement internationally agreed standards, and bank supervisors required significantly higher capital charges on exposures to institutions operating from these centres. Ultimately, however, action on either of front requires a high-level political commitment on behalf of the major countries.

Another difficulty is that hedge-fund-specific regulation is likely to lead to other institutions developing outside the expanded regulatory net, with the end result being little change in the degree of systemic risk and the integrity of markets. A further complication is that the case for regulating hedge funds arises largely from their ability to gain *large* positions in markets. As was discussed above, not all hedge funds have such positions, and so the case for regulation of *all* hedge funds is weak. It might, however, be problematic to base regulation on the size of an institution’s balance sheet, or positions in financial markets.

A more promising approach is to address the conditions and practices that have allowed hedge funds to gain large positions in markets.

3.2 Improving Disclosure

Improving disclosure should make a contribution to both market integrity and financial stability. More comprehensive disclosure would make it easier to identify institutions with market power, and ultimately sanction institutions that abused that power. In addition, through contributing to better credit assessment, it would reduce the probability of credit-extension practices that contribute to financial instability. Disclosure can also help limit market panic in times of stress, by reducing uncertainty about the extent of exposures.

Despite the advantages of disclosure, recent events highlight that the market has failed to ensure that adequate information is available to counterparties, regulators and the general investment community. In part, this market failure reflects the fact that in determining private disclosure arrangements, institutions do not take into account the public benefits that accrue from the release of information.

There is also a coordination problem. Even though some institutions recognise that the system would work better if standards of disclosure were enhanced, they are unwilling to impose tougher standards on their counterparties than those imposed by their competitors. Moreover, individual institutions are sometimes reluctant to disclose to the market extensive details of their own risk profile for fear that such an action would be misinterpreted. To overcome these coordination problems and the apparent divergence in private and public gains from better disclosure some public-sector intervention is required.

Over recent years, the argument for improved disclosure has often been applied to the release of information by governments and central banks, but it applies equally to private-sector participants. In markets which consist entirely of private-sector buyers and sellers, and where coordination problems have been addressed through the development of regulated exchanges (such as share markets and futures markets), strict disclosure standards have evolved to ensure that the market works efficiently and fairly. In markets such as foreign exchange, however, standards of disclosure are much weaker or non-existent. This may reflect the difficulties of coordination and of collecting information in over-the-counter markets, as opposed to exchange-traded markets. Also important is that historically these

markets have tended to be dominated by governments and central banks, with individual private-sector players having little, or no, market power. But with large investors now taking on foreign exchange positions which rival, or exceed, those of the authorities, it is important that disclosure standards be improved, particularly in the foreign exchange market.

Disclosure requirements should apply to as broad a set of institutions as is possible. If requirements apply to just a subset of institutions (say currently regulated institutions and hedge funds), other types of institutions would evolve outside the regulatory net. In cases in which universal requirements create practical difficulties, specific institutional types could be exempted on the basis that regulation was not needed for market integrity and financial stability reasons. Any exemption could be reviewed from time to time.

In designing enhanced disclosure requirements there are at least three central issues:

- what information should be disclosed;
- to whom should it be disclosed; and
- how should disclosure be enforced.

What information should be disclosed?

There is a need for enhanced information in at least three areas. These include: information concerning market concentration; information that promotes sound credit assessment; and information that allows market participants and regulators to assess the health and stability of markets.

One way of addressing the market concentration issue is to require some form of large position reporting, where large positions are defined in terms of the relevant market. For example, institutions could be required to disclose positions that account for more than some percentage of a market's turnover or outstanding contracts. The benchmark levels for disclosure could be determined by national regulatory agencies, or through international agreement, perhaps through the BIS. At one extreme, institutions might be required to notify the authorities of the specific details of positions that exceeded the relevant benchmark. A less intrusive approach would be to require some form of public reporting in which institutions periodically disclose whether they had "large" positions in certain markets, but were not required to disclose specific details of those positions. Other alternatives are also possible, although one disadvantage of *any* disclosure based on *size of positions* is that it increases the incentive for institutions to spread positions across a number of related cash and derivatives markets in such a way that each position is small enough to escape the reporting requirement. One way of overcoming this problem is to disclose statistics which should, in principle, be highly correlated with the size of exposures relative to the market.

The disclosure of information on market concentration should also be helpful from the point of view of making sound credit assessments, as large market positions can involve considerable liquidity risk. Another particularly important element in the credit assessment process is the "value-at-risk" (VaR) of an institution's portfolio and various subsets of the portfolio. One way of providing this data is for institutions to disclose a matrix of risk exposures by country and individual asset type – for example, institutions might be required to disclose the VaR of their foreign exchange positions in both major markets and emerging markets, as well as the VaR on positions in equity and securities markets. Some aggregation across specific markets is likely to be necessary to avoid the reporting requirements from becoming excessively onerous.

While the VaR is a useful summary measure, it can hide a variety of risks. For example, an institution might hold extremely large positions, but report a small VaR if the positions are assumed to be to very tightly negatively correlated (for example, a long position in one bond, and a short position in another bond with closely matched, but not identical, characteristics). This assumption might be valid in normal times, but in times of stress it may fail to hold and liquidity problems may make it impossible to unwind the positions. In such cases, the VaR calculation might seriously underestimate the amount of risk being incurred. An implication of this is that disclosure of the VaR needs to be supplemented with additional information.

One option is for institutions to disclose the assumptions underlying the VaR calculation. While this should be done as a matter of good practice, the complex and detailed nature of these assumptions in many cases reduces the usefulness of this information.

