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January 16, 1998

To: Members of the Executive Board

From: The Secretary

Subject: **Hedge Funds and Financial Market Dynamics**

Attached for consideration by the Executive Directors is a paper on hedge funds and financial market dynamics, which will be brought to the agenda for discussion on a date to be announced. Issues for discussion appear on pages 39 and 40.

Mr. Eichengreen (ext. 38534), Mr. Mathieson (ext. 37662), or Mr. Chadha (ext. 36669) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

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INTERNATIONAL MONETARY FUND

Hedge Funds and Financial Market Dynamics

Prepared by the Research Department

Approved by Michael Mussa

January 16, 1998

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I. INTRODUCTION

1. Each bout of turbulence in international financial markets heightens the attention of government officials and others to the role played by institutional investors, and hedge funds in particular. This was the case in 1992, following the ERM crisis. It was the case in 1994, a period of turbulence in international bond markets. It was again the case in 1997 in the wake of the financial upheavals in Asia. In each case, it has been suggested, hedge funds precipitated major movements in asset prices, either through the sheer volume of their own transactions or through the tendency of other market participants to follow their lead.

2. Yet for all this attention, little concrete information is available about the extent of hedge funds' activities. No consensus exists on their implications for financial stability and on how policy at the national and international levels should be adapted to accommodate their presence in the markets. The goal of this paper is therefore to provide a basis for better understanding the role of hedge funds in international financial markets.¹

3. Better understanding starts with clearer definition. Hedge funds can be defined as eclectic investment pools, organized as private partnerships and often domiciled offshore, whose managers are paid on a fee-for-performance basis.² Their prospectuses and legal status place few restrictions on their portfolios and transactions. Consequently, their principal partners and managers are free to use a variety of investment techniques, including short positions, derivative securities, and leverage, to raise returns and cushion risk.³

¹A staff team headed by Mr. Eichengreen, including Messrs. Mathieson and Chadha, and Ms. Kodres (all RES) held discussions during November and December 1997 with representatives of hedge funds, prime brokers, commercial and investment banks, and regulators in New York, Greenwich, Connecticut, London, and Washington D.C. Mr. Chadha headed mission visits to Singapore, Malaysia, and Hong Kong. Messrs. Sharma and Lall (both RES) participated in these visits. Background papers for the present study are provided in "Hedge Funds: Background Material" (forthcoming). This is not the first time the Fund has considered the role of hedge funds in international financial dynamics. The 1993 *International Capital Markets Report* analyzed their role in the 1992 ERM crisis. The 1994 *Report* had a chapter entitled "Bond Market Turbulence and the Role of Hedge Funds." The 1995 *Report* analyzed their activities in a chapter entitled "Increasing Importance of International Investors."

²U.S.-based hedge funds are typically organized as limited partnerships or limited liability companies.

³Hedge funds should be distinguished from the derivative financial instruments they sometimes use to implement their investment and trading strategies. Although the instruments utilized by fund managers will inevitably receive attention in conjunction with the analysis of managers'

(continued...)

4. The questions posed in this paper include the following. In what kind of activities do hedge funds engage? How large are their assets? Under what circumstances might their investment and trading activities significantly influence market outcomes? To what supervision and regulation are they subject? How should exchange-rate and debt-management policies, financial-market regulation, and monetary and fiscal policies more generally be adapted to the presence of these large investors in international markets?

5. It is important to emphasize the fragmentary nature of information on this subject. Hedge funds are a rapidly growing part of the financial sector, but they are not subject to reporting and disclosure requirements of the sort that typically apply to banks and mutual funds. In the United States, the fact that hedge funds operate through private placements and restrict share ownership to high net worth individuals and institutions frees them from the disclosure and regulation requirements of the Securities and Exchange Commission.⁴ Offshore funds typically domicile in jurisdictions where they are subject to even less regulation. This makes it difficult to construct a comprehensive enumeration of hedge funds, much less to assemble information on their activities.⁵

A. Hedge Funds and Market Moves

6. Many observers regard hedge funds as nimble and quick on their feet. In their view, hedge funds are often among the first investors to take positions against unsustainable currency pegs (or other asset prices). Because hedge fund managers have reputations as acute prognosticators of future financial market trends, news of their positions can prompt other investors to follow their lead. Thus, hedge funds can play a catalytic role in the herd behavior that amplifies volatility in foreign exchange markets.⁶

³(...continued)

trading and funding strategies, hedge funds, not derivatives, are the subject of this paper.

⁴Although it is not uncommon for them to provide shareholders with a monthly letter or an annual report.

⁵ While a number of commercial services compile information on hedge funds, these data should be treated with special caution. Still, they provide at least some basis for estimating the extent and character of hedge funds' operations.

⁶Formally, herding is a situation in which traders emulate the actions of other traders. The phenomenon is not necessarily predicated on irrationality. Models of rational herding are typically built on one of three effects. The first is payoff externalities, in which the payoffs to an agent adopting an action increase in the number of other agents adopting the same action.

(continued...)

7. That said, it turns out to be difficult to generalize about the role of hedge funds in market moves. It may be possible to point to market moves where the hedge funds played a catalytic role, the 1992 ERM crisis being the most frequently-cited example, but it is equally possible to cite episodes where they followed rather than led other investors, where they were largely absent, or where they actually acted as contrarians.⁷ Cases can be cited where other investors were first to take a position against a currency peg, and where hedge funds, instead of leading, in fact followed. Similarly, it is possible to point to instances where hedge funds took a position against a currency and lost instead of making money. Nor are hedge funds' activities limited to shorting currencies and other assets. In a number of important instances, hedge funds have taken long positions in depreciating currencies, for example, buying them in the wake of a crisis in anticipation of their subsequent recovery.⁸

8. Thus, isolating the role of hedge funds requires a detailed analysis of the episode in question. Below we provide such an analysis of the recent Asian crisis and attempt to determine which characterization is the most accurate portrayal of their actions.

B. Policy Implications and Options

9. Regulators in the United States and the United Kingdom, where the most important hedge funds operate, see little need for a specialized policy response to regulate and limit their activities to enhance financial market stability. In particular, hedge funds which take short positions against foreign currencies do so in response to evidence of inconsistent policies likely to render currency pegs unsustainable, in this prevailing view. On the other hand, insofar as hedge funds buy sharply depreciated currencies in the wake of a speculative crisis,

⁶(...continued)

Second are principal-agent models in which managers, in order to preserve or gain reputation when markets are imperfectly informed, prefer to "hide in the herd" in order not to be easily evaluated, or to "ride the herd" to prove their quality. Third are models of information cascades, in which agents infer information from the actions of others and optimally act alike. The notion that other investors regard hedge fund managers as relatively well informed and therefore follow their lead is most obviously interpreted in terms of this third effect. For a survey, see Devenow and Welch (1996).

⁷Mexico in 1994-95 is a widely-cited case where hedge funds were largely absent. Subsequent sections of this paper describe institutional reasons to believe that hedge funds are more likely than other investors to act as contrarians, and some empirical evidence to this effect.

⁸Reports suggest that hedge funds played this role following the depreciation of the Indonesian rupiah in the fall of 1997. In some of these instances hedge funds appear to have made money, in others not.

hedge funds are sources of liquidity and stabilizing speculation that dampen market fluctuations.

10. That said, limited measures to strengthen supervision, regulation and market transparency might be considered. For instance, it would be possible to strengthen and replicate the large-trader and position reporting mechanisms in place in countries like the United States as a way of rendering hedge fund operations more transparent.

11. In addition, it would be possible to limit the ability of hedge funds and other investors to take positions in financial markets by requiring banks and brokers to raise margin and collateral requirements. Similarly, it would be possible to limit the ability of hedge funds to take short positions in currency markets by restricting the ability of financial institutions to lend domestic assets to nonresidents.

12. But the most important action policymakers can take to protect their economies against uncomfortable market movements is to avoid offering one-way bets in the form of inconsistent policies and indefensible currency pegs. They can strengthen the ability of clearance, settlement, and payments systems to withstand asset-price volatility. And they can provide better information about government policy and private-sector financial conditions in order to weaken the tendency for incompletely-informed investors to "follow the herd" and thereby magnify the repercussions of the positions taken by large institutional investors, including but not limited to hedge funds.

C. Organization of the Paper

13. The rest of the paper is organized as follows. Section II situates hedge funds in the investor community. Section III reviews their history, sketches their dimensions, and projects their future. Section IV describes hedge funds' investment strategies and explores the implications for market stability, while Section V describes the regulatory framework in which these funds operate. Section VI then reviews their role in recent episodes of market turbulence, briefly in the cases of the ERM in 1992, international bond markets in 1994, and Mexico in 1994-95, and at more length in the case of emerging markets in 1997. Section VII elaborates the implications for policy. The Appendix describes the role of large traders in theoretical models of currency crises. Four background chapters follow, concerned with (i) the extent of the hedge fund industry and its performance, (ii) hedge funds' trading and investment strategies, (iii) evidence on herding by hedge funds and other investors, and (iv) the supervisory and regulatory setting.

II. AN OVERVIEW OF THE HEDGE FUND INDUSTRY

14. Hedge funds are private investment pools, often domiciled offshore to capitalize on tax and regulatory advantages. In the United States, they typically offer their shares in "private

placements” and have fewer than 100 high net worth investors to make use of exemptions to regulations under the Securities Act of 1933, the Securities Exchange Act of 1934, and the Investment Company Act of 1940.⁹ They are managed on a fee-for-performance basis; typically, management is rewarded by a 1 percent management fee and 20 percent of profits, although management and investment fees vary. Most funds require shareholders to provide advance notification if they wish to withdraw funds: notice can vary from 30 days for funds with more liquid investments to three years for other funds.

A. Diversity Within the Hedge Fund Industry

15. Two problems arise as soon as one attempts to build on these regularities. First, practices vary enormously. Market participants distinguish two main classes of funds: (1) macro hedge funds taking large directional (unhedged) positions in national markets based on “top-down” analysis of macroeconomic and financial conditions; and (2) relative value funds which take bets on the relative prices of closely related securities (Treasury bills and bonds, for example) and are less exposed to macroeconomic fluctuations. Relative value funds tend to be more highly levered than macro funds because the amount of capital needed to establish a position is relatively small on the instruments they hold.¹⁰

16. As soon as one looks more closely at these subcategories, one detects further diversity. Some macro hedge funds take positions mainly in G-3 markets; others take positions mainly in emerging markets. A number of the largest macro funds do both and spread their holdings across equities, bonds and currencies (both short and long positions), and hold commodities and other less liquid assets like real estate in both developed and emerging markets. But the majority of macro funds hold a more limited range of assets. In all but the most exceptional circumstances, only a fraction of their portfolios is allocated to emerging markets; this reflects the risk of a concentrated stake and the costs of establishing and liquidating large positions in smaller markets. Only dedicated emerging-market funds, which

⁹To be exempt from registering its shares under the Securities Act, a fund must issue its shares via a private placement. Further, the original Investment Company Act of 1940 provided hedge funds with an exemption from registration as investment companies if they had no more than 100 beneficial owners and were not making, and did not intend to make, a public offering of their securities. To take advantage of both the above exemptions, funds typically had fewer than 100 investors. In 1997, the Investment Company Act introduced another exemption. Funds were exempted from registering as investment companies if they sold their shares only to “qualified purchasers” and did not make, and did not intend to make, a public offering of their securities. A qualified purchaser is defined to include individuals with investments of at least \$5 million or any other investor acting for his own account or for other qualified purchasers with investments of at least \$25 million.

¹⁰A subsequent subsection, on hedge funds’ use of leverage, elaborates this point.

are a small minority of the hedge-fund universe, allocate a substantial share of their portfolios to positions in emerging markets.

17. Similarly, within the relative value category one finds hedge funds specializing in fixed-income arbitrage, merger arbitrage, and distressed-securities arbitrage. (That these activities are referred to as arbitrage should not be taken to imply that they are free of risk.) Most funds engaging in these activities limit their holdings to G-7 markets, if not the United States, because their institutional knowledge does not carry over to other countries.

B. The Fuzzy Line Between Hedge Funds and Other Institutional Investors

18. A second fundamental problem with defining and describing hedge funds is that other investors engage in many of the same practices. Individual investors and their institutional-investor counterparts such as investment banks buy stocks on margin. Commercial banks use leverage in the sense that a fractional-reserve banking system is a group of levered financial institutions whose total assets and liabilities are several times their capital. The proprietary trading desks of commercial and investment banks take positions, buy and sell derivatives, and alter their portfolios in the same manner as hedge funds. A nonnegligible number of mutual funds, pension funds, insurance companies, and university endowments engage in some of these same practices and are among the most important investors in hedge funds. For all these reasons, any line between hedge funds and other institutional investors is increasingly arbitrary.

