

DOCUMENT OF INTERNATIONAL MONETARY FUND  
AND NOT FOR PUBLIC USE

FOR  
AGENDA

MASTER FILES  
ROOM C-525

0451

EBS/98/10

CONFIDENTIAL

January 21, 1998

To: Members of the Executive Board

From: The Secretary

Subject: **Hedge Funds—Selected Issues**

This paper provides background information to the paper on hedge funds and financial market dynamics, which was circulated as EBS/98/9 on January 16, 1998.

Mr. Chadha (ext. 36669), Mr. S. Sharma (ext. 35306), or Ms. Kodres (ext. 36161) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

Att: (1)

Other Distribution:  
Department Heads



## INTERNATIONAL MONETARY FUND

**Hedge Funds—Selected Issues**

Prepared by a staff team consisting of Bankim Chadha, Sunil Sharma, Laura Kodres,  
and Anne Jansen (all RES)

Approved by Michael Mussa

January 16, 1998

Contents	Page
I. The Hedge Fund Industry: Structure, Size, and Performance . . . . .	4
A. Introduction . . . . .	4
B. Evolution of Hedge funds . . . . .	4
C. Characteristics of the Industry . . . . .	6
The data . . . . .	6
Investment styles . . . . .	7
Number, size, and location of funds . . . . .	8
Survival rate . . . . .	10
Manager compensation, and incentives for risk taking . . . . .	10
Redemption policies and implications for market dynamics . . . . .	12
Decision-making process . . . . .	12
The investor base . . . . .	12
Leverage . . . . .	13
D. Performance: Return, Risk, and Diversification Comparisons . . . . .	15
E. Macro Events and the Performance of Macro Hedge Funds . . . . .	16
F. Conclusions . . . . .	17
II. Hedge Fund Investment Strategies . . . . .	32
A. Strategies Used by Arbitrage-type Hedge Funds . . . . .	34
Analytics behind the strategies . . . . .	34
Strategy determinants . . . . .	36
Examples . . . . .	38
B. Strategies Used By Macro Funds . . . . .	40
Strategy determinants . . . . .	41
Examples . . . . .	43
C. Strategies Used By Emerging Market Hedge Funds . . . . .	45
Combination macro funds and arbitrage funds . . . . .	45
Special considerations . . . . .	46
D. Other Types of Hedge Funds Strategies . . . . .	46
Event related funds . . . . .	46

Value investing .....	47
Short selling funds .....	47
Sector funds .....	48
III. Effects of Hedge Funds' Strategies on Price Dynamics .....	55
A. Stabilizing Strategies .....	55
B. Destabilizing Strategies .....	56
C. Empirical Evidence .....	59
IV. Regulation of Hedge Funds .....	67
A. Introduction .....	67
B. Regulation of Hedge Funds in the United States .....	67
Investor Protection Rules .....	68
Regulations to Protect Market Integrity .....	73
Reducing Systemic Risk .....	76
C. Regulation of Hedge Funds in the United Kingdom .....	78
Appendices .....	
1. Characteristics of Hedge Fund Strategies .....	50
Box 1. Differences Between Mutual Funds and Hedge Funds in the U.S. ....	82
Tables .....	
1. Hedge Funds: Number of Funds by Investment Style .....	18
2. Hedge Funds: Number of Funds by Domicile, 1997 .....	19
3. Hedge Funds: Assets Under Management by Domicile, 1997 .....	20
4. Hedge Funds: Assets Under Management by Investment Style .....	21
5. Leverage by Investment Style, September 1997 .....	22
6. Returns, Volatility, and Risk Adjusted Returns by Investment Style .....	23
7. Correlation of Hedge Fund Returns with Benchmark Indices, January 1990-September 1997 .....	24
8. Correlation of Returns among Large Macro Hedge Funds, September 1993-97 ..	25
9. Proportion of Hedge Funds using Various Instruments Ranked by Quintile of Asset Size .....	49
10. Multiple Probit Models: Contemporaneous Herding by Selected Institutional Groups with Hedge Funds .....	63
11. Herding by Selected Institutional Groups following Hedge Funds by One Day ....	65

Figures .....	
1. Hedge Funds: Assets Under Management by Investment Style, 1990-97 .....	26
2. Monthly Total Returns by Investment Style, December 1989-September 1997 .....	27
3a. Large Macro Hedge Fund Returns and Macro Economic Events .....	28
3b. Large Macro Hedge Fund Returns and Macro Economic Events .....	29
3c. Large Hedge Fund Returns and Macro Economic Events .....	30
3d. Large Macro Hedge Fund Returns and Macro Economic Events .....	31
References .....	83

## **I. THE HEDGE FUND INDUSTRY: STRUCTURE, SIZE, AND PERFORMANCE**

### **A. Introduction<sup>1</sup>**

1. This chapter presents an overview of the hedge fund industry, focusing on its current structure and recent performance. The second section provides a brief history of the evolution of hedge funds. The third section examines available data on the size and structure of the industry—the number, domicile, and investment styles of funds; the size and evolution of assets under management; and reported measures on the extent of leverage used by hedge funds. It also discusses the investor base, fees, manager incentives for risk-taking, and the internal structure of hedge funds compared to that of other institutional investors. The fourth section examines the performance of hedge funds—returns, risk, and their use as a means for portfolio diversification—relative to aggregate benchmark indices. The fifth section discusses the behavior and individual performance of some of the large macro hedge funds against the backdrop of major macro events in which these funds have been ascribed key roles. The final section summarizes the main conclusions.

### **B. Evolution of Hedge Funds**

2. Since the term “hedge fund” is currently applied to a wide variety of funds, and popular notions often depict hedge funds as highly leveraged risk-takers or speculators rather than as risk-averse hedgers, it is useful to begin with a little history.

3. In 1949, A.W. Jones established in the United States—first as a general partnership, later converted to a limited partnership—what is regarded as the first hedge fund.<sup>2</sup> At the time, short-selling, which is the sale of a borrowed asset on the expectation that its price will decline by the time of repayment, thus yielding a capital gain to the seller, appears to have been used largely for short-term speculation in transitory opportunities. Similarly, the use of leveraging as an investment strategy, which entails the use of credit to increase the value of investments, appears principally to have been used to “raise the stakes,” that is for increasing profits but amplifying, of course, also the size of possible losses. Jones combined the two investment tools—short selling and leveraging—to create what was in fact a conservative investment system. One of his insights was that there were two distinct sources of risk in equity investment: from individual stock selection and from general market risk. He sought to separate out the two. He viewed maintaining a basket of shorted stocks as a required asset allocation to hedge against a drop in the general level of the market. Thus controlling market risk, he used leverage to amplify his returns from picking individual stocks. The strategy was to buy particular stocks, that is be long these stocks, and sell others short. By going long on

---

<sup>1</sup>This chapter was prepared by Bankim Chadha and Anne Jansen of the Emerging Markets Studies Division of the Research Department.