A second option is for institutions to report the results of stress tests that incorporate large movements in market prices and liquidity problems. Once again the difficulty here is developing a methodology that is sufficiently standardised that the results are meaningful. Supervisors in some countries, such as Australia, have made progress in this area and now require the results of standardised tests to be reported to the supervisory authorities. These tests could form the basis of a broader disclosure requirement.

A third, and perhaps more useful, option is to require disclosure of *ex post* measures of VaR performance. These include the number of days during the reporting period on which losses exceeded the VaR estimate, together with the maximum daily loss. An alternative would be to disclose a histogram of the ratio of daily changes in the value of the portfolio to the daily VaR. These measures of risk could be judged against the institution's risk policy. In addition, institutions could disclose summary measures of risk-adjusted returns - for example, the ratio of the portfolio's volatility to market volatility. Such a measure could provide an indication that an institution had large positions relative to the market, or was highly leveraged. Alternatively, institutions could disclose the standard deviation of changes in the value of the portfolio (scaled by the volatility of the market) or other measures of the distribution of returns, for example, the lower 5 per cent and upper 95 per cent. If these measures were to be disclosed, accepted benchmark measures of market volatility would need to be developed.

In a number of the above areas, the reporting of end-of-period data is of limited value due to the ability of institutions to window-dress their portfolios on disclosure dates. It is therefore important that end-of-period reporting is supplemented with intra-period data (for example, on high and low values).

In addition to the disclosure by individual institutions there is a strong case for additional *aggregate* data to be made available, as such data are necessary for regulators and market participants to assess the health and stability of markets. The current BIS banking and derivatives statistics are a useful starting point, but these collections need expanding to include the international exposures of investment banks, hedge funds and other institutional investors. A related possibility is to develop some form of international credit registry along the lines of the registries that are currently in operation in a number of countries. This approach was canvassed in the G22 Working Group on Strengthening Financial Systems. This Group advocated work to improve the efficiency of the existing systems, particularly in the area of cross-border exchanges of information.

To whom should information be disclosed?

If institutions are to disclose information such as large positions relative to the market, their VaR, the results of stress tests and VaR model performance, an important issue is to whom this information should be disclosed. One option is for this information to be provided only

to an institution's *counterparties*. This could be achieved by regulators of banks and securities firms requiring that institutions obtain the above information from any other institution with which they are dealing. This approach, while worthy of consideration, has two significant disadvantages. First, it is only partial in nature. In many cases, institutions should be seeking much more detailed information from their counterparties than that outlined above, and regulators cannot hope to prescribe all the relevant information. Second, while disclosure to counterparties might improve credit assessment, it is unlikely to make a significant contribution to improving the integrity of markets.

The alternative to setting disclosure standards that apply to counterparties is to establish standards of *public* disclosure that apply to *all* institutions active in financial markets. The advantage of this approach is that the information is available to the market as a whole, including regulators, investors and counterparties. It would ensure that there was a basic minimum amount of information in the public domain concerning institutions operating in financial markets. This information should form one of the building blocks of good credit assessment, but institutions would still be expected to obtain additional information from institutions with which they are dealing. The approach would also allow for more effective monitoring of large positions.

In addition to public disclosure, there is a need for more detailed information to be disclosed to statistical or regulatory authorities so that relevant aggregate data can be published.

How should disclosure be enforced?

A crucial issue is how enhanced disclosure arrangements might be implemented.

One option is for regulatory agencies in each country to mandate minimum standards of public disclosure. This could be done by the regulators of currently regulated institutions (including banks and securities firms) requiring disclosure along the lines discussed above as part of their licensing requirements. For other market participants some form of legislation may be needed. This could involve considerable practical difficulties, especially in ensuring compliance if institutions and investors were not also subject to some form of registration and monitoring. Registering all investors could create administrative difficulties, drive institutions offshore, and ultimately create moral hazard problems for the authorities if registration was equated with "government oversight".

An alternative approach is to work through the institutions that are already subject to prudential regulation. One way of doing this is to use the current Basle capital arrangements to create an incentive for institutions to disclose relevant information. If a participant in financial markets complied with a designated set of disclosure requirements, the standard capital charges on exposures to that participant would apply. A set of penalty capital charges would then apply to non-complying participants. For example, if a hedge fund was unwilling to disclose to the market the relevant information, the risk weight that applied to any derivatives exposures to that institution might be double or triple the weight that applied to exposures to complying institutions. One advantage of such an approach is that it recognises that exposures to institutions which fail to comply with basic disclosure requirements are inherently more risky, and therefore require more capital.

Finally, it is worth recalling that improved disclosure is no panacea for the problems that have plagued financial markets over recent years. There is even a risk that in some cases it could exacerbate problems. Improved disclosure could reinforce the strong reputations of some market participants by highlighting their successful performance. While the reputation might be dimmed by the release of comprehensive information about the risks that the institution is taking, experience shows that on some occasions such information is ignored. The end result might be greater herding in the market, and potentially, the creation of

additional market power. Further, the disclosure of large positions relative to the market is no guarantee that institutions will not attempt to develop and use market power.

Notwithstanding these qualifications, improved public disclosure concerning large positions, the risks that institutions are taking, and the overall health of markets, should promote the resilience of the financial system and the integrity of the markets within the system.

3.3 Improving Bank Supervision and the Supervisory Framework

The third possible public-policy response is for bank supervisors to improve the way that they supervise currently regulated institutions. If, over recent years, regulated institutions had paid greater attention to the risks that they were taking, some of the recent problems almost surely would have been avoided.

