

Hedge Funds in the New International Financial Architecture¹

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I. Introduction

Recent economic and financial events have placed hedge funds in the spotlight. Malaysia's Prime Minister Mahathir accused them of being behind the speculation against Asian exchange rates that precipitated the Asian currency and financial crisis. The authorities in Hong Kong accused them of coordinating short sales on the Hang Seng stock market with short sales of the Hong Kong dollar in the expectation that the authorities would have to raise interest rates to defend the currency, which would hammer down the stock prices and guarantee profits to those short in equities. Hedge funds appear to have had major positions in Russian GKO's in the summer of 1998 and to have suffered significant losses as a result of Russia's default; in the scramble to cover their positions and replenish their liquidity they may have played an important role in the sharp exchange-rate swings and explosion of emerging-market bond spreads that followed. And the threatened failure of Long Term Capital Management (LTCM), a large U.S. hedge fund, in the final months of 1998, the rescue coordinated by the Federal Reserve Bank of New York, and subsequent revelations about the extent of LTCM's positions and leverage raised

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questions about the implications of hedge-fund operations not just for emerging economies but for the stability of global financial markets.

Whether hedge funds deserve the influence ascribed to them is another matter.

Information on their activities is incomplete. In its absence there may be a tendency to romanticize the role of these financial-market “gunslingers” and to exaggerate their contribution to financial market dynamics.

Clearer understanding must start with clearer definition. Hedge funds are collective investment vehicles, organized typically as limited partnerships, that pursue a variety of investment strategies. They use high-powered incentives to compensate managers, do not advertize to solicit investors, and require advance notification from shareholders wishing to withdraw their funds. They are subject to few restrictions on their investment activities and few disclosure requirements: in the United States they are exempt from the investor-protection regulations of the Investment Company Act of 1940 if they have fewer than 100 accredited investors and do not make a public offering of their securities.² They are still required under U.S.

²Those investors each must have a net worth of \$1 million and an income of at least \$200,000 in each of the last two years. Alternatively, joint spousal income must have been in excess of \$300,000 in the each of the last two years. Such firms are exempt under Section 3(c)(1) of the Investment Company Act. The National Securities Markets Improvement Act of 1996 amended the Investment Company Act to provide a second exclusion (Section 3(c)(7), which allows for as many as 499 investors, each with net worth of at least \$5 million. Not only are hedge funds meeting these conditions exempt from disclosure and reporting requirements, but voluntary disclosure of positions and other investment information could be construed as soliciting business and precipitate regulation under the Investment Company Act. Note that hedge funds also have as shareholders pension funds, university endowments, and corporate clients (for whom they invest corporate cash). These alternative sources of capital can be important; for example, among the macro funds that have been so controversial of late, these other sources of capital combined are more important than that contributed by individual investors (Hennessee Group 1998).

law to be duly diligent in reporting information on their financial activities to their shareholders. And hedge funds which trade on futures and option exchanges and accept investments from U.S. citizens must register with the Commodity Futures Trading Commission as Commodity Pool Operators and are therefore subject to disclosure, reporting and record keeping requirements and fraud prohibitions under the provisions of the Commodity Exchange Act.³ But funds domiciled in off-shore financial centers and which transact in other markets may be exempt of even these requirements.

This paper is an attempt to sort through the evidence on the role of hedge funds in international financial markets. Despite some not-inconsequential data problems, a reasonably clear picture emerges. While hedge funds are large compared to the typical emerging financial market, they are small in comparison with the assets of other financial institutions that engage in all of the same activities. Thus, unless hedge funds play a catalytic role in herding behavior among investors, it is hard to see why they *alone* should move markets. The same conclusion emerges from a review of the role of hedge funds in recent episodes of market volatility, including the Asian crisis and the Russian crisis. That review cautions against over-generalizing and exaggerating the role of hedge funds in these episodes of financial turbulence.

The paper then turns to the implications of hedge funds for systemic stability. This issue has been highlighted by the recent all-but-failure of the prominent hedge fund Long-Term Capital Management (LTCM). I therefore consider the controversy surrounding LTCM, distinguishing the origins of its difficulties, the way they were handled, and lessons for prudential supervision. I

³Note, however, that the Commodity Futures Trading Commission does not impose capital requirements on Commodity Pool Operators, nor does it normally receive detailed information about their off-exchange trading of over-the-counter derivatives.

conclude that while there are good reasons for thinking that the LTCM episode was sui generis, it does raise some justifiable concerns for systemic stability.

The remainder of the paper considers the implication for policy, distinguishing three rationales for tighter regulation of hedge fund operations: consumer protection, market integrity and systemic stability, and arguing that there is a limited case for further regulation on all three grounds. I describe policy responses to the growth of hedge funds, including those of the governments of Malaysia and Hong Kong. In addition, there is now a proliferation of official study groups on the hedge fund problem, with reports having been issued, or soon to be issued, by the Bank for International Settlements, the (U.S.) President's Working Group on Financial Markets, and the G-7's Financial Stability Forum, among others. I provide a critical analysis of their recommendations. My conclusion is that systemic-stability and market-integrity considerations warrant measures to require at least some additional disclosure of information by hedge funds and tighter regulatory oversight of their counterparties. Indeed, the two measures go hand in hand, since more effective supervision of hedge fund counterparties would not be possible without more information on hedge fund exposures.

II. The Contours of the Hedge Fund Industry

The traditional hedge fund investment strategy, from the inception of the industry in the late 1940s, was to combine leverage with short selling. Placing half the portfolio in short positions hedged returns against aggregate market movements, while leverage magnified the difference between the high returns expected to obtain on long positions and the low returns on shorts. Early hedge funds appear to have taken positions almost entirely on U.S. markets. In the

1970s, however, many new funds were established that followed a variety of quite different investment strategies, merger arbitrage and positions in distressed securities, for example. Some of these strategies did not involve short sales and leverage, previously hedge funds' defining investment strategies. The 1980s was marked by the growth of "macro" hedge funds that take positions on global markets in anticipation of movements in exchange rates, interest rates, and the level of stock markets. With rapid privatization and financial liberalization in the developing world, the 1990s saw these funds diversify into emerging markets and the appearance of dedicated emerging-market bond and equity funds.

Data on returns are likely to suffer from survivor bias and from the fact that information on small, newly established funds is under-reported.⁴ The available evidence, for what it is worth, suggests that hedge funds have historically outperformed other investment vehicles. Even adjusted for risk, their returns dominate those on the S&P 500. This could reflect the high-powered incentives offered hedge fund managers, which attract particularly talented individuals, or the fact that hedge funds have unusual investment flexibility compared to other collective investment vehicles.