<sup>2</sup>See Caldwell (1995).

stocks that were “undervalued” and short on those that were “overvalued,” the expectation was that the fund would gain regardless of the direction in which the market moved. The fund was considered “hedged” to the extent that the portfolio was split between stocks that would benefit if the market went up, and short positions that would gain if the market went down. Thus the term “hedge funds.” Although Jones valued stock picking over market timing, he increased or decreased the net market exposure of his portfolio based on his forecast for the market. As the long-term trend in equity prices is a positive one, Jones was generally “net long.”

4. There were two other notable characteristics of Jones’s fund: an incentive fee structure; and all of his own investment capital was kept in the fund. The fees payable to the general manager were set at 20 percent of realized profits. Unlike mutual funds of the time—and for that matter of today—there was no asset-based management fee.

5. Jones operated his fund with spectacular success and in relative secrecy until the mid 1960s. The publication in April 1966 of an article in *Fortune* magazine on Jones’s fund detailing rates of return—net of fees—that exceeded those of the most successful mutual fund (Fidelity Trend Fund) over the previous five years by 44 percent, and over the previous ten years (Dreyfus Fund) by 87 percent, led to a proliferation of hedge funds.<sup>3</sup> While no data is available on the number of hedge funds that were established in the ensuing period, a survey by the Securities and Exchange Commission found 215 investment partnerships for the year ending 1968, concluding that 140 were hedge funds, with the majority having been formed that year. As the rapid growth of hedge funds coincided with a strong equity market, many managers found that hedging a portfolio with short sales was difficult, time consuming, and costly. Consequently, many managers increasingly resorted to strategies of using high margins to leverage up their long equity positions, with only token hedging. The subsequent decline in the equity market (1969-70) wreaked havoc on the industry. It is reported that for the 28 largest hedge funds in the SEC survey at end 1968, assets under management declined by 70 percent (from losses and withdrawals) by end 1970, while 5 of them were closed.<sup>4</sup> The smaller funds fared worse. The stock market decline of 1973-74 then caused another sharp contraction of the hedge fund industry.

6. In the decade following 1974, hedge funds appear to have returned to operating in relative obscurity. Just as the financial press played an important role in spurring the first growth cycle in the hedge fund industry during 1966-68, so it appears to have played a similar role in the next cycle that began in the late 1980s, focusing attention in particular on the

---

<sup>3</sup>Loomis (1966).

<sup>4</sup>See Caldwell (1995).

“macro” hedge funds.<sup>5</sup> The macro hedge funds increasingly departed from the traditional hedge fund strategies that had focussed on stock picking, to take positions on the overall direction of broad global shifts in stock markets, currencies and interest rates. The growth of the hedge fund industry since the late 1980s has not, however, been limited to the macro funds who, if anything appear to have declined in importance (see below), and the present hedge fund industry is comprised of a diverse set of funds. Today, hedge funds are probably best described as eclectic pools of capital created as private limited investment partnerships, a performance-based compensation scheme for the principal partners or managers who are free to use a variety of investment techniques and leverage to raise returns and cushion risk, and their small size and internal organizational structure permitting rapid decision-making. It is important to recognize that the line dividing hedge funds and certain other types of institutional investors is an arbitrary one. In particular, the operations of the proprietary trading desks of large commercial and investment banks resemble those of hedge funds.<sup>6</sup>

### **C. Characteristics of the Industry**

#### **The data**

7. Considerable caution needs to be used in examining statistics for the hedge funds industry and its various segments. The available data offered by a number of vendors—Managed Account Reports (MAR), Hedge Funds Research (HFR), Van Hedge Fund Advisors (VHFA)—all of which were examined in writing this paper, aim to provide information useful for portfolio selection to investors in hedge funds. For present purposes, however, where the objective is to get a broader perspective on the size, structure, and returns in the hedge fund industry, they suffer from a number of deficiencies. Since all information available on these databases is voluntarily reported by hedge fund managers to these services and is not based on any publicly disclosed information, funds whose managers choose not to report are necessarily missing from the databases, and the data are obviously, therefore, incomplete. It is unclear what, if any, “due diligence” is exercised in data collection by the vendors on reporting hedge fund managers. Voluntary reporting means also that all statistics suffer from a self-reporting bias, as hedge fund managers would have an incentive to report results in a favorable light. The fact that a fund manager’s choice to start reporting may not coincide with the date of its inception distorts statistics on the growth in the number and size of funds. Return statistics suffer from a strong survivor bias, in that only returns of funds that remain in business, are reported.

8. The line between what is and what is not a “hedge fund” is a hazy one, with different vendors employing alternative definitions and resulting in varying estimates of the universe of

---

<sup>5</sup>See, for example, Rohrer (1986).

<sup>6</sup>Their potentially different appetites for, and incentives to take on, risk are discussed in the next section.



hedge funds. MAR defines a hedge fund as one that “charges a material incentive fee (usually in the 15-25 percent range) and meets at least one of the following criteria: the fund invests in multiple asset classes; in the case of a long-only fund, uses leverage; or the fund uses hedging techniques within its portfolio.” HFR includes in its universe of hedge funds a “structure that is normally a private investment partnership or offshore fund that charges a performance fee, and that encompasses a broad definition of investment strategies. Investment strategies range from the non-leveraged, hedged and arbitrated to highly leveraged and directional.” VHFA defines U.S. hedge funds as “limited partnerships or limited liability companies invested primarily in public securities or in financial derivatives.” While VHFA does not explicitly take into account whether or not the fund hedges its portfolio, over 90 percent of the U.S. funds in that database are estimated to actually hedge. For offshore funds, VHFA’s universe includes “mutual fund companies domiciled in tax heavens which can utilize hedging techniques to reduce risk.”

9. This paper focuses on the data reported by MAR. The choice of this data set was largely arbitrary, though it does represent the first commercially available database on hedge funds and has the advantage of having longer time series. This is particularly useful in examining the performance of the large macro hedge funds below. While some of the differences in estimates of industry size and structure between vendors are noted below, the data from MAR conform with both broad impressions gained from discussions with hedge fund managers, and with press reports.