While, ultimately, the measurement and monitoring of credit and market risk must remain the responsibility of bank management, supervisors have a role to play in ensuring that this responsibility is being met, and that the regulatory arrangements are not encouraging inappropriate risk taking. Possible supervisory responses fall into one of three categories:

- initiatives to improve the credit assessment process within institutions;
- changes to the Basle capital requirements; and
- active use of supervisory instruments by supervisors.

Each of these is discussed below.

3.3.1 Improving the Credit Assessment Process.

One of the lessons from recent events is that the credit assessment processes within a number of major international financial institutions were deficient. All too often institutions have put too favourable a gloss on both credit and market risks. In part, this reflects the lack of appropriate internal systems for the measurement and management of these risks. But even where these systems exist, they have often been overruled in an effort to build market share and to preserve and strengthen trading relationships.

These problems occurred despite a long-standing recognition that financial institutions' risk control procedures with respect to hedge funds needed improving. In 1994, Fed Governor LaWare testified to Congress (LaWare (1994) page 516):

“Nevertheless, banks ... need to carefully monitor their relationships with hedge funds. ... Financial firms should continue to place the highest priority on reviewing, assessing, and improving their overall risk management practices. The Federal Reserve intends to continue to use its bank supervisory authority to make certain that further progress is made in this area and that risks are being adequately controlled.”

Despite the Federal Reserve's advice to financial firms and its commitment to ensuring that further progress was made, risk management procedures did not keep pace with the changing environment. The practice of supervisors reminding and even imploring banks to be prudent had only limited effectiveness. An alternative approach needs to be found.

One promising alternative is the development of a set of standards, or sound practices, that institutions would be required to follow. These standards could effectively set some benchmarks against which institutions could measure their own internal procedures. They could also provide the basis for reporting exceptions to supervisors, and ultimately reporting

exceptions to the market, through the institution's quarterly or annual reports. This second step is an important one. Mechanisms need to be developed to increase the incentives of institutions to comply with sound practices. Otherwise, faced with strong competitive pressures and confronted with strong market reputations, institutions are likely to ignore sound practices, just as they have done in the past.

The first element of this approach – the development of a set of standards for banks dealings with highly leveraged institutions (HLIs) – is currently being explored by the Basle Committee on Banking Supervision. The proposed standards cover the following areas: (i) the development of internal policies that govern banks' relationship with HLIs; (ii) the collection of information about the activities and credit risk of HLIs; (iii) the development of accurate measures of exposures resulting from trading and derivatives activities; (iv) the setting of meaningful overall exposure limits; (v) the appropriate use of collateralisation requirements; and (vi) the processes for monitoring credit exposures.

In developing standards in these areas two issues deserve particular attention: the use of stress tests and collateralisation requirements.

- a) *Stress Tests.* Despite the considerable resources that some institutions have devoted to the modelling of market risk, the size of recent trading losses came as a major surprise; the widely used modelling techniques simply failed to capture the extent of the risk that institutions were incurring. The modelling approaches ignored the fact that in times of market stress, interrelationships between markets can change dramatically, liquidity can dry up, and assets need to be sold at distressed prices. These "facts" were ignored by even the largest and most technically sophisticated institutions. One result of this was that they were prepared to grant huge trading lines and incurred unexpectedly high risks.

One way that supervisors can contribute to better risk measurement is to require that regulated institutions undertake stress tests of their exposures. These tests should factor in the possibility of major market disruptions and liquidity problems. Particularly important is the need for banks to conduct stress tests on credit exposures arising from traded-markets activities. The extension of stress-testing techniques to the analysis of credit risk more broadly should also be pursued.

Supervisors also need to work with institutions to develop appropriate reporting arrangements for the results of these tests. As noted earlier, the lack of a standardised methodology can make it difficult to interpret the results. One approach is for supervisors to require institutions to report tests based on standardised assumptions, but also to encourage institutions to conduct tailor-made tests that more closely focus on their own risk exposures.

- b) *Collateralisation Requirements.* One of the important factors that contributed to the high leverage of some hedge funds was the absence of adequate collateralisation arrangements (see Appendix 2). While exposures generated through exchange-traded derivatives are typically collateralised, there are no standard arrangements for exposures generally in over-the-counter markets. In a number of cases, financial institutions, under pressure to retain trading business, were prepared to set very high threshold exposures before any collateral was required. Moreover, in cases in which exposures were required to be collateralised, collateral was not required to cover the potential for future increases in exposures arising from changes in market prices.

A set of sound practices should include clear policies that link collateral arrangements to explicit assessments of risks. They might also include procedures for holding collateral against potential credit risk.

Quite apart from the quality of banks' credit assessment, senior bank management's direct investments in hedge funds can create a potential conflict of interest that may lead to the overriding of normal credit-risk management processes. This suggests a need for supervisors to encourage strengthened corporate governance within banks, including improved monitoring and disclosure of management's investments and remuneration schemes.

3.3.2 Changes to capital requirements

One of the factors that contributed to weak credit assessment by regulated institutions is the distorted incentives that are created by some aspects of the Basle capital framework. In a number of areas, the relative capital requirements do not bear a close relationship to the relative risks. In particular, recent events have highlighted the following:

- the concessional capital treatment of banks' derivatives exposures to non-banks;
- the absence of a capital charge on short-dated foreign exchange contracts;
- the simplistic capital requirements on future potential exposures;
- the concessional capital treatment of repurchase agreements; and
- the treatment of on-balance sheet exposures to hedge funds.