Hedge funds' reliance on leverage is every bit as difficult to generalize about as other aspects of their activities. The survey evidence in Table 1 suggests that a third of hedge funds do not use leverage and that fewer than one in six lever their assets more than twice. The use of leverage is highest among market neutral-arbitrage funds, whose managers seek to exploit differentials between the prices of closely related securities and for whom the volatility of an

⁴The problem of survivor bias is analyzed in Brown, Goetzmann and Ibbotson (1997).

unlevered portfolio would normally be low.⁵ Macro funds use moderate leverage on average: nearly 70 percent claim to lever their capital less than two times. This is consistent with the public statements of the management of leading macro funds (Soros 1994).

Using data reported by commodity pool operators, U.S. Government (1999) estimates an overall leverage ratio of less than two, although September 1998 CPO filings identify at least ten hedge funds with capital of more than \$100 and leverage of more than ten. Roach and Montgomery (1998), using a simulation methodology, estimate that industry-wide leverage is on the order of eight.

Industry size is difficult to estimate. In addition to hedge funds domiciled in the U.S. and other major financial centers, there is a population of hedge funds domiciled offshore to obtain tax advantages and exemption from the provisions of the Investment Company Act.⁶ Information on their extent is particularly incomplete. Moreover, other collective investment vehicles, managed futures funds for example, follow many of the same practices, making the decision of who to categorize as a hedge fund more than a little arbitrary. These are among the reasons why estimates of hedge fund capital and the number of funds vary by factors of 3 to 5. Thus, while MAR/Hedge estimates there to have been 1,115 hedge funds with \$109 billion capital under management at the end of 1997, Van Hedge Fund Advisors estimates there to have been 5,500

⁵This is, of course, the category in which LTCM is traditionally placed. LTCM levered its capital as many as 100 times, suggesting that some hedge funds with very high investment to capital ratios may be lurking in the survey returns reported in high-leverage column of Table 1. LTCM obtained this leverage in part because the repute of its principals allowed it to obtain secure uncollateralized credit lines with banks, which appears to be very untypical (Eichengreen and Mathieson et al. 1998). I return to this point below.

⁶Which force onshore hedge funds to limit, for example, the number of shareholders.

funds with a capital of \$295 billion.

Table 1. Use of Leverage as of December 1997

Hedge Fund Style	Don't Use Leverage	Use Leverage	Use Leverage	Use Leverage
		Low (< 2.0:1)	High (2.0:1)	Total
Aggressive growth	35.0%	58.4%	6.6%	65.0%
Distressed securities	61.0%	35.6%	3.4%	39.0%
Emerging markets	36.1%	56.6%	7.3%	63.9%
Fund of funds	21.6%	58.4%	20.0%	78.4%
Income	35.4%	51.2%	13.4%	64.6%
Macro	16.9%	52.3%	30.8%	83.1%
Market neutral - arbitrage	18.2%	22.7%	59.1%	81.8%
Market neutral - securities hedging	31.5%	42.5%	26.0%	68.5%
Market timing	32.1%	35.8%	32.1%	67.9%
Opportunistic	24.4%	56.0%	19.7%	75.6%
Several strategies	45.1%	52.9%	2.0%	54.9%
Short-selling	22.2%	75.0%	2.8%	77.8%
Special situations	19.9%	73.0%	7.1%	80.1%
Value	35.7%	61.0%	3.3%	64.3%
Total sample	30.1%	54.3%	15.6%	69.9%

Source: Yago et.al. (1998).

\$300 billion or even \$100 billion are large amounts relative to the size of many emerging financial markets. They are 12 and 4 times, respectively, the estimated forward-market commitments of the Thai central bank on the eve of the baht's devaluation in the summer of 1997.

Add to this that hedge funds lever their capital, and the disproportion is more striking still. But before concluding on this basis that hedge funds move markets, a couple of cautions are in order. First, hedge fund capital is small relative to that of other international investors. In the U.S., U.K., Germany and Japan alone, the holdings of securities and money market instruments by financial institutions exceeds \$20 trillion, a figure which swamps that of hedge funds. A significant share of these assets (those under the management of the proprietary trading desks of investment and commercial banks, for example) are devoted to exactly the same activities as hedge fund capital. Investment banks are every bit as leveraged as hedge funds; Salomon Smith Barney estimates that the ratio of total assets to equity (gross leverage) for the top investment banks ranges from 25 to 35, while the ratio of gross assets excluding matched-book financing to equity (net leverage) ranges from 10 to 25. The five largest commercial bank holding companies had an had average leverage ratios of 14 to 1 at the end of 1998.⁷ And then there is the fact that only a fraction of hedge fund capital is devoted to activities in emerging markets. The best estimates suggest that roughly a third, circa the end of 1997, was in the hands of the “macro” funds that take positions in emerging as well as advanced-industrial-country markets, and that only a fraction of that third was devoted to emerging-market investments.

III. Evidence on the Role of Hedge Funds in Recent Episodes of Market Turbulence

Thus, one can reasonably question whether hedge funds alone move markets on the grounds that other investors follow many of the same trading and investment strategies and have

⁷As reported in International Monetary Fund (1998) and US Government (1999). See also Graduate (1998).

many times more capital under management.⁸ To be sure, hedge fund capital is not so small compared to the capitalization of individual emerging markets, and hedge funds would have a particularly pronounced impact on market conditions if they acted in concert or if other investors herded in and out of markets following their lead. Unfortunately, the evidentiary basis for statements about the role of hedge funds in recent episodes of market turbulence is incomplete.⁹ Some investigators draw inferences from the returns reported by hedge funds for periods coinciding with major market moves. For example, the fact that macro funds reported disappointing returns in 1994, the end of a period when the dollar weakened against the yen and the deutsche mark, is taken to suggest that their positions contributed first to the dollar's surprising strength and then to its surprising weakness. (Hedge funds had presumably taken large long positions on the dollar while shorting the yen and the DM and were forced to scramble to close out those positions when the market began to move against them, accounting for both the disappointing returns and the currency-market volatility.) The large losses reported by global and macro funds in August 1998 (Table 2) are similarly thought to indicate the extent of exposure to Russia and to the emerging markets adversely affected by the subsequent flight to quality.¹⁰

⁸This conclusion is echoed in other recent analyses such as Yago et al. (1998) and Roach and Montgomery (1998).

⁹This applies to public evidence at least. It is likely that central banks, regulators and counterparties have additional information about the role of hedge funds in recent episodes of market turbulence — evidence which is not yet available to researchers.