C. A Look Back

19. Investment partnerships have existed as long as financial markets. The partnerships known as hedge funds, a name coined in the 1950s, originally attracted investors by combining two investment tools: short sales and leverage. Short selling involves borrowing a security and selling it in anticipation of being able to repurchase it at a lower price in the market, at or before the time when it must be repaid to the lender. Leverage is the practice of using borrowed funds. (Financially-leveraged firms thus have high debt-to-equity ratios.) Both short selling and leverage are regarded as risky when practiced in isolation. The original hedge fund, the Jones Hedge Fund established by sociologist and financial journalist Alfred Winslow Jones in 1949, is credited with showing how these instruments could be combined to limit market risk while generating attractive returns.¹¹

20. Jones's insight was that coupling long exposure with short sales of other securities issued by firms in the same sectors could insulate (or "hedge") the returns on a portfolio from market fluctuations. Performance "within the hedge" would thus depend on stock selection

¹¹A history of the Jones Hedge Fund and of the industry more generally is Caldwell (1995).

rather than market direction. Using leverage, Jones's fund magnified the impact of differences in performance between the stocks in which it was long and the stocks in which it was short. Jones's fund, like others which adopted its strategy subsequently, was organized as a limited partnership (from 1952). Jones made the manager's incentive fee a function of profits (in his case, 20 percent of realized profits) and agreed to keep his own investment capital in the fund (insuring that his incentives and those of his investors would be aligned). The limited-partnership and incentive-fee structures, with variations, continue to characterize hedge funds to this day.¹²

21. Hedge funds proliferated in the "go-go years" 1966-68, as the stock market rose and Jones's fund garnered favorable publicity. A 1968 SEC survey enumerated 215 investment partnerships, 140 of which were categorized as hedge funds, the majority of which had been formed that same year.¹³ These funds concentrated on investments in corporate equities. With the market on an upward trend, hedge fund managers relied more on leverage than short sales. This rendered them vulnerable to the extended market downturn that started at the end of 1968. By one estimate, assets under management by the 28 largest hedge funds had declined by 70 percent by the end of 1970. Five of those 28 large funds had shut down, with smaller funds going out of business at an even faster pace.¹⁴

22. Those hedge funds which survived and new entrants to the industry experienced renewed popularity in the 1980s. Their resurgence was associated with financial liberalization that opened new investment opportunities, managers building internationally-diversified portfolios of government bonds, currencies and other assets. Hedge funds became particularly fashionable starting in 1986, a year of favorable press commentary on Tiger Fund (and its offshore counterpart, Jaguar Fund), which had reaped high returns in 1985 on a "global macro play" involving a \$7 million investment in foreign currency call options purchased in the expectation that the U.S. dollar, having risen sharply for four years, was now misaligned and would decline against the European currencies and the yen. Subsequent years saw the establishment of hundreds of new hedge funds following a variety of investment strategies, most of which utilized short sales, leverage, and derivative instruments even more specialized than currency call options.

¹²In contrast, and as described above, many hedge funds have moved away from the original Jones strategy of hedging market risk by matching offsetting short and long positions. This is the basis for the frequently-heard statement that to call these investment pools "hedge" funds is a misnomer.

¹³See SEC (1969).

¹⁴Again, see Caldwell (1995), pp.10-11 and *passim*.

D. Quantitative Dimensions

23. No reliable estimates exist of the number of hedge funds and the value of hedge fund capital. Commercial services that report on hedge funds rely on fund managers for information. This may bias upward average returns, since the worst performing managers are least likely to provide information. Newer, smaller funds may be picked up only with a lag. Estimates of hedge fund capital may suffer from double counting insofar as some commercial services combine data for funds of funds (hedge funds which invest in other hedge funds) with other categories.

24. Above all, there is the problem of who to include. Should one include individuals or family groups taking highly levered positions? Should one include limited partnerships or limited liability companies that invest primarily in assets other than public securities and financial derivatives, or which do not use leverage or short selling? Should one include managed futures funds, which limit their activities to futures markets? Differences in how they answer these questions help to account for the widely varying estimates of the total number of hedge funds and hedge-fund capital under management.

25. Still, it is useful to see how far the available data allow us to go. We used data from Managed Account Reports Inc. (MarHedge), which appears to apply one of the more conservative definitions of the hedge fund industry. Data for both U.S. and offshore funds were used to generate the attached tables which show the seven investment styles available in the database and a fund of funds category. Since treating this last category symmetrically with the others may introduce double counting, grand totals are presented both including and excluding funds of funds.

26. The resultant estimates of number of funds (Table 1) come to more than 1,000 in 1997, of which approximately one quarter are funds of funds. The corresponding estimates of capital (Table 2) are just under \$100 billion including funds of funds, and \$81 billion excluding them.¹⁵ Of this \$81 billion total, \$25 billion is in the hands of macro funds, \$30 billion in the

¹⁵ Other services put forth much larger numbers (as many as 3,000 funds and \$368 billion in assets) based on their conversations with fund managers (and strong assumptions), although they actually gather data for a rather similar number of funds and produce rather similar tabulations of fund capital. As of the end of September 1997, these come to 774 funds and \$81 billion for MarHedge, 1,561 funds and \$189 billion for Hedge Fund Research (HFR), and 1,990 funds and \$146 billion for VanHedge. The larger numbers referred to in the first sentence of this note are extrapolations of reported data. For example, HFR estimates there to exist 3,000 funds (on the basis of its conversations with managers). To gross up their estimates of capital to the \$370 billion range, they therefore essentially multiply reported capital by 3,000/1,100. In addition, it is important to note that the larger estimates sometimes provided for the capital of macro funds erroneously attribute all the capital of, say, the Soros (continued...)

hands of global funds. (Macro funds engage in "top-down" analysis, looking at national macroeconomic and financial variables such as the current account, the inflation rate, and the real exchange rate, while global funds engage in "bottom-up" analysis, investing globally but picking stocks on the basis of individual companies' prospects.)

27. While the approximate nature of these numbers should be emphasized, there is no question that hedge fund capital pales in comparison with capital of other institutional investors such as investment and commercial banks. In the mature markets, the assets of institutional investors exceed \$20 trillion. Moreover, these other institutional investors engage in many of the same practices as hedge funds. This creates doubt that hedge funds can dominate, or corner, particular markets under most circumstances.

28. Table 3 presents returns to hedge fund capital as reported to MarHedge. Macro funds (those making top-down bets on the basis of macroeconomic conditions) stand out: since 1990, on average, returns to this category of hedge funds exceed those on the S&P 500 and the J.P. Morgan Government Bond Index. On average, sectoral funds, event-driven funds (which capitalize on special situations like a possible merger or acquisition), and global funds (which follow bottom-up stock-picking strategies) also outperform the S&P handily since 1990.

29. The volatility of event-driven, global, market-neutral and funds of funds has been less than that of the S&P (Table 3). Sectoral and macro funds, on the other hand, have been more volatile than the S&P, but their returns compare favorably with the S&P after adjusting for risk.¹⁶ Well-known market trends explain variations in returns and in volatility over time: for example, the returns to hedge funds specializing in short sales slumped with the run-up in U.S. equity prices after 1993, while macro funds experienced disappointing returns in 1994 due largely to the bond-market turbulence of that year.¹⁷

30. There are two possible interpretations of why hedge funds produce higher returns than other investment vehicles. One is that hedge funds are simply prepared to assume more risk. The other is that hedge funds can offer more attractive risk-return packages because they are freer than, say, mutual funds to go short as well as long. The data provide at least some support for the second interpretation.

¹⁵(...continued)

Group to the macro category; MarHedge lists seven Soros funds, only three of which fall into this category.

¹⁶Risk-adjusted returns in Table 3 are calculated as the ratio of the average annual compound return divided by the annualized standard deviation.

¹⁷A more in-detail analysis of this episode is provided in Section V.

E. Use of Leverage and Derivatives

31. Some long-established macro funds regard fees on complex derivatives as prohibitive and make little use of them. They see it as possible to take positions in anticipation of large market moves more cost effectively using "plain vanilla" forwards and futures. Some newer macro funds do, however, pursue more specialized trading strategies using at least some complex derivative securities. Relative value funds are even more inclined to use derivatives insofar as their core activity is trolling for mispriced securities, which may themselves be hidden within complex derivatives which combine several underlying assets.

32. Hedge funds obtain leverage by buying securities on margin, putting up collateral, and/or using collateralized borrowing in repo markets.¹⁸ Hence, their use of leverage is correlated with the mix of assets in their portfolios, those arbitraging U.S. Treasury securities typically being more highly levered than those taking long positions in emerging equity markets.¹⁹ In practice, neither hedge funds nor those who provide them credit think in terms of leverage; rather they continuously assess the risk of their portfolios, attempting to predict the drawdown that will come with a 2 or 3 standard deviation market move.

33. This makes it difficult to generalize about hedge funds' use of leverage. VAN Hedge Fund Advisors estimates that 70 percent of hedge funds use leverage but that only 16 percent borrow more than one dollar for every one dollar of capital.²⁰ Macro funds use leverage more aggressively: 83 percent of the macro funds surveyed by VAN acknowledge using leverage,

¹⁸Haircuts (the share of the portfolio that cannot be traded but must be held as collateral) vary with the riskiness of the underlying securities, from 50 percent on equities to 3-10 percent on foreign exchange transactions to 1 percent or 2 percent on U.S. Treasury bonds (Appendix II provides a glossary describing this and other technical terms). Five years ago, when hedge funds were less familiar to the banking community, they were subject to more substantial haircuts. Haircuts have declined as hedge funds have acquired a track record and become more of a known entity. Better-known hedge funds can buy structured derivative products without putting up capital initially but make a succession of premium payments when the market in those securities trades up or down to trigger levels. In addition, some hedge funds negotiate secured credit lines with their banks. (At least one large relative value fund has a large unsecured credit line.) But credit lines being expensive, managers use them mainly to finance calls for additional margin when the market moves against them.

¹⁹This distinction grows less clear with the rise of margin optimization, or cross margining, where closely offsetting positions can be netted to reduce required margin.

²⁰Communication from VAN Hedge Fund Investors, December 5, 1997. Borrowed funds are typically used to take both long and short positions. Thus, figures like those in the text pertain to the sum of long and short positions.

and more than 30 percent borrow more than a dollar for every dollar of capital. Some funds may of course lever their capital many more times than this. Market participants suggest that macro funds lever their capital four to seven times on average.

F. A Look Forward

34. Most market participants see the growth of the hedge fund industry as a normal corollary of financial development. Individual and institutional investors wish to diversify their portfolios with a variety of investments having returns that are not highly correlated.²¹ This suggests that hedge-fund-style investment vehicles are likely to grow more important in the future.

35. This process is ongoing. The existence of a growing client base willing to pay performance fees is inducing entry by independent investment managers, while investment banks and securities houses for their part are setting up hedge-fund look-alikes to take advantage of their brand name. As these branded leveraged funds grow in number and size, the line of demarcation between hedge funds and other institutional investors becomes increasingly difficult to draw.

36. Some commentators suggest that entry and maturation will mean that the super-normal profits that some hedge fund investors have come to expect will be competed away. Hedge funds that offer extraordinary profits will have to assume extraordinary risks. The counter-argument is that because hedge funds are freer than, say, mutual funds to go short as well as long, they may be able to continue offering more attractive risk-return packages.

III. HEDGE FUNDS AND MARKET DYNAMICS

37. This section describes the core principles of the investment strategies of the global macro hedge funds that are most active in currency markets. Building on this analysis, it considers the possibility that hedge funds play a distinctive role in the herd behavior that may sometimes characterize those markets. It analyzes some institution-based arguments for why hedge funds are *less* likely than other institutional investors to engage in positive-feedback trading that amplifies market volatility.

²¹The source of the low correlation between hedge funds' traditional strategy of short selling and the long positions that dominate many investors' bond and equity portfolios will be obvious, but the point is more general. See the background paper on "The Hedge Fund Industry: Structure, Size and Performance" for statistical documentation.

A. Investment Strategies

38. The diversity of investment strategies that is a defining characteristic of the hedge-fund industry applies even within the subcategory of global macro hedge funds that engage in “top-down” country analysis and are most likely to take large positions in currency markets. That said, it is possible to point to several common characteristics of the strategies utilized by managers of these funds.

39. First, managers of global macro funds seek to identify countries where macroeconomic fundamentals are far out of line, so that changes in asset prices (and the associated profits) will be large when they finally occur. Investors are aware that global macro funds assume considerable risk, in return for which they expect considerable returns. Managers therefore have an incentive to identify cases where they anticipate large changes in asset prices.

40. Second, managers are especially attracted to investments where the risk of large capital losses is effectively nil—for example, to an exchange rate that may be devalued but under no circumstances will be revalued. This explains their focus on countries with currency pegs.

41. Third, hedge funds are most likely to take large positions when the cost of funding is low. Cheap funding allows them to take and hold a position even when they are uncertain about the timing of events. For example, they may expect a country to devalue with significant probability but be uncertain about the date. When funding is cheap, they can take and hold a position against that currency without worrying excessively about the cost.

42. Fourth, hedge fund managers are attracted to liquid markets, where they can do large trades at low cost. Having to pay a hundred basis points when putting on a position and another hundred basis points when taking it off can wipe out an otherwise attractive profit opportunity and neutralize the advantages of cheap funding. In emerging markets in particular, limited liquidity and the limited size of accepted deals can constrain the ability of hedge funds and other investors to build up positions. The bank that is the counterparty to such transactions would normally limit their size because of the difficulty of off-loading them.²² Moreover, where the government has capital controls in place or restricts the ability of domestic banks to do business with offshore counterparties, hedge funds may find it more difficult to put on positions than commercial and investment banks which operate both offshore and onshore. Finally, managers are wary of being identified as on the other side of the government or central bank’s transactions for fear of economic retaliation or political retribution. Anonymity is particularly difficult to maintain in smaller, less liquid markets.

²²Breaking the transaction into smaller components with different counterparties is possible but involves additional cost, takes additional time, and creates additional price uncertainty in execution.

B. Herding and Market Dynamics

43. One popular generalization is that hedge funds are nimble and quick off the mark. Their managers have a reputation for astuteness. The rumor that hedge funds are taking a position may thus encourage other investors to follow. Hedge funds' transactions, especially when they are large, will not escape the notice of other investors. Sensitive to the difficulties this can pose for the execution of trades and to possible political repercussions, hedge funds go to considerable lengths to ensure the confidentiality of their transactions, splitting up trades and in some cases signing confidentiality agreements with their counterparties.