Under current capital arrangements, if a bank incurs an exposure to a non-bank (for example, a hedge fund) by way of a direct loan, the capital requirement is 8 per cent of the exposure. In contrast, if the exposure is created through a derivatives transaction, the capital requirement is 4 per cent.¹¹ Importantly, for foreign exchange contracts of less than 14-days maturity, there is no capital charge at all. Since these contracts account for the bulk of foreign exchange swaps, banks need to hold little, or no, capital against exposures to counterparties who are speculating in the foreign exchange market. This concessional capital treatment to short-dated foreign exchange transactions has contributed to very fine pricing on these contracts, and also reduced banks' incentive to limit exposures.

The capital concession to derivatives exposures to non-banks was originally granted on the grounds that only the best quality corporates had access to derivatives markets. This universal concession is no longer appropriate. As derivatives markets have expanded, both the range of participants and the systemic risks generated by these markets have increased. Similarly, the original concession on short-dated foreign exchange contracts was partly granted on the grounds that with a large well-diversified portfolio, the marginal contribution to overall risk from such contracts was relatively small. A review of both these concessions is required.

Another area for review is the capital requirements that apply to banks' *future* potential exposures. Currently, the capital charge on these exposures is determined by a simple formula (which includes the concessional risk weight), rather than by the approach used to calculate the capital charge for market risk on banks' trading portfolios (see Appendix 3). This latter approach would provide a more accurate measure of a bank's risk exposure which, if appropriately scaled, could allow a closer alignment of capital adequacy arrangements with desired incentives.

¹¹ If exposures are fully collateralised with high-quality assets, no capital charge is levied (see Appendix 3)

A related issue is the capital charges that apply to repurchase agreements. Under current arrangements, these agreements are treated as collateralised loans (and so the capital charge applies to the security, not the original exposure). This means that no capital needs to be held against a repurchase agreement involving a government security from an OECD country (provided that it is fully collateralised). This is despite the fact that a potential exposure exists if the counterparty defaults and market prices move adversely. Again, this concessional capital treatment has encouraged very fine pricing, and reduced the incentive for banks to limit their exposures.

Finally, the same capital charge (8 per cent) applies to a direct *loan* to a hedge fund, a direct *investment* in a hedge fund, and a direct loan to a high-quality industrial firm. This is despite large differences in the amount of risk being incurred. Consideration needs to be given to greater differentiation in the risk weights that are applied to various assets.

Any review of the current capital arrangements could be included within the Basle Committee's broader review of the Capital Accord, although this may well slow progress. An alternative approach is for a timely and focussed review of the capital arrangements that apply to derivatives exposures to non-banks and in the foreign exchange market.

3.3.3 Discretionary Supervisory Instruments

The third broad approach is for supervisors in individual countries to make more active use of their discretionary supervisory instruments.

If supervisors are of the opinion that systemic risk is increasing because regulated institutions are mispricing risk and permitting excessive leverage in financial markets, one possible response is to increase the minimum capital ratios that apply to institutions in the system (or the capital ratios of the institutions incurring the most risk). Alternatively, supervisors could use their legal authority to limit institutions' activities, for example by imposing limits on large exposures.

This approach has considerable merit, but faces practical difficulties. For supervisors to alter minimum capital ratios (or limits on large exposures) as the degree of systemic risk changes, they need to be able to measure systemic risk, and have a well-based understanding of which institutions are incurring the greatest risks. Even if supervisors have this information, they are likely to find it difficult to single out particular institutions for special treatment, except perhaps in the most egregious cases. They may also find it difficult to place significantly different requirements on internationally active banks to those placed on competitors in other countries. Not only would this distort the competitive landscape, but it would also encourage trading in a country's financial markets to shift offshore.

Moreover, this approach, even if it could be implemented, is unlikely to fully insulate a domestic financial system from turbulence in world financial markets. If LTCM had been allowed to fail, and Dr Greenspan's fears about the performance of financial markets had been realised, countries with sound banking systems would have felt a considerable impact, although perhaps somewhat less than countries with poorly regulated systems. Given the global nature of financial markets, a global response is needed.

The best approach is for individual country supervisors to ensure that their own banking systems comply with sound prudential standards, and for international agreement to be reached on disclosure arrangements and changes to the Basle capital arrangements. If such agreement is not possible, large countries in which hedge funds have major operations may be able to take the lead by unilaterally requiring enhanced disclosure and by changing the capital requirements that apply to banks in their own jurisdictions.

4. Conclusion

There is a strong “in principle” case in terms of financial stability and market integrity for a public-policy response to the emergence of hedge funds as major players in financial markets. Any response, however, needs to be mindful of the possibility that specific controls on hedge funds could simply lead to the development of a different set of institutions which pose much the same risks. Effective responses need to address the sources of the problems, not just their manifestation. This means addressing the factors that allowed hedge funds to obtain large positions in some markets.

There is no single solution, with the most effective responses involving a combination of changes to supervisory practices, changes to the Basle capital arrangements and improvements in disclosure.

Bank supervisors need to work with supervised institutions to improve internal credit assessment procedures. Particularly important is the need to develop stronger collateralisation arrangements. A set of sound practices will help in this regard. The effectiveness of these sound practices is likely to be enhanced if a mechanism is developed through which institutions are required to disclose their compliance with these practices.

The current capital arrangements also need reviewing. In a number of important areas the capital charges for exposures generated in financial markets do not bear a close relationship to the risks being incurred. This had led to the financial institutions mispricing risk and paying to too little attention to the size of their exposures.