### **Investment styles**

10. The MAR database classifies hedge funds into 8 broad categories of investment styles, as reported by the managers of the hedge fund. These are:<sup>7</sup>

- **Macro** funds that take positions on changes in global economic conditions as reflected in equity prices, currencies and interest rates.
- **Global** funds include those investing in emerging markets and those dedicated to specific regions in the world. While they take positions on directional moves in particular markets as the macro funds do, they tend to be more bottom-up oriented in that they pick stocks in individual markets they favor. They tend to use index derivatives much less so than the macro funds.
- **Long only** funds are traditional equity funds that are structured like hedge funds, that is have an incentive fee and use leverage.

---

<sup>7</sup>A fuller description can be found in the next background paper, which discusses in depth hedge fund investment strategies. It should be noted that there is obviously some overlap in types of investment activities.

- **Market neutral** funds attempt to reduce market risk by taking offsetting long and short positions, and are, in this sense, perhaps most closely related in investment philosophy to the old-style hedge fund (such as Jones's). They now encompass funds that invest in a wide variety of instruments, however, including convertible arbitrage funds that take offsetting positions in convertible securities and the underlying equity, those that arbitrage stocks and index futures, or those that take positions on yield curves in bond markets.
- **Sectoral** hedge funds have an industry focus that include a wide set of industries: health care, financial services, food and beverages, media and communications, natural resources, oil and gas, real estate, technology, transportation, and utilities.
- **Dedicated short sales** funds borrow securities they judge to be "overvalued" from brokers and sell them on the market, hoping to buy them back at a lower price when repaying the broker. Such funds attract investors wishing to hedge traditional long-only portfolios, or those wishing to take a position that the market is likely to decline.
- **Event driven** funds' investment theme is to capitalize on events that are seen as special situations. They encompass distressed securities funds that focus on securities of companies in reorganization or bankruptcy, and risk-arbitrage funds that take a position on the likelihood of an announced merger or acquisition going through by simultaneously buying stocks in a company being acquired and selling stocks in the acquiring company.
- **Funds of funds** are hedge funds that allocate their portfolio of investments, sometimes with leverage, among a number of hedge funds.

#### **Number, size, and location of funds**

11. All estimates suggest that the hedge fund industry has experienced explosive growth since the mid-1980s, measured either by the number of funds or by assets under management, and continues to grow robustly.<sup>8</sup> The number of hedge funds in the MAR database increased uninterrupted from a total of 128 in 1990 to reach 1,021 by the third quarter of 1997 (Table 1). During this period the number of global funds, which have consistently represented between 40-50 percent of all hedge funds, rose almost ten-fold from 39 to 369, and such funds now account for about half the industry. Market neutral funds, which currently represent about a quarter of the funds in the industry, also grew ten-fold in the 1990s, rising from 18 in 1990 to 179 presently. Event driven investment funds, which now represent about 15 percent of funds, experienced only slightly more modest (seven-fold) growth in the number of funds during the 1990s. Macro funds have represented a relatively small fraction of the funds in the hedge fund industry, and though the number of such funds has grown over time from 14 in 1990 to 53 in 1997, the share of such funds in the industry has been declining

---

<sup>8</sup>While data in the tables is presented from earlier periods the focus is on developments since 1990 because there appear to have been substantial improvements in reporting since this time.

steadily. Macro funds currently represent only 7 percent of the funds in the industry. One other notable area of expansion has been the funds of funds category, with such funds currently representing—after the global category—the second largest concentration of funds.<sup>9</sup>

12. Most of the hedge funds in the MAR database are registered in the United States (51 percent), or in one of the Caribbean offshore centers such as the British Virgin Islands (17 percent), the Cayman Islands (13 percent), Bermuda (9 percent), the Bahamas (4 percent), and the Netherlands Antilles (2 percent), a choice determined by the relative advantages these domiciles offer individual funds (Table 2).<sup>10</sup> When the domicile of hedge funds is considered by the size of assets under management rather than by the number of funds, an alternative pattern emerges (Table 3). Of assets under management, the importance of U.S. based funds falls to only a third of the total. This difference is accounted for largely by the large macro funds, over 60 percent of whose assets under management are in funds registered offshore in the Netherlands Antilles.

13. The size of assets under management by the hedge fund industry reveal the same explosive growth as that evidenced by the number of hedge funds. Much of this has been due to the increase in the number of funds, but it has also been, though to a lesser extent, due to increases in the average size of individual funds, which rose from \$70 million in 1990 to \$100 million in 1997. From a relatively modest \$7 billion of assets under management in 1990, this figure had grown to \$81 billion (excluding funds of funds) by the third quarter of 1997 (Table 4 and Figure 1).

14. Unlike the picture that emerged in Table 1 based on the number of funds, macro hedge funds are much more important in terms of the share of the hedge fund industry's assets under their management (Table 4). There has, however, been a secular decline through the 1990s in the share of assets under their management, which fell from 65 percent in 1990 when they clearly dominated the industry, to 30 percent by 1997. Despite this secular decline the macro hedge funds continued to have the largest share of the industry's assets under management until 1996, being overtaken only in 1997 by the global funds. With \$25 billion of assets under management at the end of the third quarter of 1997, representing about 30 percent of the industry, though, the macro funds continue to manage a sizeable share of the industry's assets. The secular decline in the share of macro funds has been offset by increases in importance of global (\$29 billion, 37 percent), market neutral (\$16 billion, 20 percent), and event driven

---

<sup>9</sup>In keeping with the following tables on assets under management in the hedge fund industry, where the funds of funds are excluded from the totals to prevent double counting, such funds are also excluded from the percentages calculated in the lower panel of Table 1.

<sup>10</sup>Background paper III discusses the regulation of hedge funds, and the regulatory advantages of registering on- and off-shore.

(\$8 billion, 10 percent) funds. It is notable that assets under management by funds of funds is sizeable, and at \$18 billion in 1997, means that over 20 percent of investment in hedge funds was intermediated by these funds.

15. The stark difference in the importance of the macro hedge funds in the industry when measured by the number of funds and size of assets reveals, of course, that the funds in this segment of the industry have tended on average to be much larger than in the rest of the industry. In 1997, the average size of macro funds was \$462 million, while it was some \$80 million for global funds. The macro segment of the industry is in fact highly concentrated, with the seven largest (reporting) funds, ranging in size from \$1 billion to \$6 billion under management, representing over 80 percent of macro hedge fund assets.