¹⁰Global funds invest globally but attempt to pick individual stocks, while macro funds take positions in different markets around the world on the basis of expectations of economywide conditions.

Table 2. Monthly Returns by Investment Style, August 1998

AUG-98	Market Neutral	Global Macro	Short Sellers	Event Driven	Global Mgrs*	Fund of Funds	Intl.	Regional Emerging	Regional Established
High	9.67	4.00	24.07	-0.55	4.84	1.56	8.95	-2.29	5.06
Median	0.40	0.07	21.81	-6.40	-8.83	-3.04	-7.27	-20.98	-6.80
Low	-10.97	-19.87	19.55	-15.90	-29.68	-8.95	-40.34	-38.36	-26.10

* Sub Median for Global Managers

Source: Marhedge (<http://www.marhedge.com/whatsnew/hpr0998.htm>).

A slightly more sophisticated way of estimating hedge funds' positions is to estimate a regression model of hedge fund returns on asset price changes. For example, Brown, Goetzmann and Park (1998) regress the monthly returns of ten large hedge funds on changes in a vector of Asian exchange rates to infer hedge funds' underlying investment positions. The results do not indicate that hedge funds consistently had short positions against the Asian currencies that came under attack in 1997. These estimates may suffer from model misspecification, however: only a handful of exchange rates are included as independent variables, and the prices of other assets in which hedge funds may have had positions are omitted.

More rigorous analysis would require information on hedge funds' trades and positions (rather than attempting to infer these from correlations). Some information, on large trades and positions in five major currencies, in three month Eurodollar contracts, and in the S&P 500 futures market, for example, is available from the Large Trade Reporting System of the Commodity Futures Trading Commission (CFTC). Kodres and Pritsker (1997) use these data to test for herding or collusion among hedge funds. Hedge funds trades and positions move together in the S&P 500 index contract and the three-month Eurodollar contract and to an extent in the

Japanese yen contract. No comparable information is available, however, for emerging-market currencies, and the CFTC data pertain only to currency futures and not forward markets. And whether co-movements in positions are properly interpreted as collusion is, of course, another matter.

Eichengreen and Mathieson et al. (1998) use these data to test whether other types of investors take the same positions as hedge funds in the current or following period, a tendency which would magnify the impact of hedge funds' positions and trades. In fact, there is a negative correlation between the positions of hedge funds and the positions of other market participants in the same period, and little correlation between the positions of hedge funds in the previous period and the current positions of other traders. There is little evidence, in other words, that hedge funds play a catalytic role in herding in financial markets. Note, however, that these findings are subject to the same qualifications as in the earlier Kodres and Pritsker study.

IV. Hedge Funds and Financial Stability

Russia's default, the rescue of LTCM, and the subsequent flight to quality raised two sets of concerns about the systemic implications of hedge fund operations and the way they fit into the regulatory net. One is that hedge funds are powerful transmission belts for contagion. This could be because hedge funds are exceptionally voracious users of leverage. Losses in one market, say Russia, may therefore have forced them to liquidate positions in other emerging markets in order to meet margin calls and raise liquidity.¹¹ The greater the leverage, in this model,

¹¹Historically, returns on, say, Russian and Latin American government securities are imperfectly correlated; hence, holding a diversified portfolio including both is a way to limit the volatility of the return on the overall portfolio, a fact which may have encouraged hedge funds

the greater the distress sales of other emerging market securities.¹² And leverage was greater among hedge funds than other institutional investors.

Note, however, that the same concern arose toward the beginning of the Asian crisis when volatility appeared to spread from Korea to Brazil. Then, however, it was commercial and investment banks, including Korean banks, that appear to have been liquidating their positions in Brazilian Brady bonds to raise funds following losses on their Korean holdings. While this channel for contagion may be at work, the Korean episode reminds us to be cautious about attributing its operation to hedge funds alone.

A second concern raised by these events is whether hedge fund operations can threaten systemic stability. One potential reason for concern is the exposure of leading international banks and securities firms to LTCM and, by implication, to the hedge fund industry as a whole. While that exposure is not fully known, estimates suggest that it may be considerable (Table 3). Hence, difficulties at LTCM created concern for the stability of its counterparties and creditors and raised a red flag about the riskiness of banks' and securities firms' investments and loans to the hedge fund industry as a whole.

Regulators also worried that forcing LTCM to unwind its large positions in government securities and derivatives markets would precipitate large price movements in those markets,

like LTCM to increase their positions in the sum of these markets. In the aftermath of Russia's default and the subsequent flight to quality, however, the historically low correlation between the returns on these different classes of assets no longer held. Losses on different components of the portfolio occurred simultaneously, heightening the need for institutional investors to liquidate related holdings in order to raise capital. Again, however, the question is whether this tendency is particularly prevalent among hedge funds as opposed to other investors.

¹²A theoretical model of the mechanism is provided by Calvo (1999).

creating distress among other participants. This fear was cited by the Chairman of the Federal Reserve Board and the President of the Federal Reserve Bank of New York as the rationale for Federal Reserve efforts to facilitate the private rescue and takeover of LTCM.¹³

Table 3. Exposure of Banks and Securities Firms to Long-Term Capital Management (LTCM) | Disclosed as of October 20, 1998

Bank	Investment in LTCM	Write-offs/Exposure
<i>Banks Involved in Takeover</i>		
Bankers Trust	\$300 million	n/a
Barclays	\$300 million	n/a
Chase Manhattan Bank	\$300 million	n/a
Credit Suisse First Boston	\$300 million	\$55 million equity stake
Deutsche Bank	\$300 million	n/a
Goldman Sachs	\$300 million	n/a
Merrill Lynch	\$300 million	\$1.4 billion loans/equity stake, collateral backing
J.P. Morgan	\$300 million	loans
Morgan Stanley Dean Witter	\$300 million	\$685.7 million equity stake/trade with LTCM
Salomon Smith Barney	\$300 million	n/a
UBS	\$300 million	n/a
Societe Generale	\$125 million	n/a
Lehman Brothers	\$100 million	None
Paribas	\$100 million	\$32 million, backed by \$41 million U.S. Treasuries
<i>Banks Not Involved in Takeover</i>		
Dresdner Bank		n/a
Bank of Italy		\$144 million equity stake
		\$100 million equity stake/\$150 million loan

Source: Yago et.al. (1998).

V. A Closer Look at Long-Term Capital

But before concluding from the case of LTCM that hedge funds pose a risk to systemic stability, it is worth asking how that hedge fund got into such trouble and whether similar events are likely to recur.