There is also a need for additional disclosure of information that is useful in assessing market concentration, credit risk and the health of markets. In each of these areas, the private market has not delivered adequate information, and a public-sector response is needed. While there are a number of ways forward, one approach is for regulators to specify a minimum set of information that should be publicly disclosed by all active participants in financial markets. This set of information might include details of large positions relative to the market, various measures of VaR, stress tests and measure of the performance of the VaR models. To encourage compliance, regulated institutions could be required to hold additional capital against exposures to any institution that did not meet these minimum standards.

In each of these areas, the most effective results are to be obtained through international cooperation. However, if agreement cannot be reached, unilateral action, particularly by countries with developed financial markets and in which hedge funds have major operations, will need to be considered.

Reserve Bank of Australia
SYDNEY

March 1999

APPENDIX 1: SOME BASIC FACTS ABOUT HEDGE FUNDS

There is no standard definition of a hedge fund. Their typical characteristics are: they are limited partnerships whose main function is investment management; they are generally run out of the US, though legally are domiciled in offshore tax havens; they do not solicit funds directly from the public or advertise, but attract investors by word of mouth; and they have high minimum investment levels, ranging between US\$100,000 to US\$5 million, with US\$1 million common. These latter characteristics allow them to gain exemptions from various US federal securities laws, such as Securities and Exchange Commission (SEC) reporting, regulatory restrictions on leverage and trading strategies, and investor protector legislation.

Hedge funds may be grouped into four broad categories, defined by investment strategy:

1. *market-neutral* or *relative-value* funds which invest in fixed income and/or equity instruments and adopt strategies which do not depend on the general direction of markets. Managers exploit market inefficiencies, looking for disparities in pricing relationships between instruments with similar pricing characteristics (including fixed interest arbitrage, convertible bond arbitrage and mortgage-backed securities arbitrage, and derivatives arbitrage, and where the price anomalies are generally driven by government intervention, policy changes or forced selling).¹² These funds had traditionally been regarded as the most conservative of hedge funds because they limit their operations to arbitrage, which was seen as a low-risk activity. However, the episode involving Long-Term Capital Management, which was counted in this group of funds, showed that such activities can be very risky if they are funded by a high level of leverage. According to the IMF (1998), market-neutral funds comprise about 25 per cent of funds and 20 per cent of assets.
2. *event-driven* funds which are also active in fixed interest and equity markets but base their strategies on the actual or anticipated occurrence of a particular event, such as a merger, bankruptcy announcement or corporate re-organisation. According to the IMF (1998), event-driven funds comprise about 15 per cent of funds and 10 per cent of assets.
3. *long/short* funds which invest in fixed interest and, especially, equity markets, combining short sales with long investments to reduce, but not eliminate, market exposure. This may entail, for example, borrowing securities the hedge fund judges to be overvalued from brokers, and then selling them on the market in the expectation that the price will be lower when the fund has to buy the securities back to be able to return them to the brokers. These funds can take positions along the whole risk-return spectrum and try to distinguish their performance from that of the asset class as a whole. According to the IMF (1998), these funds account for only a very small part of the market, but they are given much more prominence in the report by Goldman Sachs and Financial Risk Management Ltd.

¹² This is not the traditional definition of arbitrage, which is based on risk-free transactions. In contrast, the transactions undertaken by hedge funds are in fact speculative and are described by the Economist (17 October 1998) as “expectations arbitrage” since they are based on an expectation that deviations from historical relationships between financial prices will be corrected. The OECD reports that the first hedge fund was set up by Alfred Winslow Jones in 1949 to balance short and long positions held by him in the equity market to reduce overall risk.

4. *tactical-trading* funds, including most *macro* and *global* funds, which speculate on the direction of market prices of currencies, commodities, and equities and bonds on spot or futures markets. Global funds invest in emerging markets or specific regions, of which Tiger Fund is probably the most famous. The most famous macro fund group is probably George Soros's Quantum Group. Management of tactical funds is described as either systematic or discretionary. Systematic managers follow trends identified by technical analysis using proprietary computer models, while discretionary managers use a less quantitative approach, relying on both fundamental and technical analysis. Tactical-trading funds are the most volatile of the different types of funds. According to the IMF (1998), these funds account for 54 per cent of funds and 67 per cent of assets.

There is no authoritative source of information about hedge funds. Any information is provided voluntarily by the funds themselves and without due diligence, so data are sketchy and should be used with caution. Hedge funds are not allowed to advertise and so they depend on "word of mouth" to generate investor funds. One way that they do this is to provide information to various industry groups, like Van Hedge Fund Advisors, Hedge Fund Research, and MarHedge. For a fee (in thousands of US dollars), these groups provide investors with statistics on earnings and some basic figures on balance-sheet size and leverage. These figures are not subject to scrutiny and no assurance is given that definitions are applied consistently and that data are comparable. For example, groups like MarHedge do not specify a definition of leverage, but rather leave it to the discretion of the fund to report leverage statistics on whatever basis it chooses.

There is even considerable uncertainty about the number of hedge funds and the size of their assets. Goldman Sachs and Financial Risk Management Ltd (July 1998) estimate, for example, that there are 1,300 hedge fund management groups which operate over 3,500 hedge funds (with different risk and investment characteristics). Total capital is estimated to be about US\$200 billion and total assets at about US\$400 billion. Van Hedge Fund (July 1998), a data collection group, says there are 4,000 funds, while The Economist (17 October 1998) estimates that there are about 3,000 funds. These numbers are considerably larger than those set out in IMF (1998), which reports that there were about 1,000 fund managers with about US\$110 billion in assets in 1997. Even reasonable estimates of the number of hedge funds can vary by a factor of up to four!