16. It should be noted that the estimates reported above based on MAR's database of the number of hedge funds and the size of assets under management by the industry are at the lower end of available estimates. Compared to the 1,021 funds with assets under management of \$99 billion (including funds of funds) in MAR's database, HFR's database has 1,561 funds with assets under management of \$189 billion, while VIIFA reports it has 1,990 funds in its database with assets under management of \$146 billion. Due to the problem of voluntary self-reporting and, therefore, of missing funds from the databases noted above, the vendors were asked to provide estimates of the universe of hedge funds. HFR estimated the current universe of hedge funds, arrived at by conversations with industry participants to be 3,000 funds with \$368 billion in assets under management, while VHFA estimated the number of hedge funds at 5,500.

### **Survival rate**

17. While there have been a number of well-publicized failures of hedge funds over the years, the available evidence does not suggest that the industry is characterized by a spectacular or even high failure rate. HFR estimates, for example, that in any given year during 1994-97, the peak proportion of hedge funds in existence that closed was 7 percent. VHFA estimated that 10 percent of the funds in its current sample (built up over the 1990s) were defunct. Closures of these funds have occurred for a number of reasons unrelated to performance, including mergers or restructurings of partnerships into new or existing partnerships, managers or general partners leaving the fund for a new one, and managers retiring. There are in fact limited examples of hedge funds closing after incurring large losses.

### **Manager compensation, and incentives for risk taking**

18. Two key features of Jones's pioneering hedge fund have endured. First, as the definitions of hedge funds used by all of the vendors of hedge fund data discussed above make clear, the one—and perhaps the only—characteristic that all “hedge funds” have in common is that managers are compensated on the basis of performance and not as a fixed percentage of assets under management. While there are variations, the industry norm appears to be that hedge fund managers receive 15-20 percent of the funds' realized trading profits, plus a

management fee of 1 percent of assets annually. Some hedge funds have “hurdle” based incentive fees, which reward the general partner or manager for performance in excess of an agreed benchmark. Others have “high watermark” provisions requiring the general partner to make up losses prior to being able to receive additional incentive fees. This contrasts with the mutual fund industry where manager compensation is typically determined as a fixed-percentage of assets under management. Second, hedge fund managers, as partners in the limited investment partnerships, have their own capital invested in the funds they manage. This is again in sharp contrast to the mutual fund industry, where managers typically do not have any of their capital invested in the funds they manage. Moreover, while hedge fund managers as partners in the hedge fund must invest at least the minimum investment requirement of the fund, the norm would appear to be that most put in substantially in excess of the minimum, with many investing most, if not all, of their own investment capital in the funds they manage.

19. Both features have important implications for the behavior of hedge fund managers, that is in affecting the return objective of managers, and in their tolerance for risk. First, since hedge fund managers are compensated on the basis of the absolute size of the realized returns of the funds, they tend to be oriented towards achieving the highest absolute return, rather than focusing on performance measures based on averages in the fund management industry, as mutual fund managers tend to do. Second, they have a stronger incentive to minimize the possibility of losses since there are no fees to be earned in that event. Third, the investment of the fund manager’s own capital in the fund reduces the inducement for managers to take on risk. This is particularly important when the fund is losing money. As is well known from the example of commercial banks with guaranteed deposits, as capital falls, the incentives for bank managers to take on higher risk-higher yield endeavors—“betting the house”—increase, since the upside potential begins to rapidly dominate the limited downside where the liabilities are limited by the guarantee. Similarly potential perverse incentive problems arise for a manager of other investors’ funds—and who, therefore, bear the loss. These problems are avoided in the case of a hedge fund, since the fund managers have their own money at risk in the funds they manage.

20. It is frequently argued that hedge funds, because they are unregulated, take on more risk than, say, banks who are regulated and supervised, and in particular are subject to minimum capital requirements. Again, it is noteworthy that while the proprietary trading desks of banks are—since they are on the bank’s balance sheet—subject to minimum capital requirements which impose, in principle, a limit on the extent of leverage they can take on, the trader is essentially trading on the institutions’ capital and internal controls are necessary to limit a trader increasing risk in the face of losses. A trader that gets fired because of substantial losses incurred from taking on high risk investments does, of course, lose flow income. He does not, however, typically suffer an immediate loss in the stock of his existing wealth as does a hedge fund manager.

### **Redemption policies and implications for market dynamics**

21. Redemption periods for investors in hedge funds vary considerably but are well in excess of those for mutual funds.<sup>11</sup> Some hedge funds allow quarterly redemptions without notice, while “lock out” periods of as long as a year are common. One prominent hedge fund has recently instituted a staggered redemption schedule over a three year period. The substantially longer redemption horizon permits hedge fund managers to have longer investment horizons than say managers of open-ended mutual funds. The predictability of purchases and redemptions by small retail investors in mutual funds depending on market conditions makes their managers particularly prone to “momentum trading,” that is buying into a rising market, and selling into a falling market, increasing market volatility. Consider a mutual fund manager in a bull market, for example. He is aware that funds will be flowing in at a robust pace. It is, therefore, in his interest to reduce his average holdings of cash balances, and increase, for example, the proportion of his portfolio devoted to equities. The opposite is true in a falling market when the manager is aware that there will be a substantial outflow. It is then in his interest to increase holdings of cash balances, that is sell in a falling market. Hedge funds, with longer redemption horizons, have fewer incentives to engage in such momentum selling.

### **Decision-making process**

22. The decision-making process of most conventional organizations—including financial institutions—often requires several stages and is often opaque to the outsider. The process is also typically time-consuming, with certain investment decisions requiring the approval of fiduciary or oversight committees. The decision-making process of hedge funds, in contrast, is relatively straightforward, with the general partner and portfolio managers exercising considerable, if not total, discretion. This leaner institutional structure increases the ability of hedge funds to move quickly.

### **The investor base**

23. No formal information is available on the composition of the investor base for hedge funds. Discussions with hedge fund managers and investors in hedge funds, particularly fund of funds managers reveals, however, a clear trend toward an increasingly diversified investor base. While growth in the absolute number of “high net worth individuals” has provided a steady source of investors in hedge funds, institutional investors have shown a growing interest in investing in hedge funds. These institutional investors include the more traditional pension and mutual funds, insurance companies, endowments, foundations, universities, and

---

<sup>11</sup>These comparisons are only valid, of course, for open-ended funds.

commercial and investment banks.<sup>12</sup> As an asset class, investment in hedge funds has increasingly become mainstream, being viewed less and less as a high return-high risk investment, but increasingly as providing fair or superior returns for risk, and as a tool for portfolio diversification. This trend is likely to continue.