LTCM, as is well known, was established as a fixed-income arbitrage fund. Its partners used model-based techniques to detect temporary discrepancies between the prices of closely

¹³See Greenspan (1998) and McDonough (1998).

related securities. Initially, its portfolio was apparently dominated by U.S. treasury securities and related derivatives. The market in U.S. treasuries being deep, liquid and efficient, such price discrepancies were relatively small. LTCM consequently needed large amounts of credit to attain an return on capital. This it obtained through the collateralized credits provided by counterparties in markets for stocks, bonds and derivative instruments, and uncollateralized credit lines extended by one or more international banks.¹⁴ Its ability to obtain unsecured credit lines appears to have been unusual: these may have been extended by its counterparties on the grounds of its partners' sterling reputation and the low risk therefore attached to its portfolio.¹⁵

Although LTCM produced admirable returns in its early years, the return on capital declined in 1997-8, perhaps because its very success lured competitors into the field. As growing resources were devoted to arbitraging price discrepancies between closely related U.S. treasury securities, fewer such discrepancies remained.¹⁶ This increased the difficulty of keeping the fund's

¹⁴Most credit to hedge funds is collateralized by the securities that the hedge funds purchase with the funds thereby obtained. Banks apply haircuts to the securities taken as collateral, discounting them relative to current market value to account for the possibility that their price may have fallen by the time they are liquidated in response to the default of the counterparty. In addition, however, LTCM obtained unsecured credit lines for which no such collateral was required. (Reports estimate this standby facility syndicated by Chase to have been as large as \$900 million; see Shirreff 1998). LTCM's ability to obtain this exceptional access to credit appears to have been very atypical of hedge funds.

¹⁵Estimates of LTCM's leverage range as high as that reported in Wolffe (1999), that it used less than \$1 billion of capital to purchase securities worth about \$125 billion and derivatives with a notional value of \$1,250 billion. Of course, many of these open positions were offsetting, rendering such figures somewhat spurious, although there are some who would claim that it is the gross rather than the net positions that matter for counterparty risk. IMF (1998) reports that as of Tuesday, September 23rd, 1998, LTCM's capital had fallen to just \$600 million, which supported balance sheet positions in excess of \$100 billion.

¹⁶As Alan Greenspan put the point, "it is the nature of the competitive process driving financial innovation that such techniques would be emulated, making it ever more difficult to find

capital profitably invested and of maintaining the rates of return to which its shareholders had grown accustomed. Management appears to have responded by returning roughly half of the fund's capital to investors in early 1998 and diversifying into new investment activities. Published reports suggest that by the summer of 1998 LTCM's portfolio included substantial positions in merger arbitrage (that is, in companies whose market value would rise if the U.S. regulatory authorities approved their intention to merge but fall if their proposed merger was disallowed), in the European convergence play (according to which spreads on treasury securities of high-debt, high-inflation countries like Italy and Greece would fall if and when they were judged as qualifying for participation in Europe's monetary union), and in a variety of emerging-market securities. These were not investments about which LTCM's models of the U.S. treasury market provided much guidance.

LTCM's portfolio, like the markets as a whole, was then hit by Russia's default and investors' flight to quality. Where the convergence play was predicated on the assumption that spreads on Italian and Greek bonds would narrow as monetary union approached, the fallout from Russia caused the spreads on the bonds of all highly-indebted issuers, including the two aforementioned countries, to widen. There may have been good reasons for believing that the underlying investment strategy was sound (and LTCM's subsequent return to profitability provides some vindication to those who clung to this view), but this was cold comfort to a highly-levered hedge fund that suddenly found itself having to meet margin calls, put up additional collateral, and repay credit lines. Indeed, the news of LTCM's difficulties may have itself

market anomalies that provided shareholders with a high return. Indeed, the very efficiencies that LTCM and its competitors brought to the overall financial system gradually reduced the opportunities for above-normal profits" (Greenspan 1998, p.2).

contributed to the meltdown of the markets in which it had positions. The counterparties who had extended LTCM margin money, collateralized credit, and uncollateralized credit were aware that LTCM was forced to liquidate positions to meet its margin and collateral calls. They had an incentive to draw down their own positions in those same markets, which only worked to further weaken prices and compounded LTCM's problems.¹⁷

One frequently-heard defense of LTCM is that the events precipitating its distress could occur only once in a lifetime; according to firm's own model, such dramatic movements in spreads could occur only once in many millions of years. That they occurred in 1998 is perhaps more revealing of the accuracy of that model than the stability and predictability of financial markets. Be that as it may, the preceding synopsis still suggests reasons why the same sequence of events is unlikely to recur. LTCM was unique in the extent of its leverage and its access to unsecured credit lines. The size of its portfolio was almost certainly unmatched by any other hedge fund. The extent of the disjuncture between its investment expertise and its portfolio was unusual. For all these reasons, both the firm and the financial system were exceptionally vulnerable when market volatility spiked up. This does not mean that hedge funds pose no risk to systemic stability — surely the opposite statement is true — but extrapolating from LTCM's experience, as analysts are prone to do, is unlikely to provide a useful guide to future risks.

LTCM's rescue has proven controversial. The Federal Reserve Bank of New York brought together 14 of the firm's principal institutional creditors, who agreed to inject some \$3.6 billion in return for 90 per cent ownership. As noted above, the concern of Federal Reserve

¹⁷Some of LTCM's principals suggest in addition that there may have been an element of revenge or predation involved (Lewis 1999). Obviously, it is hard to judge the validity of these claims.

officials was for the stability of the financial system, not for the survival of LTCM itself. But they worried that placing the firm into receivership and forcing it to liquidate its positions might add to the volatility of already volatile financial markets, create difficulties for other market participants, and place the U.S. economic expansion at risk. Had LTCM been forced to file for bankruptcy protection, repurchase and reverse repurchase agreements would have permitted its creditors to immediately sell the collateral securing those repos and swaps. It is important to recall that Russia's default and the subsequent flight to quality had already reduced the liquidity of other institutional investors and raised fears of a credit crunch.

By helping to save LTCM from outright failure, the New York Fed, it is said, created moral hazard.¹⁸ It is alleged that the knowledge that the New York Fed was prepared to arrange a meeting of the firm's creditors encouraged LTCM's partners to reject a competing proposal (by the renowned investor Warren Buffet) that would have essentially wiped out 100 per cent of their stake. The Fed thus lost the opportunity to teach investors a painful lesson, which only served to encourage risk taking by other hedge funds and their counterparties. While the moral-hazard argument cannot be dismissed, it is hard to attach too much stock in it, given that shareholders in LTCM still lost 90 per cent of their stake. In any case, moral hazard risk must be balanced against meltdown risk, especially in circumstances where Federal Reserve officials apparently perceived a threat to systemic stability.