On an aggregate level, the actual funds invested with hedge funds may appear fairly small relative to total funds in the financial sector. For instance, the Bundesbank in its March 1999 report estimates that capital invested with hedge funds in 1995 was around US\$300 billion, or 1.3 per cent of the US\$23,400 billion in total funds invested with traditional institutional investors in the OECD countries. Such a comparison, however, does not necessarily offer a good insight into the potential market impact of hedge funds, due to the effect of leverage and 'herd behaviour'.

In spite of their relatively small size, hedge funds are significant market players. Their trading strategy of eschewing benchmarks and seeking maximum absolute returns in a range of asset classes means that their investment positions can change rapidly and by large amounts, thereby having an impact on market prices. Investors find them attractive because of their generally low correlation with overall market performance. As the OECD's recent report states "hedge funds have become an integral component of the new financial landscape and are considered by most observers to be a permanent feature" (OECD 1999 p.7). In relation to this point, the Bundesbank noted that because many hedge funds depend upon the exploitation, and thus the elimination, of market

imperfections, it is likely that at some point diminishing returns may set in. This might then result in hedge funds taking on riskier, more highly leveraged positions than previously, in an attempt to maintain their high rates of return.

The OECD reports that, while the bulk of investment in funds come from market-savvy wealthy individual investors (about 80 per cent), investment by institutional investors, particularly university foundations and endowments, has expanded in recent years, accounting for about 30 per cent of new funds. Some of these investments have been very large; for example, according to the OECD, Cornell University now invests over 10 per cent of its total \$2.3 billion endowment in hedge funds, while the Yale University endowment invests roughly one-quarter of its total assets in these funds.

The events of late 1998 have not led to the demise or fundamental weakening of the hedge fund industry. Table 1 contains details of asset flows into and out of the approximate 1,200-odd hedge funds which choose to report to Mar/Hedge. These funds represented around US\$110 billion of funds under management as at the end of December 1998. The categories have been expanded from those mentioned above.

While investors in hedge funds did withdraw assets in 1998, the size of the withdrawals were small (about 5 per cent). Not surprisingly, global funds, and the large global macro funds in particular, saw the largest redemptions, as these are perceived to be the riskiest category (that is, while they have had the highest returns, they also demonstrate the greatest volatility of returns). The Soros funds, for instance, experienced an outflow of US\$566 million in December. This was soon reversed, however, with the next two months seeing inflows of US\$783 million and US\$231 million.

Table 1: Flows into and out of hedge funds¹³

	October	November	December	January	February	March
	US\$ m	US\$ m	US\$ m	US\$ m	US\$ m	US\$ m
Event driven	-227	-11	-77	-1,461	36	-20
Global emerging	-	-63	-44	-41	-3	-20
Global established	392	81	64	-2,254	124	244
Global international	-386	-203	-635	3,785	483	-7
Global macro	998	-3,625	-690	217	-163	-50
Market neutral	-81	-420	-407	-718	64	405
Short sellers	70	-31	-30	-12	34	24
Fund of funds	-437	-353	-322	-1,975	542	21
	330	-4,625	-2,141	-2,459	1,116	735

Source: Mar/Hedge Monthly reports.

¹³ According to Mar/Hedge's terminology, event driven funds focus on opportunities arising from one-off situations; global emerging funds focus on less mature financial markets; global established funds focus on established markets in the US, Europe and Japan; global international funds focus on non-US stocks; global macro funds invest opportunistically in all markets; market neutral funds attempt to neutralise market risk through the use of long and short positions; short sellers attempt to sell overvalued securities, then buy them back at a lower level; and funds of funds allocate capital among different funds.

February represented something of a turning point following the crisis, with a net inflow into hedge funds of over US\$1 billion. There are also reports that an increasing number of both pension/superannuation funds and educational endowments are now considering investing in hedge funds as part of their risk diversification strategy. Reports of increased interest in hedge funds have also noted the rapid pace of startups and the healthy state of the employment market in hedge funds, with many traders from mainstream financial institutions joining the trading desks of hedge funds.

Not only are hedge funds attractive to investors, but they are also attractive to commercial and investment banks as clients because they generate a lot of market turnover and therefore income for banks' dealing rooms. The OECD notes that: "because some hedge funds often transact in enormous size, there are specialist derivatives desks dedicated solely to hedge fund clients" and hedge funds are very big users of swaps and credit derivatives provided by banks (OECD, p 8-9). In addition, a growing number of banks are either running in-house funds or managing funds of funds. Formal and informal staff connections are also important, with staff moving between banks and hedge funds.

Hedge funds make use of a wide range of financial instruments. Many take long or short positions, or both, in equity or fixed income securities. They may also use exchange traded futures contracts or over-the-counter derivatives, while others are active in the foreign exchange or commodities markets. The President's Working Group notes that "in general, hedge funds are more active users of derivatives and of short positions than are mutual funds or many other classes of asset managers". Often there is better liquidity to be found in the derivatives markets than in the underlying instrument, and costs are usually lower. Additionally, derivatives offer a method of obtaining leverage, beyond that of simply borrowing money from other financial institutions.¹⁴

The use of leverage by hedge funds varies tremendously, although assessments are complicated by inadequate reporting requirements, the absence of a standard definition of leverage, and by the treatment of off-balance sheet activities. The OECD argues that "the use of leverage is a mainstay of some hedge fund strategies, with the degree of leverage a function of the manager's appetite for risk, the riskiness of the bets involved, and the "costs" of leveraging" (page 8). The IMF (1998, pages 7-8) estimates that 30 per cent of hedge funds do not use any leverage, and that only 16 per cent of hedge funds have a borrowing to capital ratio in excess of 1. In contrast, Goldman Sachs and Financial Risk Management Ltd suggest that average leverage is about 2. Information gained from Commodity Pool Operator¹⁵ (CPO) filings indicate that most reporting hedge funds have balance sheet leverage ratios (total assets to capital) of less than 2-to-1. The President's Working Group notes exceptions to this. According to September 1998 filings, at least ten hedge funds with capital exceeding US\$100 million had leveraged their capital more than ten times, with the most leveraged fund displaying leverage of more than 30 times. Due to the presence of economic or off-balance sheet leverage, none of these sets of

¹⁴ The President's Working Group defines leverage in two ways; as balance-sheet leverage, which refers to the ratio of assets to net worth; and economic, or off-balance sheet, leverage, which is a measure of economic risk relative to capital. Economic leverage can be obtained through the use of repurchase agreements, short positions, and derivatives contracts.