### **Leverage**

24. A feature of hedge funds' investment strategies that has always attracted attention has been their use of leverage. Since successful hedge funds have excellent (internal) credit standings with banks and brokers they have access to, and are extensive users of, leverage, it has been argued that a fund that begins with a pool of, say, \$1 billion in equity may actually have \$10 billion to play with in the market, thanks to its bank credit. Leveraging, thus greatly magnifies the economic clout of these funds, at the same time amplifying their returns and losses. Clout, of course, matters in itself in that hedge funds could corner and or move markets. It can also create a multiplier effect in the event of losses which could exacerbate market movements. For example, if losses lead to an increased demand by creditor banks or brokers for collateral on money lent to the hedge funds—a margin call—the funds may need to sell some of their other holdings to raise cash. This can also transmit negative shocks across markets. In the turmoil in U.S. bond markets during 1993–94 the macro hedge funds were ascribed an important role in exacerbating market volatility due to the substantial leveraged positions they held. Attention was focused first by the financial press, followed by investigations by various regulatory authorities in the United States, and with formal hearings by the Committee on Banking, Finance and Urban Affairs of the U.S. house of representatives.<sup>13</sup> It was argued at the time that the “deleveraging” of large positions built up by the macro hedge funds in the face of increases in interest rates by the Federal Reserve had magnified the effect on interest rates. It was also argued that the margin calls on hedge funds' U.S. bond positions caused them to liquidate positions in European bond markets, causing a spillover into these markets, which would otherwise have been unaffected by developments in U.S. interest rates.<sup>14</sup>

---

<sup>12</sup>While data is hard to come by, there are some well-publicized reports of institutional investments in hedge funds. White (1995), for example, reports that the Rockefeller foundation allocated 5 percent of its portfolio to hedge funds.

<sup>13</sup>The New York Federal Reserve and the Bank of England both reportedly undertook investigations of the terms, conditions, and quantity of leverage extended by banks in their jurisdictions to hedge funds.

<sup>14</sup>In March 1994 the central bank governors of the G-10 countries, at their monthly meeting at the Bank for International Settlements, were reported, however, to have judged the movements in markets as a justified “correction.” See *The Banker* (1994).

25. Because of both conceptual problems in how precisely to measure the total use of leverage in a portfolio and self-reporting biases, the available data on the reported use of leverage by hedge funds is particularly unsatisfactory. In the MAR database, 48 percent of hedge funds (measured by asset size) either report not using leverage at all, or do not report their use of leverage (Table 5). Of the macro hedge funds, over 80 percent fall into this category, while of the global funds about 50 percent fall into this category. This lack of coverage effectively renders any discernible patterns on the use of leverage across segments of the industry and their effects on risk and return as unrepresentative. The MAR data do suggest, however, that at least 50 percent do use leverage. HFR estimates that during the 1990s, between 60-70 percent of hedge funds used leverage, while 15-20 percent did not, and the remainder did not report. The HFR data reveal a modest increase in the proportion of firms using leverage during the 1990s, though this increase largely offsets a decline in the share of nonreporting funds, suggesting that this increase may simply reflect improved reporting. HFR's estimates suggest that over 80 percent (of the total number) of macro hedge funds use leverage. VHFA reports an estimated 70 percent of hedge funds use leverage, that about half of all hedge funds have leverage ratios of less than 2, and only 15 percent have leverage ratios in excess of 2.

26. It should be emphasized that there are fundamental unresolved issues in how appropriately to measure the extent of leverage used by investors. While the measurement of the extent of leverage used by an investor in a single instrument class or, say, by an institutional investor that specializes in one instrument class such as an equity or bond mutual fund is straightforward, the issue is considerably more complicated for investors in a portfolio of securities. Most popular notions of the use of leverage—by hedge funds or anyone else for that matter—tend to gross up notional positions and compute a ratio relative to capital, which for hedge funds is total assets under management. Investment strategies employed by hedge funds—and in particular the taking of short positions—make this measure not only less than ideal but in principle, highly misleading. What is the leverage ratio, for example, of a market neutral equity fund established with \$50 of investor capital that, using the common 2 to 1 leverage ratio available for highly rated borrowers on blue-chip equities in the United States, takes a long equity position of \$50 (using \$25 of capital) and simultaneously a short equity position of \$50 (using the other \$25 of capital)? Traditional measures of leverage which grossed up the notional value of each position (sum of \$100) and divided by capital (\$50) would place the leverage ratio of the fund at 2. However, this ignores the fact that the market risk in the long and short positions actually offset each other. If the short position is subtracted from the long position in calculating market exposure or what could be described as a “risk-adjusted” measure of leverage, the leverage in the portfolio would in fact be calculated as zero. In reality, of course, the evaluation of the extent of leverage employed in actual portfolios is substantially more complicated when there are a variety of long and short positions in different instruments—in equities, bonds, currencies, commodity futures, and derivative instruments.

27. It is misleading to single out hedge funds because of the use of leverage in their investment strategies. Other institutional investors, as noted above, in particular the



proprietary trading desks of commercial and investment banks use leverage in investment activities, much as hedge funds do. The traditionally more conservative institutional investors such as mutual and pension funds have also begun to increasingly employ currency and market-risk hedges. These instruments inherently create leverage. Finally, it should be noted that traditional commercial banks are some of the most leveraged players in financial markets. With commercial banks' average capital ratios (unadjusted for credit risk) ranging in the industrial countries between 3.5 to 8 percent, their implied gearing or leverage ratios are between 12 and 29.<sup>15</sup> The bottom of this range exceeds the highest reported leverage ratios for any hedge fund.

#### **D. Performance: Return, Risk, and Diversification Comparisons**

28. Over the 1990s, average annual compound returns of the majority of hedge fund investment styles—sectoral (34 percent), macro (29 percent), event driven (19 percent) and global (19 percent)—have handily exceeded those on the mature equity markets as measured by the S&P 500 (16 percent) and on bond markets as measured by J.P. Morgan's Government Bond Index (GBI) (8 percent) (Table 6, panel 1, and Figure 2). With returns on sectoral and macro funds almost double those of the S&P 500 on an average annual compounded basis, they have yielded cumulative returns over the 1990s of 861 percent and 617 percent, respectively, compared to 233 percent on the S&P 500. Returns on funds of funds were very similar over the period to those of the S&P 500, while those of market neutral funds, and—as would be expected—those of dedicated short-sales funds well below those of the S&P 500.