44. While hedge fund managers are aware of regulatory measures ("Chinese walls") designed to restrict the flow of information between the desks within commercial or investment banks that serve as counterparties to their transactions on the one hand and the proprietary desks of those same institutions and to other parts of the financial community on the other, they remain concerned that news of their transactions can spread. They make it clear to credit officers and dealers that they will lose the fund's business if information spreads about the fund's activities and positions. Notwithstanding these efforts, however, fund managers generally regard it as naive to think that information never goes further than the sales and credit desks of the counterparties.

45. Hedge fund managers also are concerned about parallel transactions beyond those that might be undertaken by banks' proprietary trading desks. While pension funds, insurance companies, and mutual funds are subject to prudential restrictions on their foreign exchange market positions, they still have some freedom to follow other investors. And the financial assets at their disposal are several orders of magnitude larger than those of hedge funds.

46. For all these reasons, hedge funds can and do sometimes serve as the lead steer when the financial herd begins to move. The recent theoretical literature (surveyed in the appendix) in which foreign exchange markets are characterized by multiple equilibria suggests that such "lead steers" can be important. In these models they can precipitate a crisis in two ways. First, they can themselves undertake a volume of sales sufficient to drive interest rates to levels which the authorities regard as unacceptably high, leading them to abandon a currency peg that they would otherwise be prepared to maintain. Second, they can serve as the leaders who other smaller traders follow. In this case it will be unnecessary for large traders to actually take large positions, only to signal their intention of doing so. This mechanism is consistent with models of herding in foreign exchange markets.

47. That said, there is also reason to be skeptical that hedge funds are always the leaders in market moves. Hedge funds have low overhead; a small staff can mean that they have limited capacity to monitor conditions simultaneously in many markets. Many are consumers rather than producers of information (relying on the publications of, inter alia, the International Monetary Fund). Insofar as other institutional investors have better access to information and more extensive research capability, hedge funds may in turn follow their lead.

48. Systematic evidence on these relationships is scanty. One relevant study is Wei and Kim (1997), who analyze the correlation between the positions taken by large foreign exchange traders (including commercial banks and other financial entities) and subsequent exchange rate changes, finding no evidence of an association. They conclude that this casts doubt on the assumption that large participants like hedge funds have better information about future exchange rate movements or are otherwise better able to predict market moves.

49. Another relevant study is Kodres and Pritsker (1997), who analyze data reported to the Commodity Futures Trading Commission by broker-dealers, commercial banks, foreign banks, hedge funds, insurance companies, mutual funds, pension funds, and savings and loans who take large positions in futures markets.²³ The authors find that herding within their various groups of institutional investors is statistically significant for some but not all futures contracts, but that it explains no more than 13 percent, and in most cases less than 5 percent, of total position changes among large participants. Hedge funds are found to herd among themselves in the S&P 500 index contract and the 3-month Eurodollar contract. Smaller funds were detected as herding with larger ones in the Japanese yen contract and the S&P 500 Index contract.

50. But given that hedge funds are small relative to other investors, it is more important to determine whether those other investors follow the hedge funds' lead. We therefore extended this analysis (as described in Background Chapter 3) to test whether there was a significant tendency for other categories of investors to take the same positions as hedge funds in the current or immediately subsequent period. Here the evidence is mixed or actually negative. There is in fact a negative correlation between the positions of hedge funds and the positions of other institutional traders in the same period, and there is little correlation between the positions of hedge funds in the immediate past period and the current positions of other traders.²⁴ There is little evidence here, in other words, that hedge funds play a singular role in herding in financial markets.

²³These reports are made under the provisions of the Large Trader Reporting System, described below. Kodres and Pritsker's results need to be treated with caution, especially insofar as institutional investors (including hedge funds) in currency markets tend to transact in forward and spot rather than futures markets.

²⁴If these data provided a complete picture of the relevant markets, or even accounted for a large segment thereof, one would expect a negative correlation, since, if some traders go short, others must go long. In fact, however, positions reported under the provisions of these Large Trader Reporting Systems account for only a fraction of the total positions outstanding. These results do, however, support the view, represented above, that hedge funds follow contrarian trading strategies.

C. Feedback Trading

51. While hedge funds have the flexibility to take short positions, they can also be the first to take long positions in currencies which have depreciated in the wake of a speculative attack, providing much needed liquidity to illiquid markets and helping the currency to establish a bottom. The expectation on the part of their clients that hedge funds will make above-normal returns will, other things equal, discourage managers from buying the same assets being purchased by other investors or shorting the same assets being unloaded by other investors, since the prices of those assets will already reflect moves by others.

52. Thus, while managers of global macro funds search for fundamentally overvalued currencies against which to go short, they also search for currencies that have recently depreciated and are trading for prices lower than warranted by fundamentals with the goal of buying them on the rebound. In this sense they can function as “stabilizing speculators.”

53. There is some evidence consistent with this view.²⁵ Kodres and Pritsker, in the aforementioned study, find that hedge funds, and large hedge funds in particular, tend to negative feedback trade—that is, their current position changes depend negatively on past price changes. They buy when prices fall and sell when prices rise, which, other things equal, should stabilize the markets.

54. There are two reasons to think that hedge funds may be less inclined than other investors toward “positive feedback” trading strategies that amplify market moves. First, hedge funds, unlike mutual funds, are not bound by their prospectuses to invest inflows of funds in the same manner as existing capital. A mutual fund that enjoys high returns may attract new investors and be bound by its prospectus to buy more of the recently appreciated asset; hedge funds have more flexibility.²⁶

55. Second, other institutional investors may be forced to liquidate declining positions—to sell into a falling market. Other institutional investors may be forced to cut their losses by their internal controls. A mutual fund that makes losses may suffer withdrawals. A mutual fund manager who allows losses to mount in anticipation of a subsequent reversal may find himself

²⁵In Section 5 we mention reports that hedge funds acted this way in the market for the Indonesian rupiah, taking long positions once it had fallen to 5,100 against the dollar in the view that it had depreciated excessively. Fung and Hsieh (1997) similarly conclude that hedge funds follow very different investment strategies than mutual funds.

²⁶The severity of this constraint will vary with the prospectus of the particular mutual fund. Some funds commit to specializing in country- or region-specific investments, while others leave themselves free to reallocate capital across countries or regions in response to changing investment opportunities. In addition, the SEC requires mutual funds that use options, futures, forwards and short sales to cover their positions.

a former mutual fund manager before that reversal takes place, creating an understandable reluctance to let the position ride. Hedge funds are better able to ride out these fluctuations because their investors are locked in for substantial periods and because some have credit lines on which they can draw when asked to put up additional margin or collateral.

IV. SUPERVISION AND REGULATION

56. Regulations affecting collective investment vehicles such as hedge funds fall under three headings: those motivated by issues of investor protection, those related to issues of market integrity, and those related to issues of systemic risk.

57. The first category of regulation focuses on ensuring that small investors receive adequate information about the risks of their investments. But since participation in hedge funds tends to be limited to high-wealth individuals and institutions, hedge funds are generally exempt from regulations promulgated on these grounds. Regulations covering issues of market integrity are designed to ensure a level playing field for all market participants. Typically, these regulations (e.g. insider trading restrictions, position limits, order execution priorities, restrictions on the ability to "corner" or "squeeze" a market, and so on) apply to all participants including hedge funds. Most transaction and large position reporting requirements serve to both protect the integrity of markets, by assuring all participants that those with undue influence in particular markets will be observed (and reprimanded) by authorities, as well as to monitor systemic risk. Systemic risk is also limited by prudential regulations on large institutions, typically banks, brokers, and other financial intermediaries, that are designed to ensure they are adequately monitoring and managing their exposure to counterparties and not extending credit imprudently. Hedge funds are included among the relevant counterparties, and regulators seem generally satisfied that they pose no special problems of systemic risk.

A. Investor Protection

58. To date, hedge funds have been established in a manner that has generally satisfied regulators that there are no investor protection-grounds for more intensive regulation. In the United States, hedge funds are exempt from most investor-protection regulation if they accept investments only from accredited investors consisting of institutional investors, companies, or high net worth individuals who can "fend for themselves."²⁷ They offer their securities as a

²⁷Under the provisions of the Securities Act, an accredited investor is defined to include, inter alia, an individual (with spouse) with net worth of \$1 million or any individual with income of \$200,000 in each of the two most recent years or joint income with his/her spouse in excess of \$300,000 in each of these years, and who has a reasonable expectation of earning a like

(continued...)

private placement—on an individual basis rather than through broader advertizing. So long as they do so, most hedge funds do not have to register as securities issuers or publicly disclose their financial performance and asset positions.²⁸

59. This does not free hedge funds from all reporting requirements. They must still provide investors with all material information about their securities and activities through an offering memorandum and regularly audited financial statements thereafter. They are subject to statutes governing fraud and other criminal activities.²⁹

60. Hedge funds that participate in exchange-traded derivative markets have to comply with regulations requiring registration, regulatory disclosure, and record keeping. In the United States, the Commodity Exchange Act requires commodity pool operators (investment trusts, syndicates or similar enterprises that trade in any commodity on futures or options markets) to register, provide information on their historical performance, file an annual report, and supply investors with periodic account statements and certified annual reports. They must maintain detailed records for inspection by the U.S. Commodity Futures Trading Commission (CFTC) and the Department of Justice, in many cases for every transaction. Offshore funds, to the extent that they operate in U.S. futures markets or are managed by commodity pool operators based in the United States, are subject to these requirements. Exemptions are granted to small commodity pools (in general, with gross capital contributions under US\$200,000) run by family members or as informal clubs.

61. In the United Kingdom, to qualify as an “unregulated scheme” free of some of the restrictions placed on unit trusts (regarding, inter alia, short selling and the use of leverage), hedge funds cannot advertise or otherwise solicit investments from the general public. Again, however, this does not free them from all regulation. They are still subject to the self-regulating-organization rules promulgated by the Investment Management Regulatory Organization (IMRO), which require periodic accounting statements, and disclosure of

²⁷(...continued)

amount in the current year. A nonaccredited investor is any person not meeting these income and net worth standards.

²⁸While a private placement could in principle be made to 35 or fewer nonaccredited investors, nonaccredited investors would then have to be provided with essentially the same information that would have been provided had the offering been registered rather than private. For this reason, hedge funds do not in general accept funds from nonaccredited investors.

²⁹In addition, most hedge funds make use of the “trader” exemption from the Securities Exchange Act that requires broker-dealers to maintain an extensive set of records and customer transactions and file detailed financial reports with the SEC, among other conditions. This exemption is available to entities that trade securities solely for their own account and do not carry on a public securities business.

information about management and asset valuation. IMRO also verifies whether the unregulated scheme in fact has disclosed the information promised in its customer contract. More relaxed standards are applied to funds whose shareholders are "nonprivate customers," a category roughly equivalent to high net worth individuals in the United States. Even in these cases, however, IMRO is required to verify that the fund has adequate control of customer money, that managers are "fit and proper," and that there is an absence of fraud.

B. Disclosure of Activities with Implications for Market Integrity

62. A second category of regulation is designed to allow officials to ascertain when individual participants are attempting to dominate or manipulate markets. While hedge funds' private partnership status and offshore domicile free them of many of the other reporting requirements that apply to entities making public offerings of their securities, they are still subject to these transaction and position reporting requirements in the United Kingdom and United States.

63. In the United States, hedge funds are subject to the reporting system for large foreign currency positions administered by the Federal Reserve System on behalf of the Treasury Department.³⁰ Reports must be filed weekly and monthly throughout the calendar year on positions in each of five currencies (the British pound, Canadian dollar, German deutschmark, Swiss franc, and Japanese yen) by market participants with more than \$50 billion equivalent in foreign exchange contracts on the last business day of any calendar quarter during the previous year.³¹ Quarterly reports are required of participants who had more than US\$1 billion in foreign exchange contracts outstanding at the end of any quarter in the last year. U.S.-based institutions file a consolidated statement for domestic and foreign branches and subsidiaries, while U.S.-based subsidiaries and branches of foreign entities file individually or on a U.S. consolidated basis and not for the foreign parent.

³⁰ As far as we are aware, large exposure or position monitoring encompassing *all* large participants, including those outside bank, broker, or investment bank intermediaries, in the over-the-counter foreign exchange market only exists in the United States. In many countries, large foreign exchange transactions, typically denominated in the home currency, are reported to authorities. These types of reporting arrangements are rooted in recent attempts to limit money laundering or in the ongoing enforcement of capital controls.

³¹ Such contracts include the amounts of foreign exchange spot contracts bought and sold, foreign exchange forward contracts bought and sold, foreign exchange futures bought and sold, and one half the notional amount of foreign exchange options bought and sold. Exemptions from monthly and weekly reporting are available to banking institutions that file certain other reports.

64. In the United States, the Treasury's Large Position Reporting system for government securities tracks participants with large positions in to-be-issued and recently issued securities. Such information enables the Treasury to ensure that large players are not squeezing other market participants. The Large Option Position Reporting systems instituted by many options exchanges track net changes in large positions and detect "excessive" short uncovered options positions. Also, the Securities Exchange Act requires large institutional investment managers having accounts totaling more than US\$100 million in exchange-traded and NASDAQ-quoted securities to file a quarterly report with the SEC on their holding.

65. In futures markets, CFTC similarly requires reporting of all futures positions above certain thresholds.³² It has broad inspection powers concerning the details of all large transactions, positions, inventories and commitments, as well as the names and addresses of all entities involved. Traders are required to keep complete records on all reportable futures positions, which can be inspected by the CFTC and the U.S. Department of Justice.