¹⁵ Sponsors of hedge funds that trade on organised futures exchanges and have US investors are usually required to register with the Commodity Futures Trading Commission (CFTC) as Commodity Pool Operators, and are subject to periodic reporting, record keeping and disclosure requirements.

statistics, or others that are available, necessarily provide a reliable guide to the exposure of hedge funds to changes in financial prices (although one might assume a fund with balance sheet leverage of 30 times is more likely to take aggressive positions).

Table 2 sets out monthly median returns for the different categories of hedge funds and for the Standard and Poors 500 index. Over 1998, no category of fund managed to outperform the S&P500 index (while hedge funds typically do not benchmark, preferring to measure their performance in absolute terms, the S&P500 at least provides an indication of overall market performance). Not surprisingly, emerging market funds produced by far the worst returns over the year, on average losing around 31 per cent of their asset values, and no category managed to post returns above 5 per cent. In 1999, results have been mixed, with quite few funds still experiencing negative returns. Two of the most well known funds, George Soros's Quantum Fund and Julian Robertson's Tiger Management, posted large negative returns (-13.8 per cent and -8.5 per cent respectively) over the first four months of 1999. Nonetheless, as noted earlier, this has not prevented a resumption of investor subscriptions.

Table 2: Hedge Fund Returns

	1998			1999			March		
	1998 Annual	Oct	Nov	Dec	Jan	Feb	Mar	5th %ile	95th %ile
Event driven	3.1	0.8	1.7	1.7	1.3	-0.2	0.5	9.9	-2.4
Global emerging	-31.1	0.9	4.9	-0.7	-1.2	0.1	4.3	23.4	-3.4
Global established	7.3	2.3	4.5	4.0	2.7	-2.6	1.4	13.1	-6.9
Global international	4.3	0.2	3.4	2.3	2.0	-0.1	1.8	9.1	-8.4
Global macro	3.7	-2.1	2.8	2.6	1.2	-0.7	-0.2	8.3	-9.4
Market neutral	5.1	0.0	1.3	1.2	1.2	0.7	0.2	6.0	-5.9
Short sellers	4.3	-9.6	-6.0	-4.0	-5.3	9.8	-0.4	4.0	-21.1
Fund of funds	0.4	-0.4	1.5	1.3	1.4	-0.2	0.8	6.2	-2.6
S&P500	26.7	8.0	5.9	5.6	4.1	-3.2	3.9		

Source: Mar/Hedge reports. See Table 1 for a definition of categories.

APPENDIX 2: LEVERAGE AND FINANCIAL MARKETS

Investors taking positions in financial markets can obtain leverage in a number of ways. One option is to borrow directly from an institution (or to issue debt securities) and then purchase financial instruments. A second, and more frequently used, option is to undertake market transactions in financial instruments. There are three general ways in which this can be done: transactions in the foreign exchange market, undertaking repos, and the purchase and sale of derivatives (such as options).¹

The nature of margining requirements and the ability of investors to obtain trading lines are important determinants of the amount of leverage that investors are able to obtain. To illustrate this, we use a transaction that has been commonly employed by hedge funds to short the Australian dollar (AUD).

Suppose the current AUD/USD exchange rate is US68 cents for one AUD, US interest rates are 4.5 per cent, Australian rates are 5.5 per cent, and an investor expects the AUD to depreciate significantly over the next week and so wishes to establish a short position of AUD10 million. The most frequently used method of establishing this speculative position involves two steps:

- Step 1: Selling AUD10 million spot and buying USD6.8 million (for delivery in 2 days time).
- Step 2: Undertaking a foreign currency swap in which AUD10 million is purchased spot for USD6.8 million (for delivery in 2 days time) and then sold for USD6.7988 million in 7 days time.

The combined effect of these transactions is that the investor has established a short position in AUD without the need for any capital or liquidity up front – the AUD funds that are needed to settle the spot transaction are obtained through the first leg of the swap.

The ability of an investor to take on much larger positions of this type is partly constrained by its ability to obtain trading lines. Financial institutions place limits on the face value of contracts that they are prepared to deal with a single investor or counterparty. These limits are related, amongst other things, to the counterparty's capital and the nature of its business. Over recent years, however, some global financial institutions faced with strong competitive pressures have been prepared to grant extremely generous lines to hedge funds, often in ignorance of the extent of similar lines from other institutions, and in excess of what normal risk management practices would suggest. This has allowed the hedge funds to obtain very large positions.

Another possible constraint on leverage is the need for a margin to be posted when a position is established. In practice, as in the above example, such margins are typically not required in the foreign exchange market. An additional constraint might apply if financial institutions require mark-to-market exposures to be collateralised (through the equivalent of a margin call). For example, using the above transaction, if after 4 days the AUD rate had appreciated to 0.70 (contrary to the hedge fund's expectation), the bank might require the hedge fund to provide AUD0.3 million in cash or government securities

¹ Garber (1998) provides a useful summary of various ways in which transactions in financial markets can be used to gain leverage and disguise capital flows.

to cover its credit exposure. While such margining practices have become more common over recent years, they are not universally used.