29. Only some of the higher returns on hedge funds have been associated with higher volatility (Table 6, panel 2). The investment styles with the highest returns, the sectoral and macro funds, have indeed been associated with the highest volatility of returns, exceeding that of the S&P 500, as has that of dedicated short-sales funds. The volatility of event driven, global, market neutral, and funds of funds, on the other hand, has been below that of the S&P 500. The remarkably low volatility of returns of market neutral funds is notable at a sixth that of the S&P 500, as is that of event driven funds and funds of funds at less than half that of the S&P 500.

30. On a risk-adjusted return comparison, each of the segments of the hedge fund industry—with the exception of dedicated short-sales funds—outperformed the S&P 500 during the 1990s (Table 6, panel 3). The high volatility of returns of the sectoral and macro funds offsets to a considerable extent their high returns, but still yields a favorable comparison with the S&P 500. Event driven and market neutral funds provide, on the other hand, a return-risk combination that exceeds that on the S&P 500 by a factor of two, while that on funds of funds is only modestly below this.

---

<sup>15</sup>See Chadha and Folkerts-Landau (1997).

31. Because of the differences in strategies of hedge fund investments with traditional long portfolios of stocks and bonds, and the resulting lack of systematic correlation with returns from these traditional sources, investments in hedge funds provide a powerful tool for portfolio diversification. The low correlations of hedge fund returns by investment styles with returns in bond and equity markets reveals the tremendous advantages of portfolio diversification—raising returns without increasing risk—available to a bond or equity only investor by allocating a proportion of his portfolio to hedge funds (Table 7). The highest correlation of hedge fund returns with the S&P 500 over the period is that of the global funds at 0.7. That for event driven funds is 0.4, and that of macro funds 0.3. As would be expected, the correlation of dedicated short-sales funds with the S&P 500, and this is, of course, the reason for the existence of such funds, is strongly negative at -0.5.

#### **E. Macro Events and the Performance of Macro Hedge Funds**

32. The macro hedge funds have on several occasions been ascribed important roles in affecting aggregate market dynamics, and their reported investment activities routinely attract considerable attention. They could play a pivotal role in affecting market dynamics by either taking quantitatively important positions in a market thereby moving prices, or they could be market leaders with other investors following. Because of their use of leverage and their potential ability to mobilize large pools of capital, market participants have argued that when the hedge funds are buying into a market, they push prices to high, perhaps unsustainable levels, and when they sell, the complaint is that they exaggerate the speed and extent of the price adjustment. Unless one is to argue that each one of the macro funds can mobilize huge amounts of capital, these arguments also reflect the implicit belief that many of the macro hedge funds have simultaneously taken similar positions. Their consistently high rates of return have also, on occasion, led to reports that the hedge funds, ahead of the investor pack, tend to “get it right” almost always.

33. Figures 3 plot the returns of the two largest macro hedge funds in the periods surrounding the 1987 stock market crash, the 1992 ERM crisis, the turbulence in U.S. bond markets in early 1994, and the July 1997 collapse of the Thai baht, respectively. Ideally one would want to examine the returns of more than two funds. Longer time series of returns are, however, only available for these two funds. Both are prominent funds, run by different general partners and managers and, each with assets under management of a little less than \$6 billion, together account for almost half the macro hedge fund industry's assets.

34. Clearly neither of the two funds predicted the September 1987 stock market crash, and were not in any sense ahead of the curve. Both funds made substantial losses of about 30 percent during the month (Figure 3a). The turbulence in U.S. bond markets in early 1994 does not appear to have had a severe effect on the returns of either fund. Both funds made modest losses at the time, with one losing a cumulative 11 percent during February-April of the year and the other losing 8 percent (Figure 3b). Only one of the funds made substantial gains at the time of the devaluation of the pound sterling in September 1992, of about 25 percent, while the other made relatively modest gains of around 5 percent (Figure 3c). In

this case it is notable that the fund that made the large gains, suffered large losses a few months later of almost similar magnitude. This suggests that the high profile events such as the ERM crisis have not been the only events from which the hedge funds gained or lost. Both funds made good returns at the time of the devaluation of the Thai baht, though at around 10 percent these returns were much more modest than at the time of the pound sterling's devaluation (Figure 3d).

35. Returns of both of the funds were clearly impacted, albeit to varying degrees by the four events. The extent of correlation in returns among the two funds varies across the events. In some instances it has been high. However, much of this correlation comes, no doubt, from movements in the general level of the market. In figure 3a, for example, the quick rebound in returns of both funds in the lower panel by December 1987 is associated with a rebound in the U.S. equity market. The correlation of returns in the two funds between January 1986 and September 1997 is 0.4, which is relatively modest. Correlations between five of the largest funds run by different general partners over the more recent period from September 1993 to September 1997, for which data is available, range from a high of 0.6 to a low of -0.1, again suggesting a diversity of investment strategies (Table 8).

## **F. Conclusions**

36. Hedge funds have been in existence for some time. Since their inception in the late 1940s, however, as funds that held a substantial portion of their portfolios in offsetting long and short equity positions, the industry has grown rapidly since the late 1980s, evolving into a diverse set of funds offering several distinct specialized investment strategies. Two characteristics, namely a performance-based fee structure for managers, and the investment of the general partner and fund manager's own capital in the funds they manage, have endured. These features encourage fund managers to seek the highest absolute returns while at the same time limit the incentives for taking on risk. During the 1990s, returns of the majority of hedge fund investment styles substantially exceeded those in the mature equity markets, and only some of the higher returns have been associated with higher volatility. When adjusted for risk, returns in each segment of the hedge fund industry exceeded those on mature equity markets such as the S&P 500. The use of leverage by hedge funds is often cited as a primary factor behind hedge funds' high returns. Hedge funds, however, are neither the sole users of leverage in investment strategies, nor, it would appear, are they the most leveraged players in financial markets. The ability of hedge fund managers to use leverage and a variety of other investment tools such as short selling, their small size, and internal structure makes them more agile and quick in responding to new information than other institutional investors. The high returns for risk and low correlations with traditional benchmark portfolios offered by hedge fund investments have caused a growing interest in the industry. Investment in hedge funds has gradually become mainstream, with increasing institutional investor participation, and the industry appears set to continue to grow rapidly.

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
<b>Total (including fund of funds)</b>	<b>1</b>	<b>22</b>	<b>128</b>	<b>177</b>	<b>252</b>	<b>372</b>	<b>539</b>	<b>712</b>	<b>909</b>	<b>1,021</b>
<b>Total (excluding fund of funds)</b>	<b>1</b>	<b>18</b>	<b>96</b>	<b>132</b>	<b>189</b>	<b>287</b>	<b>406</b>	<b>534</b>	<b>692</b>	<b>774</b>
<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
<b>Total (excluding fund of funds)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: MarHedge.