66. CFTC rules limit the speculative positions that can be taken by participants in specific commodity futures markets.³³ Exemptions are available only if the participant can show that it has risks associated with cash positions or that it is engaged in arbitrage. (In some markets, such as the U.S. Treasury bond market, the foreign exchange market, and precious metals futures market, position limits have been replaced by position accountability rules under which

³²In its case, on a daily basis. Central clearing and trading facilities associated with futures exchanges make such reporting relatively easy to conduct. A recent survey of the 13 countries that participated in the London Commodity Futures Market Conference in June 1997 in the wake of the Sumitomo Bank copper losses revealed that position information by customer or individual trader is collected on the futures exchanges of Brazil, Canada, Hungary, Japan, the Netherlands, Singapore, the United Kingdom, and the United States. Another source, the *International Regulation of Derivative Markets, Products and Financial Intermediaries* (September 1997) produced by the International Organization of Securities Commissions (IOSCO), additionally reports that Malaysia and Hong Kong also require position reporting. Other countries (for example, France, Germany, Italy, and South Africa) do not routinely collect futures position information at the level of the customer, but can obtain information from their trading systems to monitor the positions of clearing members. In addition, nearly all countries' regulators are permitted by law to call for additional information to maintain the integrity and efficient functioning of their markets, including the beneficial owner of positions.

³³The CFTC specifies the position limits for agricultural commodities (corn, cotton, oats, soybean, wheat), while those in other contracts are specified by the exchanges and approved by the CFTC. Limits for futures contracts on agricultural commodities traded on different exchanges are specified for the "spot month," each separate futures trading month other than the spot month, and the sum of all futures trading months including the spot month—for example, as of March 31, 1994 these limits for corn futures traded on the Chicago Board of Trade are 3, 17, and 30 million bushels, respectively.

the exchange may request information on the position from the trader at any time.) Finally, the CFTC has the authority to take emergency action if it suspects manipulation or cornering of a market.

67. To reinforce CFTC surveillance, the futures exchanges have their own systems for identifying large traders and limiting positions and credit risk exposures through margin requirements. The Chicago Mercantile Exchange, for example, requires reports from traders with more than one hundred S&P 500 contracts. U.S. options exchange also have large position reporting systems, which apply to options written on individual equities as well as equity index products.³⁴

68. In the United Kingdom, the other main market in which a large number of hedge funds are located, there are transaction reporting requirements for futures and commodity exchanges but not for equity, bond and foreign exchange markets. Laws with general application to U.K. markets and the investment business also apply to hedge funds. These include: the laws on insider dealing and market manipulation in the Criminal Justice Act 1993 and the Financial Services Act 1986; the law in the Companies Act 1985 pertaining to disclosure of interests in company shares that requires the disclosure of any interest of three per cent and each percentage point thereafter; the Takeover Code and the jurisdiction of the Panel of Takeovers and Mergers if acquiring a UK public company.

C. Systemic Risk Management

69. A third class of regulations is designed to protect against imprudent extensions of credit with the potential to damage the financial system. It includes margin requirements, collateral requirements, and limits on exposure to individual counterparties. These regulations affect hedge funds' business with banks, brokers and other counterparties.

70. Regulators in the United States and the United Kingdom, the countries in which banks and brokers are most active as counterparties and creditors to hedge funds, seem generally satisfied that these institutions are adequately managing their exposure to hedge funds, which therefore pose no special problems of systemic risk.

³⁴ To date, however, such large trader reporting requirements have not been extended to over-the-counter (OTC) trading in derivative products, nor is it clear how this might be done. Moreover while there are some foreign exchange futures contracts covered by futures large trader reporting requirements, the amount of volume is somewhat limited compared to spot and forward contracts executed in the over-the-counter market. Thus, position reporting in futures markets does not substitute for large position reporting in the broader foreign exchange market.

71. Market intermediaries are insulated from customer defaults by margin requirements on securities trading imposed by the Federal Reserve Board and the stock exchanges themselves. Most borrowings are collateralized and the amount of the such collateral is determined by the market risk associated with the investments. Typically, the extension of credit to large institutional investors by broker-dealers is overseen by internal credit committees, whose approval is required for transactions above certain thresholds.

72. In order to manage the credit risks associated with lending to hedge funds, prime brokers and banks mark to market daily their positions vis-à-vis hedge funds, request daily payments, and collateralize their lending when appropriate. They continuously monitor the funds' investment strategies, monthly returns, and investor withdrawals. Based on the results of this monitoring and the length of their relationship with each fund, creditor banks and brokers establish limits on their credit exposure to each fund.

V. HEDGE FUNDS AND RECENT CRISES

73. This section reviews what is known about hedge funds' activities in recent episodes of market turbulence, with particular attention to emerging markets in 1997. It builds upon previous staff analyses and on discussions with market participants.

A. The 1992 ERM Crisis

74. The 1992 ERM crisis is the episode where hedge funds are most frequently cited as having played an important role.³⁵ The prologue was the flow of capital into high-yielding ERM currencies between 1987 and 1991 in what was known as the "convergence play." This was a trend in which hedge funds participated. The critical ingredients were cheap funding (in Deutsche marks, among other currencies), attractive yields in countries like Italy, and the belief that exchange rates, having been credibly pegged, were unlikely to move against investors sufficiently to offset the interest differential.

75. But starting in 1992, competitiveness problems cast into doubt the assumptions underlying the convergence play. Italy's multilateral relative unit labor costs rose strongly, by some 20 per cent, in the 16 quarters leading up to the crisis. Worries that the lira was overvalued were heightened by the country's deteriorating current account and weakening business profitability. Sterling appreciated strongly in the period preceding the United Kingdom's 1990 entry into the Exchange Rate Mechanism of the European Monetary System, creating comparable worries of overvaluation, and the current account deficit widened in 1992. Finland and Sweden suffered massive external shocks due to the collapse of their Soviet

³⁵This discussion draws on Chapters III and IV of *International Capital Markets: Part I. Exchange Rate Management and International Capital Flows* (April 1993).

trade. On top of this, Denmark's rejection of the Maastricht Treaty in its June 1992 referendum cast into doubt the priority European countries attached to their currency pegs.

76. All this meant that countries for which the convergence trade had been a source of funding for their current account deficits now found it more difficult to obtain external finance. And that in turn implied that the exchange rate stability upon which the convergence trade was predicated might prove an illusion. Seen from this perspective, the decline of the U.S. dollar (which fell by 17 percent against the DM between mid-March and early September, further eroding European competitiveness) and the 75 basis point increase in the Bundesbank's official discount rate on July 16th (which increased the cost of funding) were only the final nails in the coffin.

77. Hedge funds were early to recognize the significance of these trends and position themselves accordingly.³⁶ They participated--although they were far from the only players--in the build-up of long positions in the heyday of the convergence play. They participated--although they were again far from the only players--when investors unwound these long positions, and they were among the first to begin shorting European currencies. They entered into over-the-counter forward sale contracts of European currencies with banks in anticipation of being able to buy back those currencies at lower prices after their realignment. The banks covered their positions by selling an equivalent amount of the currency on the spot market and entering into currency swaps of the same maturity as the forward contracts to cover the foreign exchange maturity mismatch.³⁷

78. How large were these transactions? The short answer is that no one knows. One well-known macro fund which accounted for about 15 per cent of hedge fund capital reportedly was able to use collateral and margining to fund a \$10 billion short position in sterling. But other macro funds did not make equally aggressive use of leverage to short sterling.³⁸ Hedge

³⁶See the April 1993 *International Capital Markets Report*.

³⁷Because those transactions were generally undertaken with other banks, the initial forward sale typically set in motion a chain of subsequent transactions until the initial position was distributed among a number of investment banks and other investors willing to hold it. The circle was closed when the hedge fund purchased the currencies previously sold short in the spot market at the time the forward contract expired.

³⁸In Congressional testimony, George Soros, who managed this fund, estimated that it accounted for about 15 percent of the hedge fund industry at the time but that it was more active in currencies than the typical hedge fund. United States Congress (1994), p.44.

funds as a group are also reported to have made profits taking short positions in the forward foreign exchange market in Italian lira.³⁹

79. Thus, if hedge funds played a precipitating role in the crisis, they did so by acting as market leaders that other institutional investors followed. Their actions in 1992 "to position themselves favorably for possible exchange rate realignments in the ERM apparently served as a signal for other institutional funds managers to re-examine their own...positions," in the words of the 1993 *Capital Markets Report*. "Thus, although hedge funds have less than \$10 billion (sic) in capital, their potential influence on forex markets [was] larger."⁴⁰ But mutual funds, pension funds, insurance companies, and nonfinancial corporations provided the "real financial muscle," pension funds, insurance companies, and mutual funds in Canada, Germany, Japan, the United Kingdom and the United States alone having had more than \$11 trillion under management.⁴¹

B. Bond Market Turbulence in 1994

80. Hedge funds, proprietary traders at banks and securities houses, and institutional investors were again viewed as playing a significant role in the bond-market turbulence of 1994. Hedge fund capital had increased significantly—doubling by some estimates—in the second half of 1993 as high-income investors searched for yield in the prevailing low-interest rate environment. While they were far from the only investors to take such positions, hedge funds led the march back into European bonds—especially high-yielding bonds—once calm returned to foreign exchange markets in the second half of the year.⁴² The widening of ERM margins from 2¼ percent to 15 percent in August encouraged the belief that European interest rates would fall on the grounds that authorities wishing to stimulate economic activity now had more room to cut interest rates.⁴³ Managers funded their European bond positions in yen,

³⁹On the other hand, they were widely reported to have lost money on currencies which were devalued later, such as the Spanish peseta. Again, see *International Capital Markets Report* (April 1993).

⁴⁰*International Capital Markets: Part I. Exchange Rate Management and International Capital Flows* (April 1993), p.11.

⁴¹Some \$7 trillion of which was controlled by U.S. institutional investors.

⁴²For discussion of this topic see the *International Capital Markets* (September 1994).

⁴³Given that recovery was slower to get underway in Europe than the United States, it was expected that European central banks would be quicker to capitalize on the opportunity. Similarly, the depressed state of the Japanese economy implied lower interest rates there than
(continued...)

capitalizing on the low level of interest rates in Japan. With interest differentials seen as increasingly favoring dollar-denominated fixed income assets, they went long on the dollar and shorted the yen and the deutsche mark.

81. In the event, expectations of falling European interest rates were disappointed by two 25 basis point increases in U.S. rates, in February and March 1994 (reflecting the strength of the American economy), the stabilization of Japanese rates (reflecting the buoyancy of equity markets there), and a decision by the Bundesbank Council not to lower official rates on February 17th. Bond yields rose sharply throughout the mature markets from 50 to more than 150 basis points between February 3rd and March 30th, as hedge funds and other investors scrambled to close out their long positions.

82. But hedge funds as a group did not make large profits on these market movements. To the contrary: having placed large bets that interest rates would decline, they suffered heavy losses when this did not occur. Indeed, although they made double-digit rates of return in 1993, most categories of hedge funds lost money in 1994.

C. The 1994–95 Mexican Crisis

83. Hedge funds played a limited role in the next episode of financial-market turbulence, the Mexican crisis of 1994–95. Studies concluded that domestic residents and not international investors played the leading role in the crisis.⁴⁴ In a world of globalized financial markets, they concluded, foreign investors managing internationally diversified portfolios may find it difficult to keep abreast of conditions in a myriad of countries. The smaller the emerging market, the less the incentive for large investors to do so. Consequently, domestic residents with a comparative advantage in accessing and processing the relevant information may be first to take a position against a currency peg. And the deregulation of domestic financial markets and international financial transactions, which long inhibited position-taking by domestic residents, makes it easier for them to do so.⁴⁵

84. The structural characteristics of developing countries' financial markets may have prevented hedge funds and other international investors from playing a large role in the

⁴³(...continued)
in the United States.

⁴⁴ Frankel and Schmukler (1995). See also *International Capital Markets* (1995).

⁴⁵As Frankel and Schmukler (1996) note, the fact that the Mexican Bolsa, on which transactions by Mexican residents dominate, responded more quickly than closed-end mutual funds, through which foreigners invest in the Mexican market, is consistent with this view.

1994–95 currency crises.⁴⁶ In Mexico as in other emerging markets, hedge funds and proprietary traders were prevented from borrowing the domestic currency from domestic banks against a small margin in order to sell it forward, reflecting moral suasion by the authorities and restrictions on capital account convertibility. Even where they might have been able to borrow the domestic currency, they worried about the ability of their domestic counterparties to deliver on the forward contract due to prospective capital controls and possible bankruptcies of the counterparties.

D. Interim Summary

85. Several regularities emerge from this review of earlier episodes. First, while hedge funds sometimes take sizeable positions, so do banks, corporates, and institutional investors, all of whom manage assets many times larger than those of the hedge funds. Second, while there is some evidence, especially for 1992, that hedge funds can be early to take positions against shaky currency pegs, in most cases that evidence is only anecdotal. Third, although hedge funds made substantial profits betting on changes in macroeconomic variables in 1992, they did not make money on all their forward foreign exchange market positions in that year, and they made substantial losses from such bets in 1994. Their forecasts are not infallible, nor does emulating their positions guarantee profits. Fourth, hedge funds worry about the liquidity and the risk of their positions, not just about the return, and are less inclined to take large positions in small, relatively illiquid markets.

E. The 1997 Crisis in Emerging Markets

86. The process leading up to the current crisis extends back some years. The story of the current crisis begins with the markets' enthusiasm for the fixed-income debt of emerging economies, in particular of high-growth East Asia, starting with Malaysia and then extending to Indonesia, Thailand and other countries. Hedge funds were initially long in these markets.⁴⁷ Their positions were paralleled by those of other institutional investors, including commercial and investment banks who built up the largest books in the carry trade.

87. International investors were encouraged to establish and maintain these positions in, but not limited to fixed-income markets, by low interest rates in the major financial centers. They funded themselves in industrial-country markets and invested in East Asia. The ample credit of which they made use reflected the low level of interest rates in Japan and the United

⁴⁶*International Capital Markets* (1995), p.7.