In addition, there is the fact that the Fed put up no money of its own. Rather, its effort to

¹⁸Allegations continue to circulate that the Fed did more than provide a conference room and a coffee machine. But William McDonough of the New York Fed and Chairman Greenspan have reiterated that "no Federal Reserve funds were put at risk, no promises were made by the Federal Reserve, and no individual firms were pressured to participate." Greenspan (1998), p.1.

facilitate a lifeboat operation in which other financial institutions took over the portfolio and operations of a fundamentally-sound financial institution is the classic, textbook responsibility of a lender of last resort, with precedents stretching back as far as the Baring Crisis of 1890 (Bordo and Schwartz 1998).¹⁹ It is not clear that this operation could have been arranged without the help of the Fed; not only were there formidable large-numbers and free-rider problems to be surmounted, but commercial and investment banks that might have otherwise been prepared to collaborate in LTCM's rescue first required assurances that they would not be subject to legal action for having colluded.

Thus, criticisms of the New York Fed-brokered rescue of LTCM would appear to be hard to sustain.

VI. Implications for Policy

Before arguing for tighter regulation of hedge fund operations, it is important to step back and articulate the rationale for the regulation of financial institutions itself. Regulation generally can be justified on three grounds: consumer protection, market integrity, and systemic stability.

Consumer Protection. The traditional view of legislators and regulators (implicit, for

¹⁹Baring Brothers' problems in November 1890 were the consequence of a debt default by the Government of Argentina, whose securities the House had underwritten. The Bank of England headed off a panic in London by arranging a lifeboat operation in which a number of other London banks provided the funds to recapitalize Barings. The authorities' involvement was more direct than the New York Fed's involvement in the rescue of LTCM; in 1890 the Bank of England contributed to the lifeboat operation, and the government effectively guaranteed the loans provided by the other banks. The official contribution was large relative to the Bank of England's reserves; the Bank therefore raised the discount rate and borrowed L2 million from the Banque de France (subsequently increased to L3 million), and a further L1.5 in gold from the Imperial Bank of Russia. See Eichengreen (1999).

example, in the U.S. Investment Company Act) is that there is no need for regulation of hedge funds on consumer protection grounds, their high-income shareholders being able to fend for themselves. Recent events offer no obvious grounds on which to question this view. To be sure, when the extent of LTCM's difficulties was revealed, some investors complained that they had not been provided adequate information, proper warning of impending difficulties, and sufficient opportunity to comment on takeover plans. In part such problems are unavoidable: a hedge fund under water will hesitate to reveal the extent of its difficulties to its shareholders for fear that news of its distress will leak to the markets, with adverse consequences for the prices of its assets as other investors react.²⁰ Similarly, it is difficult to give 100 shareholders full opportunity to comment on a takeover plan when the goal is quick action that avoids the need to appeal to the bankruptcy court or to liquidate the portfolio. In any case, it is not clear that tighter regulation is needed to solve this problem. In the U.S., hedge funds are already required to provide regularly-audited financial statements to their clients and are subject to statutes governing fraud if they fail to comply.

The LTCM episode does point up the question of whether institutional investors in hedge funds, some of whom took large losses, require additional protection through, *inter alia*, requirements for hedge funds to disclose additional information about their financial position. The argument is that LTCM's counterparties did not have adequate monthly, quarterly, or even annual information on the composition of its investments, the extent of its leverage, and its exposure to

²⁰Thus, when on September 2nd, 1998, LTCM sent its investors a letter announcing 52 per cent losses in the first eight months of the year, the contents became widely known, allegedly leading other investors to sell into the markets into which LTCM was long, an anticipation of the latter's fire sale, compounding the difficulties of the fund.

market risk because the information they obtained from management was either incomplete or out of date.²¹ In fact, banks and other institutional investors in hedge funds are already required to do due diligence. They can demand regular information about the financial performance of the counterparties as a condition for lending; indeed, they can demand to inspect their books regularly as a condition for extending credit. The authorities responsible for their prudential supervision simply need to scrutinize the adequacy of that due diligence and to apply existing sanctions where there are lapses. It is not clear that new initiatives are required.

Market Integrity. Outside the United States, concern about the activities of hedge funds revolves around market integrity — about whether hedge funds collude and whether they can corner or manipulate markets. The same market-integrity arguments that governments use to demand information about possible collusive practices in other markets (the antitrust suit against Microsoft springs to mind) can be invoked to justify regulations requiring hedge funds to provide information about their large trades and positions. In the United States, the Large Trade and Position Reporting System of the CFTC requires entities with foreign exchange positions in excess of \$50 million to report these to the authorities. At present, similar reporting requirements do not exist in other major markets, and the U.S. system mandates reporting of positions in only five major currencies. Providing reassurance regarding market integrity would require extending reporting to other currencies, lowering the threshold above which positions must be reported, and establishing parallel reporting requirements in other national markets. Reporting would have to apply not only to exchange-traded products like futures as at present but also to products traded

²¹One report in the *Financial Times* states that, in line with LTCM's "long-standing practices," it did not disclose trading positions, books or documents of any kind to its creditors.

over the counter like forwards. This appears to be the preferred approach of Japanese officials.²²

Still on the topic of market integrity, the allegation that Long-Term Capital's counterparties sold into the markets in which LTCM was known to have positions in anticipation of its need to raise liquidity to meet collateral calls, if not for predatory reasons, points up the need to strengthen the "Chinese Walls" between the proprietary trading desks and lending departments of investment and commercial banks. Those walls are supposed to prevent the flow of information between those departments and to prevent counterparties from capitalizing on any inside information they acquire about the financial activities and condition of their clients. Here, lending to hedge funds by banks that engage in many of the same investment activities as their customers is only a particular instance of a generic problem that arises in the context of banks' business with non-hedge fund clients as well. But it points to the need for supervisors and regulators to strengthen their oversight of counterparties "Chinese Walls" and to levy heavier penalties when they are breeched.

Systemic Stability. Turning to systemic stability, the danger that the borrower's financial problems will infect the lender could be addressed by raising capital risk weights and other prudential requirements on bank lending to hedge funds and by applying capital surcharges to banks lending to entities that do not disclose information on their trades and positions.²³ The risk that distress sales of securities by a major hedge fund might destabilize securities markets could be

²²See Feldman (1998). Note that the U.S. Large Trade and Position Reporting System does not apply just to hedge funds; others, like the proprietary trading operations of investment banks, are subject as well. It would be important for other national systems to have comparably broad coverage.