In contrast to the foreign exchange market, when positions are established in securities markets a margin is typically required up-front. These positions are usually created and funded through a repurchase agreement which is a form of over-collateralised loan. The lender effectively takes a margin, or 'haircut', by requiring collateral that exceeds the value of the loan. This haircut is designed to protect the lender against adverse movements in the price of the collateral. In government securities markets in most industrial countries, haircuts usually run at 2 per cent of the value of the loan, although they can vary with the maturity of the security. Thus, a hedge fund that had \$2 billion in capital could, through repos, borrow enough to fund a holding of \$100 billion of securities by applying the capital to haircuts – that is, it could gear up 50 times.

The haircuts involved on repos in emerging market securities are larger than those on Treasury securities but still allow substantial gearing. Because these markets had performed well over a run of years, and their price volatility had declined, haircuts had been below levels which could absorb recent falls in values.

Up-front margins also need to be paid on other derivatives contracts. Initial margins are typically less than 2 per cent for bond contracts and less than 6 per cent for equity contracts, allowing investors to take on exposures to market positions that are many multiples of their capital. With options, the extent of gearing that can be attained depends on the premia that investors need to pay, which vary with market conditions and the characteristics of the options. In most cases, however, the premium is only a small percentage of the face value of the option, so that once again very high gearing can be attained.

APPENDIX 3: THE CAPITAL TREATMENT OF FINANCIAL MARKET ACTIVITIES

The Basle capital arrangements require banks to hold capital against both credit and market risk.

Credit Risk

The credit risk capital charge on traded instruments is calculated by first translating the exposure into a balance-sheet equivalent; and then applying the relevant risk weight.

The Balance-Sheet Equivalent

The balance-sheet equivalent (the “credit equivalent” in supervisory parlance) is defined as the sum of the *current* exposure and the potential *future* exposure. There are two methods of calculation.

The first method calculates the current and future exposures separately. The current exposure is measured by the current market value of the contract; that is, the cost to the bank that would result if the counterparty collapsed, and a replacement contract had to be obtained in the market. If the current value of the contract is negative, the bank owes money to its counterparty and has no current credit exposure.

The future potential exposure is calculated as a percentage of the contract’s notional principal (this exposure exists regardless of the size of the current exposure). The relevant percentage depends upon the maturity of the contract and the asset underlying the contract (see Table 1). For example, a forward contract to sell foreign exchange in six month’s time would have a potential future exposure of 1 per cent of the amount to be sold.

**Table 1: Calculating Potential Future Exposure
(percentage of notional principal)**

Residual Maturity	Interest Rate	Exchange Rate and Gold	Equity	Precious Metals (except gold)	Other Commodities
One year or less	0.0	1.0	6.0	7.0	10.0
Over one year to five years	0.5	5.0	8.0	7.0	12.0
Over five years	1.5	7.5	10.0	8.0	15.0

The second method does not use the current market value of the contract to assess the current exposure, but simply calculates the sum of the current and future exposures as a percentage of the notional principal. The relevant percentages are shown in Table 2.

**Table 2: Calculating Total Exposures (“rule-of-thumb” approach)
(percentage of notional principal)**

Original Maturity	Interest Rate Contracts	Other Contracts
One year or less	0.35	1.5
Over one year to two years	0.75	3.75
For each additional year	0.75	2.25

All foreign-exchange contracts with a maturity of 14 days or less are excluded from all the above calculations. Thus, a short-dated foreign exchange swap does not incur a capital charge.

The Risk Weight

The risk weight depends on the counterparty. In general, the standard risk weights that apply to on-balance sheet exposures – 0 per cent for government obligations and 20 per cent for OECD banks – also applies to the credit – equivalent exposures. The exception is the risk weight that applies to banks’ exposures to the non-bank private sector (including hedge funds). If these exposures are on the balance sheet, a risk weight of 100 per cent applies. In contrast, if the same exposure is generated through a derivatives contract, the risk weight is only 50 per cent risk.

If a bank holds collateral against the credit equivalent exposure, the risk weight becomes the weight that would normally apply to the asset used as collateral. Thus, no capital is required to be held against a repurchase agreement involving government securities issued by OECD countries.

Market Risk

The market-risk capital requirements distinguish between a bank’s trading activities and its non-traded or “banking book” activities. The market risk capital requirements apply only to the former. Banks may choose between two broad calculation methods in assessing market risk – the standard and the internal-model methods.

The standard model sets out fixed formulae for the aggregation of exposures across asset classes (interest rates, foreign exchange, equities and commodities). Within each asset class a charge against the net open position (adjusted for the extent to which differing instruments may be regarded as offsetting) is levied. These asset-class charges are then summed. The internal model approach allows banks to make their own assessment of the extent to which differing instruments offset one another based on empirically observed correlations. Thus, the capital charge attributable to any individual contract depends not only on the individual contract, but on the composition of the bank’s overall portfolio and the extent to which that individual contract has been hedged.

Both the standard model and internal model methods are calibrated against a ten-day holding period and 99 per cent confidence interval. That is, the market risk charge addresses the trading losses that may be incurred in the event that a portfolio were held constant for ten trading days. It is expected that, 99 times out of 100, the capital charge would cover the losses accumulated over any ten-day period. An amount equal to the market risk change must be held in capital.

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