⁴⁷From 1991-2 in the case of Malaysia and 1993 in the case of Thailand and Indonesia. At least one prominent macro fund went short in Asian equities (including but not limited to Japanese banks), but it was the exception, not the rule.

States.⁴⁸ Using low-cost funding to buy high-yielding East Asian fixed-income securities was attractive so long as East Asian exchange rates did not move. In the case of Thailand, in 18 of the 20 quarters through 1997-II this carry trade was profitable, the pegged exchange rate ruling out large exchange-rate surprises. (See Figures 1-2 and Table 5; for details, see Box 1.) Hedge funds participated in this build-up, although they were not dominant players in the carry trade, in which commercial banks, investment banks, pension funds, mutual funds and other institutional investors all participated.

88. Notwithstanding the baht's stability, a growing number of investors began to worry that the period of financial stability might be drawing to a close. The first episode of pressure on the currency was in July 1996, following the collapse of the Bangkok Bank of Commerce and the central bank's injection of liquidity to support the financial system. The second episode was in early 1997, following the release in January of disappointing fiscal and export performance data.⁴⁹ International investors who were important players in the carry trade began closing out their positions. At this stage, the liquidation of long positions in Thai securities by domestic corporates and banks, proprietary trading desks of commercial and investment banks, treasuries and foreign exchange desks of the major money center banks, mutual funds, hedge funds and retail investors was probably more important than short sales in weakening the baht.⁵⁰

⁴⁸Revealingly, the genesis of the Asian carry trade, starting with Malaysia in 1991-2, coincided with the Federal Reserve's policy of keeping interest rates low so as to promote the recovery of the U.S. economy from the early-1990s recession.

⁴⁹Hanbo's collapse in January 1997 also may have been important for changing investors' perceptions of Asian economic and financial prospects.

⁵⁰Too sharp a distinction should not be drawn, however, between investors who closed out their long positions and those who shorted the baht; both actions were logical responses to the perceived rise in currency risk. Nor should those who shorted the baht in the forward foreign exchange market be regarded as more actively speculating against Thai financial markets: some of those who shorted the currency in the forward market did so in order to hedge the currency risk to which they were exposed as a result of their desire to maintain long positions in equity and fixed income markets.

Box 1. The Asian Carry Trade

International commercial and investment banks were heavily involved in dollar and yen carry trades in Asia beginning in 1992. One technique was to borrow on the interbank market in dollars and yen, to convert the proceeds into local currency, and to on-lend on the local currency short-term interbank market. At the end of the loan period, principal and interest were converted back into dollars or yen, closing out the interbank loan. An alternative was for banks and other institutional investors to borrow in the dollar or yen short-term debt market (through, for example, a treasury term repo agreement), to convert the proceeds into local currency, and to hold a time deposit. A final technique was to utilize the money markets; international investors issued money market securities in mature markets and invested the proceeds in local-currency-denominated money market instruments (promissory notes, bankers' acceptances, and other short term corporate or government paper). And, of course, hybrids of these three techniques were also used.

Data for the Thai baht confirm that all three techniques were profitable for an extended period. Returns computed using the interbank market (subtracting from the interest-rate differential the realized change in the exchange rate over the holding period) suggest that in 18 of the 20 quarters up to mid-1997 the carry trade generated a higher spread than investing in the mature markets (Figure 1). The returns on the yen carry trade were profitable in 13 of these 20 quarters, showing greater variability due to volatility in the yen exchange rate (Figure 2). Carry trades using term repos and Thai time deposits tell a similar story.

The effects of speculative pressure in the period leading up to the crisis, as well as the authorities' response, are evident in the limited time series available on the local money market instruments series for Thailand (Table 4). Although returns on dollar carry trades were substantial in the second quarter of 1997 because the squeeze applied at the time of the speculative attack raised yields while not allowing the baht-dollar exchange rate to move, returns to both carry trades turned sharply negative with the depreciation of the baht in the third quarter.

89. The carry trade was then further disturbed by changes in global financial conditions. There were increases in interest rates in the United Kingdom and Germany in the spring of 1997. Japanese long rates ticked up from 2 percent to 2½ percent when the outlook for the Japanese economy appeared to brighten after March, and short rates firmed with talk that the Bank of Japan might raise rates by the end of the year. Perhaps most important was the appreciation of the dollar against the yen, which undermined the competitiveness of Asian economies in whose basket pegs the dollar had the heaviest weight. For all these reasons it became less attractive to borrow in the United States, Europe and Japan to hold positions in, inter alia, Thailand.

90. But the main factors to which international investors pointed as the rationale for these portfolio shifts were problems with Thai fundamentals. Those who anticipated a devaluation had a further incentive to sell the baht forward. While they saw devaluation coming, however, they were uncertain about its timing. But the probability of currency appreciation was negligible; portfolio managers perceived the existence of a one-way bet, which encouraged them to maintain their positions.

91. Hedge funds' forward sales of baht are impossible to estimate precisely. Of the Bank of Thailand's \$28 billion forward book at the end of July, approximately \$7 billion is thought by market participants to represent transactions taken directly with hedge funds. Hedge funds may have also sold the baht forward through offshore counterparties, onshore foreign banks, and onshore domestic banks, which then off-loaded their positions to the central bank. There is no way of breaking out the magnitude of these transactions.

92. Although they apparently sold some long-dated forward contracts on the baht in February, the bulk of hedge funds' forward sales to the Bank of Thailand appears to have occurred only in May at the tail end of the process. If herd behavior contributed to the crisis, then the hedge funds were at the rear, not the front, of the herd, which appears to have been led by domestic corporates, domestic banks, and international commercial and investment banks.⁵¹

93. After July 2nd, corporates with unhedged foreign-currency exposure rushed for foreign-exchange cover, fueling the currency's depreciation. These domestic entities entering the period with unhedged foreign-currency liabilities appear to have played a larger role than hedge funds in the baht's continued decline.

⁵¹Hedge funds also appear to have closed out their positions soon after the initial depreciation of the baht.

94. The baht is the only Asian currency for which the hedge funds collectively took significant short positions, in the view of market participants.⁵² They appear to have been surprised by the extent of the contagion, managers not having seen comparable problems with fundamentals in other countries. Many of them were therefore taken off guard by the sharp movement of other Asian currencies. Van Hedge Fund Advisors estimates that offshore hedge funds lost 7 percent of their value in August, due largely to the decline of emerging stock markets. According to market participants, the main entities taking short positions in Indonesia, Malaysia, and the Philippines were money-center commercial banks and investment banks and in some cases domestic investors, who were better able to short due to their superior access to interbroker markets and domestic credit.

95. Besides the Thai baht, the one other significant build-up of hedge fund positions was on the Indonesian rupiah. Most of these were in fact long positions taken after the initial depreciation, reflecting the view that the rupiah had overshot and the expectation that it would soon recover. Domestic banks and corporates not only had incurred large amounts of external debt but had sold options against the rupiah's depreciation, using the premiums as a source of income. International banks may have had knowledge of domestic banks' and firms' off-balance sheet exposure, having been the counterparties to the latter's sales of options. They were aware of that if the rupiah began to depreciate these entities would rush to hedge their exposure. These anticipations precipitated foreign investor flows out of the currency, led by the international commercial and investment banks, but accompanied by little if any activity on the part of the hedge funds. Indonesian banks and corporates changed sides following the widening of the band, as they attempted to hedge their external debts and options positions. The hedge funds are reported to have come in later, on the view that the rupiah had overshot, going long.

96. It appears that only a few hedge funds took modest positions on the Malaysian ringgit. None appears to have "ridden" the ringgit for any substantial range of its fall from 2.5 to 3.5 ringgit per U.S. dollar. Reflecting their holdings of Malaysian equities, many hedge funds incurred losses from the ringgit's depreciation. The initial pressure on the currency appears to have emanated from institutional investors closing out long equity positions, reflecting their concern that the stock market was overvalued, rather than a buildup of speculative short positions reflecting concerns about the sustainability of the external debt and the state of the domestic banking system.⁵³

⁵²Systematic evidence for this view is found in Chapter 1 of the hedge fund background paper, which shows extraordinary returns to several large macro funds in the month of the Thai baht's devaluation but not during the subsequent period of generalized turbulence.

⁵³Foreign borrowing by domestic corporates is limited to those entities perceived as being naturally hedged (such as exporters) or for infrastructure projects.

97. There are no indications that hedge funds took significant positions against the Philippine peso. The limited "on-balance sheet" channels available for shorting the currency suggest that it was primarily domestic banks and international commercial and investment banks with onshore operations took positions in expectation of depreciation.⁵⁴

98. While international investors, including but not limited to hedge funds, claim to have felt for some time that fundamentals warranted taking short positions against the Korean won, there were few avenues for doing so, either on- or off-balance sheet. There are few signs of a buildup in such positions in the period leading up to the currency's sharp decline. As the crisis built, outflows were still inhibited by the costs to foreign investors of liquidating long equity positions. In this case, the predominant source of pressure on the currency appears to have come from domestic entities.

VI. STAFF APPRAISAL

99. This staff appraisal covers two areas: the implications of the crisis, and policy options in light of the activities of hedge funds.

A. Implications of the Crisis

100. There are suggestive parallels between the recent crisis and the ERM crisis of 1992. In 1992 international investors were attracted into European securities by high European interest rates, ample cheap funding, and the mirage of pegged exchange rates, just as the combination of high interest rates, cheap funding and the mirage of pegged exchange rates more recently attracted money into Asia. In 1992 it was called the "convergence play" rather than the "carry trade," but the phenomenon was fundamentally the same. In 1992, the process was disrupted by the build-up of competitiveness problems, and the reversal of opinion was catalyzed by a depreciating U.S. dollar which reinforced the declining competitiveness of the European economies, and by rising interest rates which made funding more expensive. In 1997, carry trades were wound down in response to the perception that Thailand in particular was suffering from mounting competitiveness problems. This time the reversal of opinion was catalyzed by an appreciating dollar which made Asian economies less competitive and a small but significant rise in European and Japanese interest rates.

101. A difference between 1992 and 1997 is the role of the hedge funds. For 1992 there is wide agreement that hedge funds were early to recognize the possibility that exchange-rate

⁵⁴"On-balance sheet" channels refer to the use of domestic currency credit which, when converted into foreign currency, create a short position on the local currency. The use of forward or swaps to go short on a currency are often referred to as "off-balance sheet" since this is where such transactions are typically recorded.

pegs might not be sustained and that the positions they took to avail themselves of this possibility provided the signal for other investors to follow. In 1997 it is much less clear that hedge funds were earlier than other investors to take short positions against Asian currencies and that their trades were a signal for other investors to follow, rather than vice versa. Hedge funds had large short positions on the Thai baht, but not on Asian currencies in general, and even in Thailand they were not obviously earlier than other international investors in building those positions. Compared to international banks, hedge funds have less staff on the ground; the smaller an economy, the less likely they are to devote their limited analytical resources to investment opportunities in its market, and the more likely they are to follow rather than lead other investors. The fact that hedge funds appear to have followed rather than led other investors in Mexico in 1994-95 is consistent with this view.

102. Two fundamental differences distinguish the recent Asian crisis from both Europe and Mexico. First, because in this recent episode the authorities used controls and moral suasion to limit the ability of offshore counterparties to borrow domestic currency and securities from onshore banks, those investors with the best access to the domestic broker market, such as investment banks and domestic banks and corporates, were in a position to act as market leaders. Second, and closely related, investment banks have dramatically expanded their operations in emerging markets compared to even three years ago. Both facts point to the likelihood that other institutional investors, and not merely hedge funds, were major participants in 1997.

103. Finally, the 1997 crisis, like the bond market turbulence of 1994, reminds us that hedge funds' market bets are not always right; they lose as well as make money. In 1994 they bet on a decline in industrial-country interest rates and suffered losses when interest rates unexpectedly rose. In 1997 they anticipated the depreciation of the Thai baht and made profits on short positions in forward currency contracts but appear to have been taken off guard by the virulence of the contagion, incurring substantial losses on balance from their positions in other Asian financial markets.

B. Policy Options

104. As noted in Section IV, regulation of collective investment vehicles can be justified on three grounds: investor protection, systemic risk management, and market integrity. Few regulators, particularly in the United States and the United Kingdom, the leading markets where hedge funds operate, see a need for additional regulation on investor-protection or systemic-risk grounds.⁵⁵

⁵⁵As noted above, they feel that banks are adequately managing their credit exposure to hedge funds, and that investor protection is dealt with by provisions that limit participation in hedge funds to high-wealth individuals. Of course, one could question whether large investors should
(continued...)

105. This leaves market integrity. The concern here is that hedge funds, with at least \$80 billion of capital, and macro hedge funds, with at least \$25 billion of capital, can dominate or manipulate markets. (In the case of the foreign exchange market, the concern that individual traders should not dominate or manipulate the market reflects the authorities' desire for autonomy for the conduct of macroeconomic policy and insulation from market pressures.) But those markets are also inhabited by a large number of other participants. Even accounting for leverage, the positions that can be taken by hedge funds pale in comparison with the position-taking capacity of mutual funds, pension funds, insurance companies, and the proprietary trading desks of investment and commercial banks. Whether they manage hedge funds, compete with hedge funds, serve as counterparties to hedge funds, provide credit to hedge funds, or surveil hedge funds from official quarters, many observers are skeptical that hedge funds are large enough to dominate markets.

106. That said, options exist for rendering hedge-fund operations more transparent and of further assuring officials that hedge funds are not dominating or manipulating markets.⁵⁶ These include extending large trade and position reporting systems, and limiting the ability of individual traders to take large short positions against the domestic currency by restricting the ability of financial institutions to loan that currency.