²³This is a likely outcome of the review of the Basle capital adequacy rules currently underway.

addressed by raising margin and collateral requirements on exchange-traded products, which would further limit the ability of hedge funds and other investors to lever up their capital.²⁴ Derivatives which are traded over the counter pose special problems since they are not subject to formal margin requirements.²⁵ Here, the agreement by 12 leading international banks, together with senior Federal officials including the chairman of the Securities and Exchange Commission, to try to set voluntary guidelines for the extension of credit to participants in derivatives markets, points to an obvious way to proceed.²⁶

Risk management by financial institutions not always being optimal — especially by banks sheltered from the adverse consequences of their decisions by the financial safety net — it is important for supervisors responsible for the maintenance of systemic stability to monitor the exposure of those banks to hedge fund counterparties and demand corrective action when that exposure is excessive or inadequately managed. The steps that need to be taken to strengthen supervision and regulation are well known, and the problem is by no means peculiar to the

²⁴The enforceability of these regulations should not simply be assumed. While the Federal Reserve's Regulation T requires purchasers to put up 50 per cent of the cost when they buy stocks on margin, it can be circumvented by doing business with offshore prime brokerage affiliates like Goldman Sachs's and Morgan Stanley's London prime brokerage offices; this points to the need to harmonize margin requirements internationally in an increasingly integrated financial world. In addition, however, there is the possibility of the prime broker and the hedge fund setting up an unregistered joint back office, in which the hedge fund takes part ownership in the separately established broker dealer, which is itself exempt from Regulation T.

²⁵It is thought that LTCM's reliance on derivatives markets, where "haircuts" are least, was an important factor behind its ability to lever its capital approximately a hundred times.

²⁶See Corrigan and Thieke (1999). A second response will be that by President Clinton's working group on financial markets. One member of that group, Patrick Parkinson of the Federal Reserve Board, told a senate hearing in December that the group was contemplating the imposition of capital requirements and margin calls in derivatives markets and new reporting standards for hedge funds and other highly-levered institutions. See Wolffe (1998).

business that banks do with hedge funds.²⁷ In addition, there is the fact that hedge funds' especially heavy use of derivative financial instruments compounds problems of information and evaluation for bank management and supervisors alike.²⁸

Finally, there is the fact that no one national regulator will know the exposure of financial intermediaries as a whole to hedge funds that obtain credit from international banks based in different countries. This was a problem with LTCM, where U.S. regulators may have known the outlines of U.S. banks' exposure and Swiss regulators may have been aware of the exposure of Swiss banks (viz. Table 3 above), but they did not know the exposure of one another's banks and therefore the risks to the international financial system as a whole.²⁹ This too is a generic problem — it applies to other large borrowers as well as hedge funds — and there is a generic solution — bank supervisors should more systematically share information with one another, as recommended by, *inter alia*, the Core Principles for Banking Supervision of the Basle Committee. Hedge funds are different from other borrowers in this respect only insofar as they tend to be highly leveraged, so that when things go wrong, they go very wrong.

One idea, tabled by U.S. and UK regulators (and resisted by their European counterparts) is to establish a clearing house or credit registry which would assemble information from the various national sources on the borrowings of hedge funds and other highly leveraged financial entities. National supervisors could collect information on the exposure to such institutions of

²⁷See for example Basle Committee on Banking Regulation (1998) and Folkerts-Landau and Lindgren (1998).

²⁸I return to this point in the next section.

²⁹Graham (1999) argues that this was true of banks as well as regulators.

their banks and other financial institutions and report these to an international registry located at, say, the Bank for International Settlements.³⁰ The danger is that assembling such figures might create a spurious sense of precision — that counterparties really know their exposure to hedge-fund counterparties in derivatives where in fact they do not -- and that it might create moral hazard for lenders if they thought that the authorities running the clearing house would feel obliged to run to the rescue of investment banks and others providing information.³¹ But both dangers — moral hazard for counterparties and the danger of overestimating the accuracy of information on the industry — already exist, and it is not clear that an international registry would aggravate either of them significantly.

VII. National Responses

Under the heading of national responses I distinguish measures taken by the governments of Malaysia and Hong Kong.

Malaysia. Malaysia's was perhaps the most notable response to the perception that hedge funds are a threat to market integrity. In response to the perception that hedge funds were destabilizing Asian currencies, it slapped on capital controls in September 1998. Approval was made obligatory for outward portfolio or foreign direct investments of more than M\$10,000. Lending by foreign banks to Malaysian residents or by Malaysian banks to nonresidents was

³⁰The procedure would not be unlike that which underlies the quarterly figures on international banks' cross-board exposures already collected and published by the BIS or the triennial survey of derivatives transactions recently inaugurated by that same institution.

³¹Then there is the question of whether the effort would be worthwhile, since few other hedge funds borrow as widely or make as aggressive use of leverage as LTCM.

prohibited, and banks and residents were barred from engaging in offshore trading of the ringgit. A one-year holding period was imposed to lock hedge funds and other portfolio investors into their positions. These measures made it more difficult for hedge funds and other “currency speculators” to take positions in the ringgit and were designed to give the central bank leeway to reduce interest rates.³² The idea was that lower interest rates and a sharply expansionary fiscal policy would insulate the Malaysian economy from the Asian recession.

There is little question that these measures insulated Malaysian currency and financial markets from the influence of hedge funds. Hedge fund managers value liquidity — that is, their ability to put on and take off positions quickly and at low cost.³³ Hence, Malaysia’s controls made it much less attractive to attempt to speculate against its markets. But there was never any question that countries can cut themselves off from international markets; readers harboring doubts need only recall the case of North Korea. The question is rather whether strategy has benefits or costs.

While Malaysia’s policies have certainly raised new doubts among international investors about the country’s credit worthiness, there is little evidence that they helped to jump-start the recovery of its economy. At the time of writing, the evolution of interest rates and output has been essentially the same in Malaysia and in other Asian countries that shunned controls.³⁴ While Malaysian interest rates came down, they came down as quickly in Thailand and South Korea. While manufacturing production appeared to have bottomed out by October of 1998, it was still

³²Without precipitating a large capital outflow and a depreciation of the currency.

³³As emphasized by Eichengreen and Mathieson et al. (1998).

³⁴This paragraph draws on Armstrong et al. (1999).

some 15 per cent below the levels of a year earlier.³⁵ Fiscal spending has been relatively restrained, reflecting the weakness of the banking system and the difficulties the authorities have had in obtaining financing.