Definitions: 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.

1/ At end-period.

2/ Excluding fund of funds.

Table 2. Hedge Funds: Number of Funds by Domicile, 1997

	Global	Macro	Market neutral	Event driven	Sector	Short sales	Long only	Fund of funds	Total
<i>(In millions of U.S. dollars)</i>									
Austria	0	1	0	0	0	0	0	0	1
Bahamas	18	0	8	4	0	1	0	13	44
Bermuda	36	3	27	2	4	0	0	21	93
British Virgin Islands	58	9	22	16	2	2	0	68	177
British West Indies	0	0	1	0	0	0	0	0	1
Canada	0	0	0	1	0	0	0	2	3
Cayman Islands	66	14	24	12	2	2	2	10	132
Channel Islands	0	0	0	2	0	0	0	0	2
Curacao	0	0	0	0	0	0	0	0	0
Guernsey	4	0	0	0	0	0	0	6	10
Hong Kong	0	1	0	0	0	0	0	0	1
Ireland	4	1	1	0	0	0	0	1	7
Isle of Man	0	0	0	0	0	0	0	1	1
Luxembourg	3	0	4	0	0	0	0	0	7
Netherlands	2	0	1	0	0	0	0	0	3
Netherlands Antilles	4	4	0	1	0	0	0	9	18
Turks & Caicos	0	0	0	0	0	0	0	1	1
United Kingdom	0	0	1	0	0	0	0	0	1
United States	174	20	90	78	23	6	13	115	519
<b>Total</b>	<b>369</b>	<b>53</b>	<b>179</b>	<b>116</b>	<b>31</b>	<b>11</b>	<b>15</b>	<b>247</b>	<b>1,021</b>
<i>(In percent of total)</i>									
Austria	0	2	0	0	0	0	0	0	0
Bahamas	5	0	4	3	0	9	0	5	4
Bermuda	10	6	15	2	13	0	0	9	9
British Virgin Islands	16	17	12	14	6	18	0	28	17
British West Indies	0	0	1	0	0	0	0	0	0
Canada	0	0	0	1	0	0	0	1	0
Cayman Islands	18	26	13	10	6	18	13	4	13
Channel Islands	0	0	0	2	0	0	0	0	0
Curacao	0	0	0	0	0	0	0	0	0
Guernsey	1	0	0	0	0	0	0	2	1
Hong Kong	0	2	0	0	0	0	0	0	0
Ireland	1	2	1	0	0	0	0	0	1
Isle of Man	0	0	0	0	0	0	0	0	0
Luxembourg	1	0	2	0	0	0	0	0	1
Netherlands	1	0	1	0	0	0	0	0	0
Netherlands Antilles	1	8	0	1	0	0	0	4	2
Turks & Caicos	0	0	0	0	0	0	0	0	0
United Kingdom	0	0	1	0	0	0	0	0	0
United States	47	38	50	67	74	55	87	47	51
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: MarHedge.

Table 3. Hedge Funds: Assets Under Management by Domicile, 1997

	Global	Macro	Market neutral	Event driven	Sector	Short sales	Long only	Fund of funds	Total
<i>(In millions of U.S. dollars)</i>									
Austria	0	1	0	0	0	0	0	0	1
Bahamas	1,083	0	222	298	0	22	0	243	1,868
Bermuda	4,085	118	1,547	7	508	0	0	807	7,072
British Virgin Islands	4,933	1,141	1,186	1,827	3	113	0	4,161	13,365
British West Indies	0	0	250	0	0	0	0	0	250
Canada	0	0	0	13	0	0	0	231	244
Cayman Islands	4,194	4,265	3,643	671	14	126	52	114	13,080
Channel Islands	0	0	0	356	0	0	0	0	356
Curacao	0	0	0	0	0	0	0	0	0
Guernsey	1,139	0	0	0	0	0	0	512	1,650
Hong Kong	0	3	0	0	0	0	0	0	3
Ireland	81	4	10	0	0	0	0	102	199
Isle of Man	0	0	0	0	0	0	0	102	102
Luxembourg	287	0	1,274	0	0	0	0	0	1,561
Netherlands	28	0	24	0	0	0	0	0	53
Netherlands Antilles	5,373	15,406	0	776	0	0	0	6,393	27,948
Turks & Caicos	0	0	0	0	0	0	0	32	32
United Kingdom	0	0	41	0	0	0	0	0	41
United States	8,412	3,571	8,035	3,933	1,248	188	239	5,522	31,148
<b>Total</b>	<b>29,615</b>	<b>24,510</b>	<b>16,233</b>	<b>7,881</b>	<b>1,774</b>	<b>450</b>	<b>291</b>	<b>18,218</b>	<b>98,972</b>
<i>(In percent of total)</i>									
Austria	0	0	0	0	0	0	0	0	0
Bahamas	4	0	1	4	0	5	0	1	2
Bermuda	14	0	10	0	29	0	0	4	7
British Virgin Islands	17	5	7	23	0	25	0	23	14
British West Indies	0	0	2	0	0	0	0	0	0
Canada	0	0	0	0	0	0	0	1	0
Cayman Islands	14	17	22	9	1	28	18	1	13
Channel Islands	0	0	0	5	0	0	0	0	0
Curacao	0	0	0	0	0	0	0	0	0
Guernsey	4	0	0	0	0	0	0	3	2
Hong Kong	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	1	0
Isle of Man	0	0	0	0	0	0	0	1	0
Luxembourg	1	0	8	0	0	0	0	0	2
Netherlands	0	0	0	0	0	0	0	0	0
Netherlands Antilles	18	63	0	10	0	0	0	35	28
Turks & Caicos	0	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0	0
United States	28	15	49	50	70	42	82	30	31
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: MarHedge.

Table 4. 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
<b>Total (including fund of funds)</b>	<b>193</b>	<b>814</b>	<b>8,295</b>	<b>12,311</b>	<b>18,610</b>	<b>36,645</b>	<b>47,956</b>	<b>52,230</b>	<b>75,719</b>	<b>98,973</b>
<b>Total (excluding fund of funds)</b>	<b>193</b>	<b>624</b>	<b>6,959</b>	<b>10,371</b>	<b>15,523</b>	<b>30,184</b>	<b>39,939</b>	<b>42,942</b>	<b>62,712</b>	<b>80,755</b>
<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
<b>Total (excluding fund of funds)</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Fund of funds 3/</b>	<b>0</b>	<b>30</b>	<b>19</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>20</b>	<b>22</b>	<b>21</b>	<b>23</b>

Source: MarHedge.