⁵⁵(...continued)

be left more vulnerable to misjudgements by fund managers, but this question is not obviously germane to the concerns of the Fund.

⁵⁶While national monetary authorities have been known to complain that they lack information on who is on the other side of the foreign exchange market, it is important to emphasize that there is nothing peculiar in this respect about either hedge funds or currency markets. To be sure, the foreign exchange market is an over-the-counter market. It is highly decentralized: individual banks quote their own bid and offer prices, which are then disseminated by financial services like Reuters. But in most major equity, fixed-income and commodity markets, just as in foreign exchange markets, most transactions are undertaken by traders whose identity is unknown to other traders. While the identity of the buyer or seller may be known to the dealer or broker who is the counterparty to the individual transaction, the dealer does not share that information. On the New York Stock Exchange, all that specialists report in real time is the amount and price of each sale so as to facilitate the printing of the trade on the tape. (On the commodity futures exchanges, buyers and sellers themselves are not required to report transactions as they occur; rather, the prices at which shouted transactions are concluded are overheard by pit observers, who relay the information to exchange officials who control the tape.) All that other buyers and sellers therefore know is the change in prices and amounts as they scroll across their screens. This can be seen as the defining feature of an efficient, competitive market, in which anonymous buyers and sellers react to the price signals sent by other anonymous buyers and sellers.

Large trade and position reporting

107. Other countries could emulate the large trade and position reporting requirements in effect in countries like the United States. As noted, this would increase transparency and reassure officials that individual traders, including hedge funds, are not dominating particular markets.

108. Implementing large position or transaction reporting is more difficult in an over-the-counter environment than when an asset is traded on an exchange.⁵⁷ Transaction reporting is particularly tough when transactions occur on the interbank market rather than a centralized location. U.S. experience suggests the feasibility of periodic large-position reporting even in this kind of decentralized environment, however. But to be totally effective, such requirements would have to apply in all jurisdictions in which foreign exchange transactions could be booked. Otherwise, were reporting requirements regarded as onerous (because, for example, of fears of repercussions when large trades became known to the authorities), the foreign exchange transaction could migrate offshore.⁵⁸

109. A partial response would be to make domestically-owned bank and nonbank subsidiaries abroad subject to the reporting requirement, as is the case in the United States for entities with foreign exchange positions in excess of \$50 billion. It would be more difficult, of course, to require international banks and multinational corporations that operate in a country but are chartered or incorporated abroad to report on all large currency transactions undertaken outside its borders. It is perhaps revealing that this is not attempted by the United States reporting system for foreign currency positions.

110. A water-tight reporting system would therefore have to be applied in all jurisdictions. How much leakage otherwise occurs would depend on how onerous traders regarded the reporting requirement.

⁵⁷In London, the largest foreign exchange trading center, roughly 65 percent of transactions are handled through direct dealing, 30 percent via voice brokers, and 5 percent via electronic broking services (such as Reuters D2000-2 and Electronic Broking Services). See Bank of England (1995). In contrast to the New York Stock Exchange and other securities exchanges on which specialists are required to continuously quote bid and offer prices, banks doing business in the foreign exchange market are not so required.

⁵⁸Assume, for illustration, that foreign exchange transactions must be reported in Country A but not Country B. Instead of borrowing the domestic currency and selling it forward in Country A, a large trader could do so in Country B. The corresponding amount of domestic credit would simply be transferred from a Country A bank (or nonbank) to its subsidiary in Country B. No foreign exchange transaction would then occur or be reported in Country A.

More comprehensive reporting requirements

111. Even in the United States, only large trades and positions are subject to reporting requirements. In particular, the \$50 billion minimum threshold for weekly and monthly reporting of foreign exchange positions in the United States would not catch most foreign exchange transactions of hedge funds and other investors. If more comprehensive reporting requirements are viewed as desirable, lower thresholds would have to be considered.⁵⁹

112. Requiring hedge funds in particular to report comprehensive data on all their transactions and positions would pose special difficulties. In the United States it would be

⁵⁹The reportable position of greater than \$50 billion in the U.S. implies that about between 30 and 40 entities are captured for weekly reporting. In the BIS 1995 survey of foreign exchange turnover, the Federal Reserve Bank of New York surveyed 147 foreign exchange dealers (non-commercial banks, commercial banks, and brokers). Since most of the participants in the position reporting scheme are commercial banks (for instance, 29 out of 36 in Wei and Kim's 1997 study using these data were commercial banks), setting a reporting threshold such that about 20 percent of the active institutions are required to report may be sufficient to be able to monitor market developments. Alternatively, instead of aiming for a given proportion of market participants, the threshold can be set by comparing the threshold to daily turnover. For example, daily turnover in the five currencies covered by the U.S. large position reporting requirements amounted to \$166 billion in April of 1995 (the last time a turnover survey was officially conducted). Assuming position sizes (a stock variable) are roughly proportional to turnover (a flow variable), the equivalent reporting threshold for the Thai baht, where the daily turnover was estimated to be \$5 billion per day in May of 1996 would be about \$1.5 billion; for the Indonesian rupiah the threshold would be about \$1 billion; for the Czech koruna, about \$150 million.

The problem with setting a threshold using information from the highly liquid, competitive foreign exchange market of New York is that it may not be representative of the market structure in emerging market currencies. For example, the largest 20 dealers in the New York market accounted for 70 percent of the turnover in April of 1995. In an emerging market country it is more likely five or six banks account for the same volume of turnover. More important than the higher market concentrations, is the loose connection between turnover and positions. For instance, turnover can be quite high and yet intermediaries may be unwilling to hold (or be prohibited from holding) outstanding positions of any substantial size. Alternatively, large positions may be in place but turnover may be extremely low. Further complicating the establishment of thresholds is the large fluctuations in activity levels in emerging market currencies. A given position may appear "large" during a period in which the market is liquid, but a much smaller position may be able to move the market in a period in which market liquidity has dried up. Thus, if authorities set the reporting level low to accommodate the latter situation it may capture too many participants, driving the market to other locations. However, if the threshold is high enough to reduce the reporting burden it fails the warn the authorities of upcoming volatility when markets become illiquid.

necessary to lift the “trader” exemption from the Securities Exchange Act which frees hedge funds and others dealing solely for their own account from having to file detailed financial reports with the SEC. Then there is the problem of where to draw the line is more general: if small investor partnerships are required to report all their investments, should the same also be asked of family groups and individual investors? Enforcing reporting requirements for hedge funds would be particularly difficult because hedge funds are especially mobile. If reporting requirements were regarded as onerous, coordination among the G-10 countries, for example, would not suffice, since hedge funds are free to locate in Bermuda or the Cayman Islands.

Limiting position taking

113. Policymakers might contemplate a variety of measures to limit the ability of hedge funds and other international investors to take positions in domestic financial markets. By taxing short-term capital inflows (as countries like Chile have done), it would be possible to discourage hedge funds and other international investors from putting on long positions in domestic markets that might then be closed out suddenly. Hedge fund managers emphasize the importance they attach to being able to put on and take off positions with a minimum of transactions costs, an emphasis that suggests that this class of investors might be particularly sensitive to such measures.

114. In addition, a growing literature (viz. Cowan and De Gregorio 1998) suggests that these last measures can have the further advantage of limiting the magnitude of capital inflows during periods when funds are flowing to emerging markets, damping down asset-price booms and preventing distortions in the structure of relative prices, and of limiting countries' vulnerability to disruptions to their external accounts if and when capital flows suddenly reverse direction.

115. Similarly, by requiring banks and brokers to raise margin and collateral requirements, it would be possible to limit the use of leverage by hedge funds and other investors.⁶⁰

116. Finally, by limiting the ability of financial institutions to provide the domestic credit needed to short the currency and to loan the securities needed to short equity and fixed-income markets, it might be possible to limit the ability of hedge funds and other investors to take short positions. By slowing the development of active and liquid bond markets, it might

⁶⁰These last initiatives would have to be coordinated internationally, of course, since hedge funds can obtain credit in a variety of national markets. It would have to be coordinated across assets to prevent hedge funds and other investors from shifting from assets subject to increased margin requirements to other assets, including derivatives, not so covered. In addition, there is the possibility that higher margin requirements would induce hedge funds and others to shift from purchasing securities on margin to obtaining leverage through the use of bank credit lines. See the discussion of this practice in Section II.

be possible to discourage trading in those assets by hedge funds and other investors that prefer to transact in markets where positions can be easily taken and easily liquidated.⁶¹

117. But strong limits on position taking could prevent hedge funds and other international investors from acting as contrarians. While hedge funds may be among the first institutional investors to short a currency when there is evidence of inconsistent macroeconomic fundamentals and shaky currency pegs, they may also be among the first buyers to jump back into the market after a crisis in which a depreciating currency overshoots and the foreign exchange market dries up. As noted in Chapter II of the accompanying Background Paper, there are reasons to think that hedge funds' structure and incentives incline them less than other investors toward positive-feedback trading strategies that amplify asset-price volatility. It is not clear, therefore, that discouraging position-taking by hedge funds would reduce that volatility.⁶²

118. In addition, attempts to impose position limits or margin requirements will provide incentives for financial market participants to arrange transactions in unregulated or offshore jurisdictions, neutralizing efforts to constrain their activities.

119. Finally, the costs in terms of economic growth of policies of financial repression—for that is what being discussed—are high. Slowing the development of active and liquid bond markets by imposing position limits, margin requirements and other permanent restrictions on trading may discourage position taking by hedge funds and others, but this does not make the policy desirable. Repressed markets may be stable, but this does not mean that they are efficient or conducive to growth. Indeed, the evidence that financial liberalization leads to financial deepening and accelerating growth is incontrovertible.⁶³ If measures are adopted to discourage position taking by hedge funds and other investors, it is critically important that these do not encourage a relapse into costly policies of financial repression.⁶⁴

⁶¹Similarly, a “sand-in-the-wheels” tax on foreign exchange transactions, if effectively applied, would discourage short-term moves in and out of currency markets. The feasibility and advisability of throwing sand in the wheels of currency markets will presumably be taken up in a separate Board paper and discussion.

⁶²Again, these arguments are familiar from the debate over the Tobin Tax. See al Haq, Kaul and Grunberg (1996).

⁶³A recent compendium of research on this question can be found in World Bank (1997).

⁶⁴To be sure, precipitous liberalization associated with inadequate supervision and regulation of domestic financial institutions can create problems and provide justification for going slow, but this has little to do with hedge funds.

Improving information to discourage herding

120. That said, because some hedge fund managers have well-publicized reputations for astuteness, the news that they have taken positions in particular assets or markets may encourage other less-well-informed investors to follow their lead (in an example of the information-cascades phenomenon described above). In other words, hedge funds may play an important role in the herd behavior that sometimes characterizes financial markets.

121. Herding is a situation in which a large number of investors simultaneously scramble in or out of a market on the assumption that others doing likewise know something that they themselves don't. It can force difficult adjustments on policymakers and shift the market from a better to a worse equilibrium.⁶⁵

122. Herding of this sort--that is, herding based on information cascades--takes place when information is asymmetric and incomplete, rendering market participants uncertain about a government's policies or intentions and causing them infer them from the actions of other traders. The solution is to provide better information to the markets on government policies and the condition of domestic financial institutions to encourage investors to trade on fundamentals rather than to run with the herd.

123. This means releasing full information about current governments policies and about contingencies that might affect future government policies, as well as using interest rates and other financial variables under the government's control to clearly signal policy priorities. It means not presenting hedge funds and other private investors whose combined resources constitute a market vastly larger than the assets of central banks and governments with an incentive to take large positions against a currency by offering them the irresistible combination of inconsistent policies and unsustainable currency pegs.

VII. ISSUES FOR DISCUSSION

124. Directors may wish to comment on various aspects of hedge funds' operations, including the following:

- Has the proliferation of international investment vehicles, of which hedge funds are one manifestation (along with pension funds, mutual funds, commercial banks and investment banks) had a positive effect on global financial markets?

⁶⁵This possibility arises in a situation of multiple equilibria. Morris and Shin (1995) show that it is possible to have multiple equilibria when investors have less than perfect information about the economic environment. For further discussion, see the Appendix.

- Is it useful for policy purposes to draw a distinction between hedge funds and institutional investors such as corporate treasuries and the proprietary trading desks of international banks? In particular, do the mobility and regulatory status of hedge funds enable them to engage in different financial market operations than other institutional investors?
- Would greater transparency regarding the operations of hedge funds, their counterparties, and their creditors significantly alter financial market dynamics?
- Would raising margin and collateral requirements effectively limit the impact of hedge funds on market volatility? If so, would such measures have other costs?
- Would the more timely and comprehensive provision of information regarding macroeconomic policy and financial regulation limit the herding in which hedge funds can play an important role?

Hedge Funds and Market Dynamics: Theoretical Perspectives

125. This Appendix considers the applicability of theoretical models which suggest that large traders such as hedge funds can significantly influence market outcomes, focusing on the foreign exchange market.

126. Traditional models of currency crises assume that the foreign exchange market is a competitive market like any other--that it is populated by a large number of small traders. Only recently has the model been extended to admit a role for large agents. The first step in this direction was the development of "second-generation" models of speculative attacks characterized by multiple equilibria. In "first-generation" models of attacks on pegged currencies, outcomes were uniquely determined.⁶⁶ Budget deficits financed by money creation were assumed to fuel balance-of-payments deficits and the progressive depletion of official reserves, until the authorities remaining foreign assets were eliminated in the one fell swoop known as a speculative attack. From that point the exchange rate was assumed to depreciate secularly, reflecting the pressure of budget deficits on the money supply and inflation. Strikingly, even though the collapse of the currency peg occurred all at once in an atmosphere of crisis (as the authorities' reserves were suddenly exhausted by a wave of speculative sales of the domestic currency), the events precipitating that collapse were perfectly foreseen.