It would appear that it was this difficulty of obtaining domestic financing and a growing appreciation of the need to borrow offshore that led the Malaysian authorities to modify their controls. In February of 1999 they replaced the one-year holding period for portfolio investment with an exit tax at rates ranging from 30 per cent for investments that have been held for less than seven months to zero for investments that have been held for more than a year. Money brought into the country after February 15, 1999 is exempt from taxes on principal repatriation, while profits are taxed at 30 per cent if taken out before one year, and at 10 per cent otherwise. The restrictions on outward investment and on lending to nonresidents by Malaysian banks remain in place, although removal of the one-year holding period requirement was widely seen as the first step in a more general liberalization.

Thus, Malaysia's experiment suggests that controls can succeed in limiting hedge fund operations in emerging markets, they come at a high cost for countries with weak financial systems and heavy dependence on external finance.

Hong Kong. The other notable response was that of Hong Kong in the summer of 1998. The authorities there complained that hedge funds were simultaneously selling the Hong Kong dollar short, forcing up interest rates as the supply of credit contracted, and shorting the Hang Seng stock market in anticipation that the higher interest rates would depress equity prices. It is

³⁵Data for GDP growth point in the same direction, with a fall of some 6 per cent in the most recent year in Malaysia compared to 8 per cent in Thailand.

worth making two observations about this hedge fund play. First, it hinged on Hong Kong's maintenance of a pegged exchange rate. The commitment to the province's currency board law meant that the authorities had to accede to the rise in interest rates; maintenance of the peg left them no choice. And they could not inflict losses on hedge funds that had shorted the currency by widening the band and creating scope for the currency to appreciate as well as depreciate. Second, implicit in the official analysis of the problem was the belief that hedge funds were colluding, since it seems unlikely that sales of the currency by any one hedge fund could have put such dramatic upward pressure on interest rates.

The Hong Kong Monetary Authority responded by purchasing nearly \$20 billion's worth of shares on the Hang Seng. Its intervention appears to have been successful in the sense that the Hang Seng recovered quickly, making profits for the Monetary Authority and averting the kind of financial collapse that might have even jeopardized the currency board. Hedge funds, having been shown that speculation against the Hong Kong dollar and the Hang Seng was not a one-way bet, withdrew from the market. The Monetary Authority made considerable profits on its intervention, which can therefore be judged as successful on all grounds.

Whether other countries have the capacity to emulate Hong Kong's example is another question. The Monetary Authority had ample reserves, enabling it to intervene without igniting fears of inflation; not many other central banks would be in the same position. The Monetary Authority's autonomy appears to have minimized pressure for it to favor some companies and shares over others, although it can still be argued that this kind of intervention favors large-

capitalization, liquid stocks.³⁶ For the vast majority of countries, the safer response to this problem would be to simply eliminate the one-way currency-cum-interest rate bet by adopting greater exchange rate flexibility.

VIII. Regulatory Responses

The BIS. The first regulatory analysis of the problems raised by LTCM and the hedge fund industry generally was by the Basle Committee on Banking Supervision (BIS 1999), which focused on implications for systemic stability and on the need for banks to better manage hedge fund risks. It criticized the banks for failing to adequately analyze LTCM's creditworthiness.³⁷ In addition, it argued that the banks had erred by relying for security mainly on collateral in the form of government securities. "Reliance on collateral," it wrote, "cannot substitute for day-to-day risk management and monitoring."³⁸ The problem is that the value of many of these securities fell sharply with the flight to quality in the autumn of 1998, leaving collateral in practice worth less

³⁶Thus, its intervention in the Hang Seng made the Hong Kong Monetary Authority the largest shareholder in the Hong Kong and Shanghai Bank, whose shares appreciated while those of other leading Hong Kong banks were falling sharply. The Monetary Authority's concentrated stake also raised difficult issues of how it should carry out its responsibility for corporate governance. Hale (1998) has suggested that governments could deal with this problem by setting up separate, independent agencies ("government hedge funds") to undertake this kind of contrary speculation.

³⁷It writes that "In some cases, competitive forces and the desire to conduct business with certain counterparties may have led banks to make exceptions to their firm-wide credit standards" (p.1 of the preface). A more revealing sentence later in the report (p.5) states, "However, a bank should not grant credit solely because the counterparty, or key members of its management, are familiar to the bank or are perceived to be highly reputable."

³⁸Basle Committee (1999), p.5.

than collateral on paper.³⁹ In addition, there were delays in identifying the need for additional margin and in rebalancing positions in rapidly moving markets, which exposed banks to additional credit risk.⁴⁰ Most important perhaps was the fact that collateral alone is not sufficient to mitigate credit risk (when, for legal reasons, collateral cannot be recovered).

Many of the committee's recommendations are uncontroversial: banks should improve their procedures for assessing the risks of lending to hedge funds, better stress test their balance sheets against exceptional events heightening their exposure and eroding the value of their collateral, and impose firm-wide credit limits on lending to individual hedge funds that force different departments within an institution take into account one another's exposures. The committee emphasizes the need to stay in touch with hedge-fund counterparties on a "sufficiently timely and ongoing basis," since the unusual flexibility enjoyed by their management permit radical changes in trading activities and investment strategies (a lesson from the late days of LTCM). It is hard to quibble with any of these recommendations, although it is worth emphasizing that they will not be easy to implement. None of them, in any case, is new.

The report echoes the risk management guidelines issued by the Committee of Banking Supervisors in 1995 for assessing risk to counterparties in over-the-counter derivatives markets.⁴¹ Exposure to a counterparty in such transactions may change discontinuously as a contract

³⁹"Full collateralization of mark-to-market positions does not eliminate exposure to secondary risks such as declines in the value of securities pledged as collateral from a volatile market environment that could follow the default or disorderly liquidation of a major HLI [highly-leveraged institution]" (p.5).

⁴⁰Margin on collateral tends to be called the day after the position has been marked to market (Celarier 1998).

⁴¹Bank for International Settlements (1994).

suddenly moves into the money. Banks were therefore urged to develop more useful measures of potential future exposure that provide a meaningful estimate of the extent of a bank's involvement with such counterparties, that allow it to convert derivatives contracts into loan equivalent amounts, and that permit it to aggregate counterparty credit exposures across products and instruments. Again, it is hard to dispute the merit of these recommendations, although implementing them will be easier said than done.

One new element is the recommendation that banks impose tougher terms on hedge funds that are slow to disclose information about their trades, positions and financial condition, including requiring such institutions to post initial margin in excess of current exposure. The problem is that no one set of national banks or regulators will want to be first to do so for fear of losing business to competitors who impose less demanding margin requirements. This, then, is the kind of measure that must be adopted through agreement by the Basle Committee and for which compliance should be monitored by the BIS and other multilaterals.