127. While it was assumed that financial markets are populated by a large number of small traders, it would have made no essential difference had it been assumed instead that a few large investors traded foreign exchange. The timing of the speculative attack which occurred in response to the depletion of foreign exchange reserves was uniquely determined so as to avoid excessive arbitrage profits. The small currency traders in the model were assumed to move (to sell domestic currency for the authorities' remaining international reserves) at just the time required to prevent the exchange rate from jumping. Whether they were a few large traders or a myriad of small ones made no essential difference.

128. A potential role for large traders was introduced by "second-generation" models in which there is uncertainty about the future course of the exchange rate and the fundamentals on which it depends.⁶⁷ Once fundamentals are no longer certain, outcomes are no longer uniquely determined. Say that the authorities are balancing the benefits of maintaining the currency peg (which accrue in the form of enhanced policy credibility) against the costs of its defense (which take the form of high interest rates that depress domestic output and

⁶⁶ In other words, equilibria were unique. See Krugman (1979) and Flood and Garber (1984a).

⁶⁷ The seminal second generation models are Flood and Garber (1984b) and Obstfeld (1986). Recent reviews stressing optimization by the authorities as a mechanism underlying the existence of multiple equilibria are Obstfeld (1994) and Flood and Marion (1997).

employment).⁶⁸ In the absence of speculation against the currency, they may be happy to maintain the peg. But if speculators begin selling the currency, it may be necessary to raise interest rates to defend it. The costs of maintaining the peg (which now take the form of higher interest rates which do more to depress the economy) will have risen relative to the benefits. A government or central bank willing and able to defend the currency peg in the absence of speculative pressure may be inclined to abandon it in the event of adverse speculation and switch to a more expansionary policy. Thus, outcomes may no longer be unique. Whereas in first-generation models currency traders simply anticipate the abandonment of a currency peg made inevitable by imbalances in the underlying fundamentals, in second-generation models they actually provoke the change in fundamentals that makes their speculative attack profitable.

129. The question left unanswered by the original second generation models was what determined whether and when currency traders, facing a government with such incentives, would launch their attack. If only a small number chose to move, the impact on interest rates would be insufficient to prompt the authorities to abandon their defense of the peg. One resolution was to introduce large traders into the model. Large traders can precipitate a crisis in two ways. First, they can themselves undertake a volume of sales sufficient to drive interest rates to levels which the authorities regard as unacceptably high. Second, they can serve as the leaders who other smaller traders follow. In this case it will be unnecessary for large traders to actually take large positions, only to signal their intention of doing so. This mechanism is consistent with models of herding in foreign exchange markets.⁶⁹

130. The first formulation requires individual traders to be large not just relative to other traders but also to the market as a whole, which may only rarely be the case. The second has the advantage that there exists a variety of theoretical rationales for hedge funds' leadership role: these include payoff externalities, in which the payoffs to a trader adopting an action increase in the number of other traders adopting that action;⁷⁰ principal-agent models, in which money managers prefer to follow the same strategies as their competitors (or "hide in the

⁶⁸A defense of the currency peg which entails raising interest rates may have a variety of other costs. These include the impact on the health of the financial system (higher interest rates making it more difficult for bank borrowers to repay), the impact on the public accounts (higher interest rates increasing the cost of service on short-term and indexed debt), and the impact on mortgage interest rates (particularly in countries where these are indexed to market rates at short intervals).

⁶⁹For a survey, see Devenow and Welch (1996).

⁷⁰This is the basis for the model of self-fulfilling attacks in Obstfeld (1995), where no one large trader can exhaust the authorities' foreign exchange reserves, but several large traders (or one large trader and many small ones) can.

herd") in order not be easily evaluated; and information externalities, in which traders infer information from the actions of others.

Glossary

Arbitrage: Trading strategies designed to profit from price differences for the same or similar goods (assets) in different markets. Historically the term implied little or no risk in the trade, but more recently it has come to include strategies that entail some risk of loss or uncertainty about total profits.

Broker: (1) A person paid a fee or commission for acting as an agent in making contracts, sales, or purchases; (2) a “floor” broker: a person who actually executes someone else’s trading orders on the trading floor of an exchange; and (3) an “account executive”: the person who deals with customers and their orders in commission house offices.

Carry trade: The interest rate arbitrage technique of borrowing in a low-yielding currency and lending in a high-yielding one.

Counterparty: The other party to a contract. For exchange-traded futures and options contracts, the counterparty is usually the exchange itself (an exception is LIFFE, where the broker plays this role). For over-the-counter instruments, the counterparty is generally a financial intermediary such as a major money-center banks, an investment or merchant bank, or a securities company.

Currency Swap: A transaction in which two counterparties exchange specific amounts of two different currencies at the outset and repay over time according to a predetermined schedule that reflects interest payments and, possibly, amortization of principal. The payment flows in currency swaps (in which payments are based on fixed interest rates in each currency) are generally like those associated with a combination of spot and forward currency transactions.

Dealer: A financial intermediary that makes a market in a financial instrument and hence, as distinct from a broker, participates as a principal in the financial transaction.

Derivative securities / derivatives: Securities whose value is “derived” from the value of other financial securities (called the underlying financial security or instrument).

Forward contract: A cash market transaction in which two parties agree to the purchase and sale of a commodity at some future time under such conditions as the two agree. In contrast to a futures contract, the terms of a forward contract are not standardized; a forward contract is not transferable and usually can be canceled only with the consent of the other party, which often must be obtained for consideration and other penalty. Also, forward contracts are not traded on organized exchanges.

Futures contract: An exchange-traded contract generally calling for delivery of a specified amount of a particular grade of commodity or financial instrument at a fixed date in the future. Contracts are highly standardized and traders need agree only on the price and number of contracts traded. Traders' positions are maintained at the exchange's clearinghouse, which becomes a counterparty to each trade once it has been cleared at the end of each day's trading session. Members holding positions at the clearinghouse must post margin, which is marked to market daily. Most trades are unwound before delivery. The interposition of the clearinghouse facilitates the unwinding because a trader need not find his original counterparty, but may arrange an offsetting position with any trader on the exchange.

Haircut: A capital charge representing the fraction of a broker/dealers' securities portfolio (or more generally of any portfolio) that cannot be traded but must be held to provide for potential losses.

Hedging: The process of offsetting an existing risk by taking an opposite position on another risk likely to move in the same direction.

Leverage or leverage ratio: the proportion of debt to equity.

Liquidity: The ease with which a prospective seller of a financial instrument can find a buyer at the prevailing market price. Liquidity is generally higher in markets in which the volume of trading is larger.

Long position: (1) In the futures market, the position of a trader on the buying side of an open futures contract; and (2) in the options market, the position of a trader who has purchased an option regardless of whether it is a put or a call. A participant with a long call option can profit from a rise in the price of the underlying instrument while a trader with a long put option can profit from a fall in the price of the underlying instrument.

Margin: An amount of money deposited by both buyers and sellers for futures contracts to ensure performance of the terms of the contract, that is, the delivery or taking of delivery of the commodity or the cancellation of the position by a subsequent offsetting trade at such price as can be attained. Margin in futures markets is not a payment of equity or down payment on the commodity itself but is rather in the nature of a performance bond or security deposit.

Off-balance sheet activities: Banks' business, often fee-based, that does not generally involve booking assets and taking deposits (for example, trading of swaps, options, foreign exchange forwards, stand-by commitments, and letters of credit).

Option: The contractual right, but not the obligation, to buy or sell a specified amount of a given financial instrument at a fixed price before or at a designated future date. A **call option**

confers on the holder the right to buy the financial instrument. A **put option** involves the right to sell the financial instrument.

OTC trading (over-the-counter trading): Trading in financial instruments transacted off organized exchanges. Generally the parties must negotiate all details of the transactions or agree to certain simplifying market conventions. In most cases, OTC market transactions are negotiated over the telephone. OTC trading includes transactions among market-makers and between market-makers and their customers. Firms mutually determine their trading partners on a bilateral basis.

Position: A market commitment. For example, one who has bought futures contracts is said to have a *long* position, and, conversely, a seller of futures contracts is said to have a *short* position.

Repurchase agreements or repos: an agreement where the owner of marketable securities agrees to sell them to a financial institution and then buy them back later. The price at which the securities are bought back is slightly higher than the price obtained for their sale. In effect, the financial institution provides a fully collateralized loan to the owner of the securities and the difference between the repurchase price and the sale price is the interest on the loan. Most repos are overnight repos and the agreement is renegotiated the following day. Longer-term agreements are called term-repos.

Short position: (1) In the futures market, the position of a trader on the selling side of an open futures contract; and (2) in the options market, the position of a trader who has sold or written an option regardless of whether it is a put or a call. The writer's maximum potential profit is the premium received.

Short sales: The sale of assets that a seller does not own.

Spot: Term denoting immediate delivery for cash as distinct from future delivery.

Swap: A financial transaction in which two counterparties agree to exchange streams of payments over time according to a predetermined rule. A swap is normally used to transform the market exposure associated with a loan or bond borrowing from one interest rate base (fixed term or floating rate) or currency of denomination to another.

Table 1. Hedge Funds: Number of Funds by Investment Style 1/

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997
<i>(In numbers)</i>										
Global	1	8	39	60	90	132	198	259	341	369
Macro	0	3	14	16	21	30	37	42	52	53
Market neutral	0	5	18	23	40	64	95	125	159	179
Event driven	0	2	17	25	26	43	52	77	99	116
Sector	0	0	1	1	2	5	8	14	21	31
Short sales	0	0	6	6	7	8	10	10	10	11
Long only	0	0	1	1	3	5	6	7	10	15
Fund of funds	0	4	32	45	63	85	133	178	217	247
Total (including fund of funds)	1	22	128	177	252	372	539	712	909	1,021
Total (excluding fund of funds)	1	18	96	132	189	287	406	534	692	774
<i>(In percent of total) 2/</i>										
Global	100	44	41	45	48	46	49	49	49	48
Macro	0	17	15	12	11	10	9	8	8	7
Market neutral	0	28	19	17	21	22	23	23	23	23
Event driven	0	11	18	19	14	15	13	14	14	15
Sector	0	0	1	1	1	2	2	3	3	4
Short sales	0	0	6	5	4	3	2	2	1	1
Long only	0	0	1	1	2	2	1	1	1	2
Total (excluding fund of funds)	100	100	100	100	100	100	100	100	100	100

Source: MarHedge.

1/ At end-period.

2/ Excluding fund of funds.

Notes: *Global*: invest in emerging markets and other specific regions of the world. *Macro*: take positions on changes in global economic conditions. *Market neutral*: attempt to reduce market risk by taking offsetting long and short positions. *Event driven*: attempt to capitalize on events that are seen as special situations. *Sector*: have an industry focus. *Short sales*: borrow securities they judge to be "overvalued" from brokers to sell them on the market, hoping to buy them back at a lower price when repaying the broker. *Long only*: traditional equity funds structured like hedge funds. *Fund of funds*: allocate their portfolio of investments among a number of hedge funds.

Table 2. Hedge Funds: Assets Under Management by Investment Style 1/

	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997
<i>(In millions of U.S. dollars)</i>										
Global	193	489	1,229	2,161	3,858	6,553	12,486	15,377	21,103	29,615
Macro	0	29	4,504	6,462	8,919	18,141	19,252	17,326	24,498	24,510
Market neutral	0	78	664	961	1,716	3,414	4,776	5,703	10,176	16,233
Event driven	0	29	373	544	780	1,743	2,878	3,843	5,613	7,881
Sector	0	0	2	3	8	47	85	169	670	1,774
Short sales	0	0	187	239	226	244	403	432	473	450
Long only	0	0	0	0	16	41	58	92	179	291
Fund of funds	0	190	1,336	1,940	3,086	6,462	8,017	9,288	13,007	18,218
Total (including fund of funds)	193	814	8,295	12,311	18,610	36,645	47,956	52,230	75,719	96,973
Total (excluding fund of funds)	193	624	6,959	10,371	15,523	30,184	39,939	42,942	62,712	80,755
<i>(In percent of total) 2/</i>										
Global	100	78	18	21	25	22	31	36	34	37
Macro	0	5	65	62	57	60	48	40	39	30
Market neutral	0	12	10	9	11	11	12	13	16	20
Event driven	0	5	5	5	5	6	7	9	9	10
Sector	0	0	0	0	0	0	0	0	1	2
Short sales	0	0	3	2	1	1	1	1	1	1
Long only	0	0	0	0	0	0	0	0	0	0
Total (excluding fund of funds)	100	100	100	100	100	100	100	100	100	100
Fund of funds 3/	0	30	19	19	20	21	20	22	21	23

Source: MarHedge.

1/ At end-period.

2/ Excluding fund of funds.

3/ Proportion of assets channeled through fund of funds.

Notes: *Global*: invest in emerging markets and other specific regions of the world. *Macro*: take positions on changes in global economic conditions. *Market neutral*: attempt to reduce market risk by taking offsetting long and short positions. *Event driven*: attempt to capitalize on events that are seen as special situations. *Sector*: have an industry focus. *Short sales*: borrow securities they judge to be "overvalued" from brokers to sell them on the market, hoping to buy them back at a lower price when repaying the broker. *Long only*: traditional equity funds structured like hedge funds. *Fund of funds*: allocate their portfolio of investments among a number of hedge funds.