The President's Working Group on Financial Markets. This report, issued in April 1999, was authored by an interagency task force including the Treasury, Federal Reserve, Securities and Exchange Commission, and Commodity Futures Trading Commission. Many of its conclusions are consistent with those of the BIS report. While it emphasizes that responsibility for preventing excessive risk rests first and foremost with hedge fund shareholders and counterparties, the report warns that these market-based constraints can break down in good times. In addition to a variety of BIS-like recommendations (that financial institutions should enhance their procedures for managing counterparty risk, that regulators should push for such improvements in risk management systems), the report therefore concludes that more frequent

and detailed information on hedge funds should be made public. While the emphasis throughout is on disclosure of this information to the public, these recommendations are presumably intended to facilitate the efforts of supervisors and regulators as much as to strengthen market discipline.

Specifically, the report recommends that hedge funds that are registered as Commodity Pool Operators and therefore required to report to the CFTC should be made to file more comprehensive reports on a quarterly rather than an annual basis. Funds that are not registered as CPOs should be required to disclose similar financial information, presumably also on a quarterly basis.⁴² Financial institutions, for their part, should be required to disclose a summary of their exposure to hedge fund counterparties.

While this push for disclosure is understandable, two doubts about it can be raised. First, will quarterly reports be a significant improvement over annual reports, given the speed with which hedge funds put on and take off positions. Would a report for the second quarter of 1998, made available to the public in the third quarter, have provided significant advance warning of the difficulties of LTCM and invigorated the operation of market discipline? This seems unlikely.

Second, requiring additional disclosure may lead hedge funds that regard the requirement as onerous to relocate to offshore jurisdictions. The task force therefore recommends that offshore financial centers should adopt and comply with internationally-agreed upon standards for disclosure and prudential supervision. Recommend it can, but the problem of offshore financial centers and tax havens is long-standing, and in the absence of specific actions it is not clear that it will go away. From this point of view, the recommendation that regulators (and the Basle

⁴²This would require Congress to enact legislation requiring this and setting up a mechanism for disclosure.

Committee) apply tougher capital standards on counterparty transactions for banks doing business with financial entities offshore that do not comply with the Basle Core Principles is useful, although such differential charges would have to be significant to achieve the desired result.

Presumably in response to both problems, the task force suggests that disclosure statements could concentrate on measures of value at risk (VAR) and stress-test results. Requiring the publication of VAR results but not proprietary information on trades and positions is presumably intended to avoid driving hedge funds offshore. Given the exceptional mobility of hedge funds, however, the result remains to be seen. The publication of stress tests, for its part, is presumably intended to enable market participants and regulators to better infer future problems from past behavior. Given the limitations of existing stress tests and VAR models, it similarly remains to be seen how effective this approach would be.

While these caveats should be borne in mind, the task force's recommendations would seem an obvious place for US regulators and legislators to start. But given the footloose nature of the hedge fund industry, other nations would have to quickly follow suit.

IX. Conclusion

Hedge funds are here to stay, reflecting the growth of a clientele of high-income investors seeking to diversify their portfolios to include high-risk, high-return elements.⁴³ So long as the demand exists, attempts to suppress them in one place will only cause them to pop up in another.

⁴³Not just individuals but also pension funds, university and foundation endowments, and corporate clients. In addition, advances in information technology, securitization and financial liberalization have made it that much easier to establish and operate collective investment vehicles tailored to the needs of these high-income clients.

This is not to say that nothing should be done by regulators in response to their growing presence. Risks to systemic stability can be addressed by requiring modest additional disclosure by hedge funds and by strengthening oversight of their counterparties. The two approaches are complementary, since regulators cannot effectively monitor the adequacy of counterparties' controls in the absence of information about hedge funds' borrowing and investment strategies.

Expanding the scope and coverage of the U.S. Large Trade and Reporting System and establishing analogous reporting mechanisms in other countries have the further merit of providing information to officials and others concerned about the implications for market integrity of the existence of a small number of large investors. Moreover, the very obligation to report their large trades should provide a disincentive to hedge funds and other currency speculators who might be tempted to collude. And strengthening the Chinese Walls between the credit and proprietary trading departments of hedge funds' investment bank counterparties should help to prevent the latter from piggybacking on hedge fund operations and limiting herding in and out of markets.

But more heavy-handed regulation designed to limit hedge funds' positions and to require them to reveal detailed balance-sheet information is unlikely to be feasible. Such regulation would have to be universal, since hedge funds are the most mobile of investors. In particular, it would have to be applied by tax havens and offshore financial centers since many hedge funds are already legally domiciled in places like the Cayman Islands. One recalls Chairman Greenspan's remark that "most hedge funds are only a short step from cyberspace."⁴⁴

Further efforts to limit the risks to systemic stability thus will have to approach the problem

⁴⁴Greenspan (1998), p.6.

mainly from the angle of regulation of the hedge funds' counterparties. Regulators are responsible for seeing that banks and other financial intermediaries stay on top of the operations of their hedge-fund customers and of the credit risk posed by those relationships. They are responsible for ensuring that banks properly calculate potential future exposure. Regulators should also contemplate raising capital requirements for banks lending to highly-leveraged customers, especially to those releasing relatively little information on their trades, positions, and financial condition. They should consider raising margin and collateral requirements on exchange-traded products and agreeing to standards for the extension of credit to participants in derivatives markets. They should more systematically share information on the exposure of the intermediaries they oversee to hedge funds and other highly-leveraged institutions. To this end, the idea of a clearing house or credit registry to assemble information from the various national sources should be revived.

For their part, emerging markets at risk from hedge fund operations have no choice but to protect themselves. They should adopt more flexible exchange rates as a way of removing the one-way bets that hedge funds find so irresistible and place holding period taxes on foreign investment (the kind of system that Chile has long had in place and to which Malaysia has now begun to turn) as a way of increasing the cost of getting in and out of domestic markets without disrupting the country's access to long-term foreign investment. However, more draconian measures that would be highly disruptive to the operation of financial markets are unlikely to be justified. Malaysia's experience suggests that comprehensive controls on capital outflows and short selling tend to have high costs and dubious benefits.

Even if governments succeeded in reigning in the hedge funds, they would still be faced

with investment banks, commercial banks and other institutional investors who engage in all the same investment activities and control infinitely more capital. Clamping down on hedge funds, even were it possible, would change nothing. Hedge funds are just one manifestation of the world of high capital mobility and liquid markets in which we will continue to live.

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