Table 3. Returns, Volatility, and Risk Adjusted Returns by Investment Style
(In percent)

	90-91	92-93	94-95	96-97	90-97
Compound Annual Returns					
Global	13.0	27.4	9.6	26.2	18.6
Macro	48.0	32.3	10.0	28.3	28.9
Market neutral	5.5	8.6	7.4	14.7	8.8
Event driven	17.5	28.7	10.2	21.7	19.2
Sector	30.2	35.7	14.4	63.1	33.9
Short sales	3.2	8.1	6.7	1.4	5.0
Long only		24.8	19.4	36.0	
Fund of funds	13.8	21.8	3.5	21.0	14.6
J.P Morgan GBI	11.5	8.5	6.6	5.2	8.0
S&P500	10.8	8.6	17.5	29.1	15.8
Standard Deviations of Monthly Returns					
Global	3.4	1.8	2.4	2.4	2.6
Macro	5.5	5.9	3.3	4.4	4.9
Market neutral	0.6	0.4	0.7	0.2	0.6
Event driven	2.2	1.6	1.4	1.5	1.7
Sector	5.1	3.6	2.8	5.9	4.5
Short sales	5.1	3.0	4.0	5.5	4.4
Long only		2.6	3.6	3.8	
Fund of funds	1.4	1.5	1.8	2.0	1.7
J.P Morgan GBI	1.1	1.1	1.3	1.2	1.2
S&P500	5.0	1.9	2.7	3.9	3.5
Risk Adjusted Annual Returns ^{1/}					
Global	1.1	4.5	1.2	3.2	2.1
Macro	2.5	1.6	0.9	1.9	1.7
Market neutral	2.5	5.9	3.2	18.5	4.5
Event driven	2.3	5.3	2.1	4.3	3.2
Sector	1.7	2.9	1.5	3.1	2.2
Short sales	0.2	0.8	0.5	0.1	0.3
Long only		2.7	1.5	2.7	
Fund of funds	3.0	4.3	0.6	3.1	2.4
J.P Morgan GBI	3.0	2.2	1.5	1.2	2.0
S&P500	0.6	1.3	1.9	2.2	1.3

Source: MarHedge.

^{1/} The risk adjusted rate of return is calculated as the ratio of the average annual compound return divided by the annualized volatility (standard deviation).

**Table 4. Yields on U.S. Dollar and Japanese Yen Carry Trades in the Thai Baht
(using money markets) 1/**

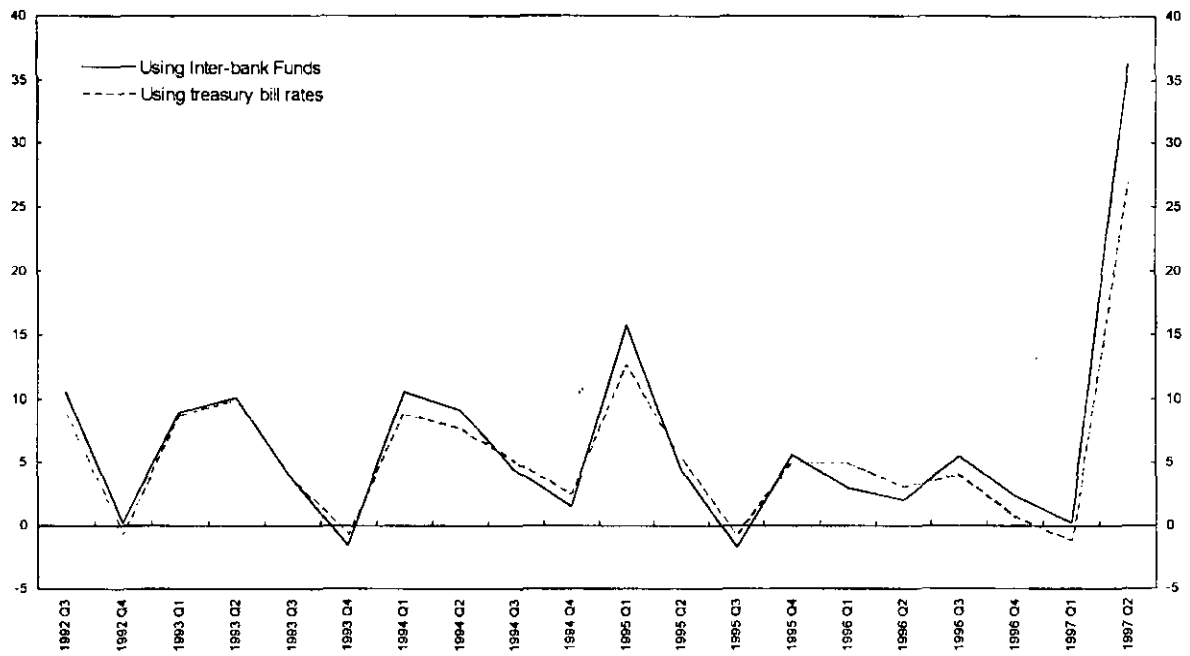
Quarter	Index returns in Yen 2/	Japanese Yen LIBOR (3 month)	Profit from Yen carry trade	Index returns in US\$ 2/	US \$ LIBOR (3 month)	Profit from US\$ carry trade
1996 Q3	15.66	0.52	15.09	8.88	5.63	3.13
1996 Q4	23.42	0.49	22.85	6.03	5.56	0.45
1997 Q1	36.24	0.58	35.52	3.97	5.77	-1.73
1997 Q2	-1.33	0.66	-1.98	34.47	5.78	27.54
1997 Q3	-64.90	0.56	-65.15	-71.32	5.77	-73.47

1/ All returns are annualized

2/ Computed by converting Thai money market index returns into US\$ and Yen.

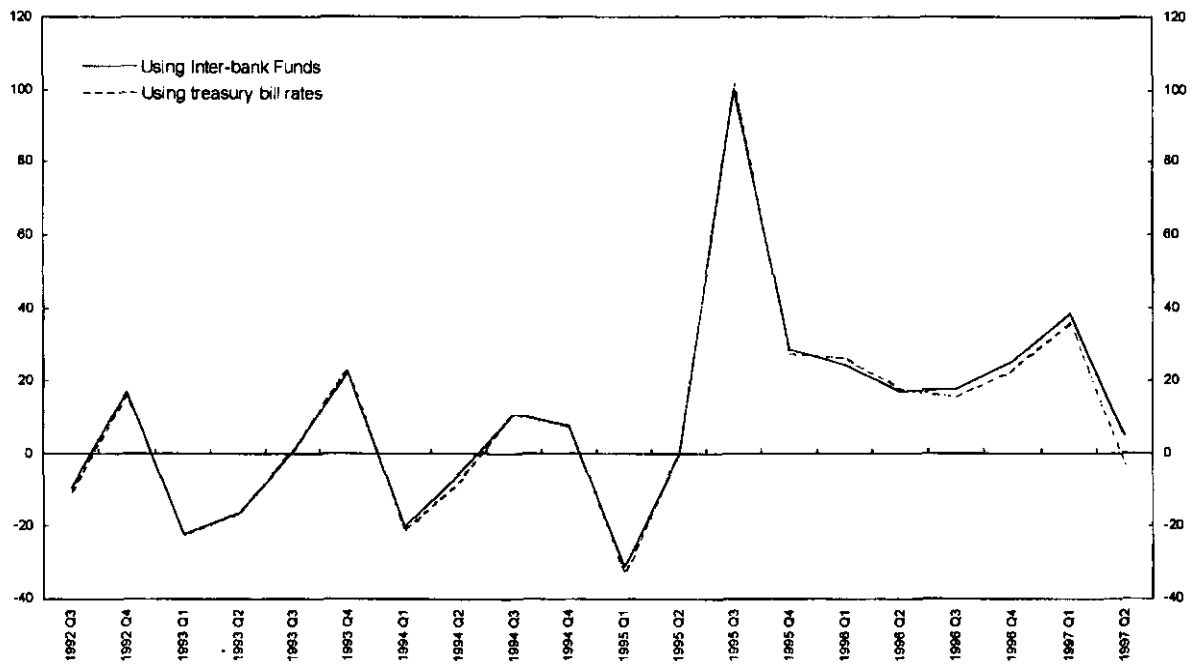
Source: IFS, Bloomberg LP, Peregrine Securities and staff estimates.

Figure 1. Annualized Yield on U.S. Dollar Carry Trades in the Thai Baht, 1992Q3-1997Q2



Sources: Bloomberg; IFS; and Staff estimates.

Figure 2. Annualized Yield on Japanese Yen Carry Trades in the Thai Baht, 1992Q3-1997Q2



Sources: Bloomberg; IFS; and Staff estimates.

REFERENCES

- Bank for International Settlements, 1995, "Central Bank Survey of Foreign Exchange Market Activity in April 1995: Preliminary Global Findings" (Basle: BIS, October 24)
- Caldwell, Ted, 1995, "Introduction: The Model for Superior Performance," in Jess Lederman and Robert A. Klein (eds), *Hedge Funds: Investment and Portfolio Strategies for the Institutional Investor* (Chicago: Irwin), pp. 1-17.
- Celarier, Michaelle, 1994, "How the Banks Caught Hedge Fund Fever," *Global Finance* (March), pp. 48-53.
- Cowan, Kevin and Jose De Gregorio (1998), "Exchange Rate Policies and Capital Account Management: Chile in the 1990s," in Reuven Glick (ed.), *Managing Capital Flows and Exchange Rates: Perspectives from the Pacific Basin*, Cambridge: Cambridge University Press, pp.465-488.
- Devenow, Andrea, and Ivo Welch, 1996, "Rational Herding in Financial Economics," *European Economic Review*, Vol. 40, pp. 603-15.
- Flood, Robert, and Peter Garber, 1984a, "Collapsing Exchange Rate Regimes: Some Linear Examples," *Journal of International Economics* 17, pp. 1-13.
- , 1984b, "Gold Monetization and Gold Discipline," *Journal of Political Economy*, Vol. 92, pp. 90-107.
- Flood, Robert, and Nancy Marion, 1997, "Perspectives on the Recent Currency Crisis Literature," unpublished manuscript, International Monetary Fund and Dartmouth College.
- Frankel, Jeffrey A., and Sergio Schmukler, 1996, "Country Fund Discounts and the Mexican Crisis of December 1994: Did Local Residents Turn Pessimistic Before International Investors?" *Open Economies Review*, Vol. 7, Suppl. 1, pp. 511-34.
- , 1997, "Country Funds and Asymmetric Information" (unpublished manuscript; University of California, Berkeley and the World Bank, November).
- Fung, William and David A. Hsieh (1997), "Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds," *Review of Financial Studies* 10, pp.275-302.
- Grinblatt, M., S. Titman, and R. Wermers, 1995, "Momentum Investment Strategies, Portfolio Performance and Herding: A Study of Mutual Fund Behavior," *American Economic Review*, Vol. 85, pp. 1088-105.

- Kodres, Laura E, and Matthew Pritsker, 1997, "Directionally-Similar Position Taking and Herding by Large Futures Market Participants," unpublished manuscript, International Monetary Fund and Board of Governors of the Federal Reserve System.
- Krugman, Paul, 1979, "A Model of Balance of Payments Crises," *Journal of Money, Credit and Banking*, Vol. 11, pp. 311-25.
- , 1996, "Are Currency Crises Self-Fulfilling?" *NBER Macroeconomics Annual*, pp. 345-77.
- Kuper, Simon, 1997, "Hedge Funds: Gentler Face for 'Evil Geniuses'," *Financial Times* (September 19).
- Martinson, Jane, 1997, "Niederhoffer: Speculator Sticks with Thailand Despite Loss," *Financial Times* (September 17).
- Morris, Stephen and Huan Song Shin (1995), "Informational Events that Trigger Currency Attacks," Working Paper No. 95-24, Federal Reserve Bank of Philadelphia.
- Obstfeld, Maurice, 1986, "Rational and Self-fulfilling Balance of Payments Crises," *American Economic Review Papers and Proceedings*, Vol. 76, pp. 72-81.
- , 1994, "The Logic of Currency Crises," *Cahiers Economiques et Monetaires*, Vol. 43, pp. 189-213.
- , 1995, "Models of Currency Crises with Self-fulfilling Features," *European Economic Review*, Vol. 40, No. 3-5, pp. 1037-47.
- Securities and Exchange Commission, 1969, *35th Annual Report for the Fiscal Year Ended June 30th, 1969* (Washington, D.C.: GPO).
- Shapiro, Daniel S., 1995, "Unrelated Business Taxable Income Considerations for Tax Exempt Investors in Securities partnerships," in *Hedge Funds: Investment and Portfolio Strategies for the Institutional Investor*, ed. by Jess Lederman and Robert A. Klein (Chicago: Irwin), pp. 215-31.
- Thornhill, John, 1997, "Soros Puts Faith and \$2.5 Billion into the New Russia," *Financial Times* (July 29).
- Ul Haq, Mahbub, Inge Kaul and Isabelle Grunberg, eds., 1996, *The Tobin Tax: Coping with Financial Volatility* (New York: Oxford University Press).

- United States Congress, House of Representatives, "Statement and Testimony of George Soros," in *Risks that Hedge Funds Pose to the Banking System*, Committee on Banking, Finance and Urban Affairs, 103 Congress, 2nd Sessions (April 13).
- Van, George, 1995, "Taming Hedge Funds," *Pension Management* (August).
- Wei, Shang-Jin, and Jungshik Kim, 1997, "The Big Players in the Foreign Exchange Market: — Do they Trade on Information or Noise?" NBER Working Paper no. 6256 (November).
- Weiss, Gary, and Joseph Weber, 1994, "Fall Guys," *Business Week* (April 25), pp. 116-21.
- Wermers, R., 1995, "Herding, Trade Reversals, and Cascading by Institutional Investors," unpublished manuscript, University of Colorado at Boulder (December).
- Wirth, Gregg, 1997, "Hedge Funds Struggled in First Quarter, Look Ahead Nervously," *International Dealers' Digest* (April 21).
- World Bank, 1997, *Private Capital Flows to Developing Countries: The Road to Financial Integration* (New York: Oxford University Press).