Definitions: 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.

1/ At end-period.

2/ Excluding fund of funds.

3/ Proportion of assets channeled through fund of funds.

Table 5. Leverage by Investment Style, September 1997

(In millions of U.S. dollars)

	Global	Macro	Market neutral	Event driven	Sector	Short sales	Long only	Fund of funds	Total	% of Total
Not reported	14,583	20,369	5,819	3,087	131	110	2	3,893	47,994	48
Minimal	897	75	782	273	87	165	1	632	2,911	3
1-100%	5,497	828	1,356	1,446	451	44	111	8,472	18,205	18
101-200%	4,108	222	1,349	2,294	1,100	19	5	38	9,135	9
201-300%	228	78	395	490	0	0	0	119	1,310	1
>300%	0	1,620	3,843	5	0	0	0	13	5,481	6
Medium	2,423	0	0	95	3	1	0	0	2,522	3
Maximum	0	0	2	9	0	0	3	0	14	0
Varies	1,880	1,318	2,686	182	1	110	170	5,051	11,399	12
Total	29,615	24,510	16,233	7,881	1,774	450	291	18,218	98,972	100

Source: MarHedge.



Table 6. Returns, Volatility, and Risk Adjusted Returns by Investment Style

(In percent)

	1990-91	1992-93	1994-95	1996-97	1990-97
Compound Annual Returns by Investment Style					
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 by Investment Style					
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 by Investment Style 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 7. Correlations of Hedge Fund Returns with Benchmark Indices,  
January 1990-September 1997

	S&P500	MSCI	GBI
Global	0.7	0.5	0.3
Macro	0.3	0.2	0.4
Market neutral	0.2	0.2	0.0
Event driven	0.4	0.3	0.2
Sector	0.6	0.4	0.3
Short sales	-0.5	-0.3	0.0
Long only	0.6	0.4	0.3
Fund of funds	0.6	0.4	0.5
S&P500	1.0	0.7	0.6
MSCI	0.7	1.0	0.4
GBI	0.6	0.4	1.0
Lipper Mutual Funds 1/	0.5	0.7	0.2

Source: MarHedge.

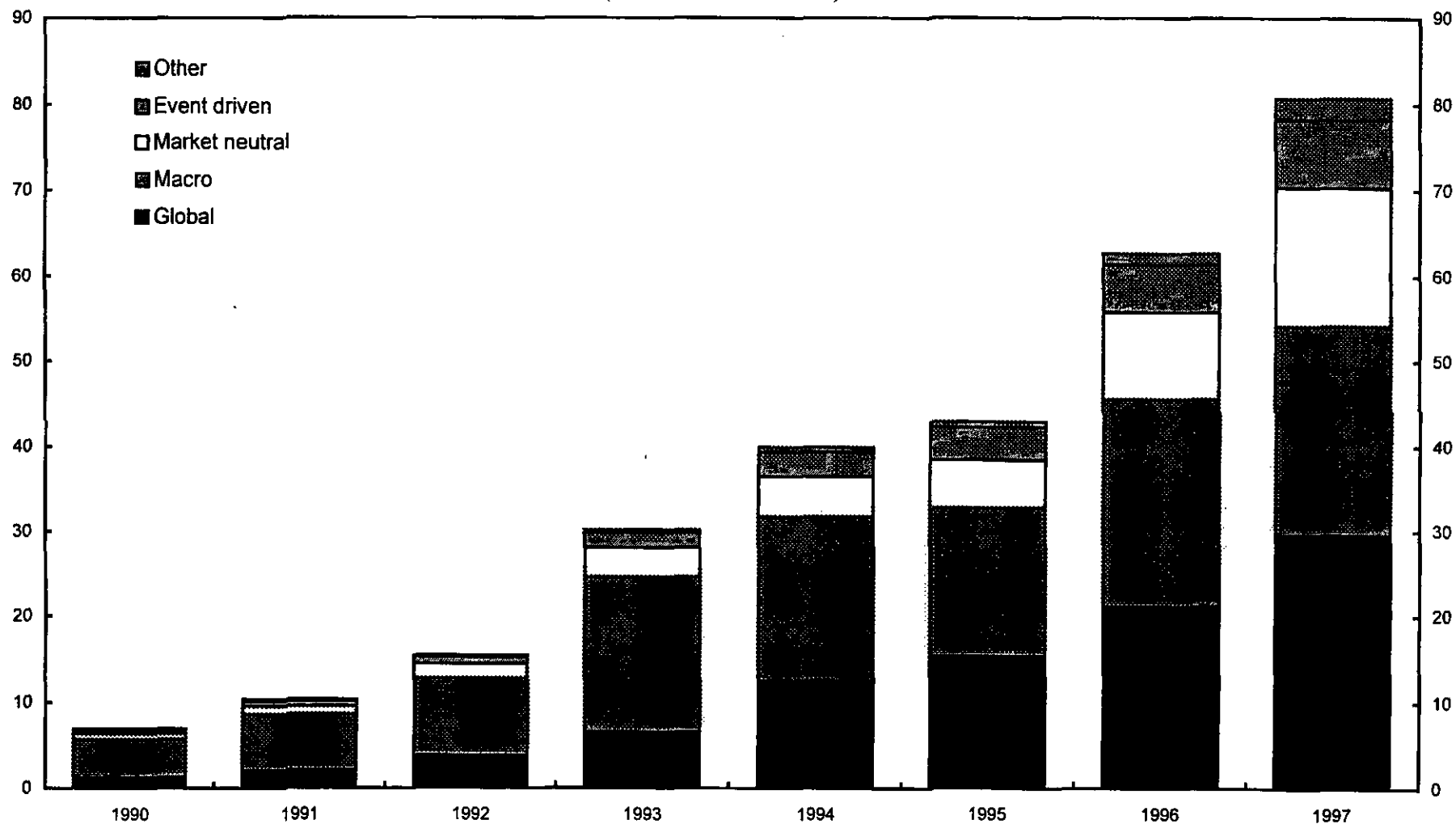
1/ Global Equity Index.

Table 8. Correlation of Returns Among Large Macro Hedge Funds, September 1993-97

	A	B	C	D	E
A	1.0	...	...	...	...
B	0.4	1.0	...	...	...
C	0.4	0.6	1.0	...	...
D	-0.1	0.0	0.0	1.0	...
E	0.5	0.3	0.3	-0.1	1.0

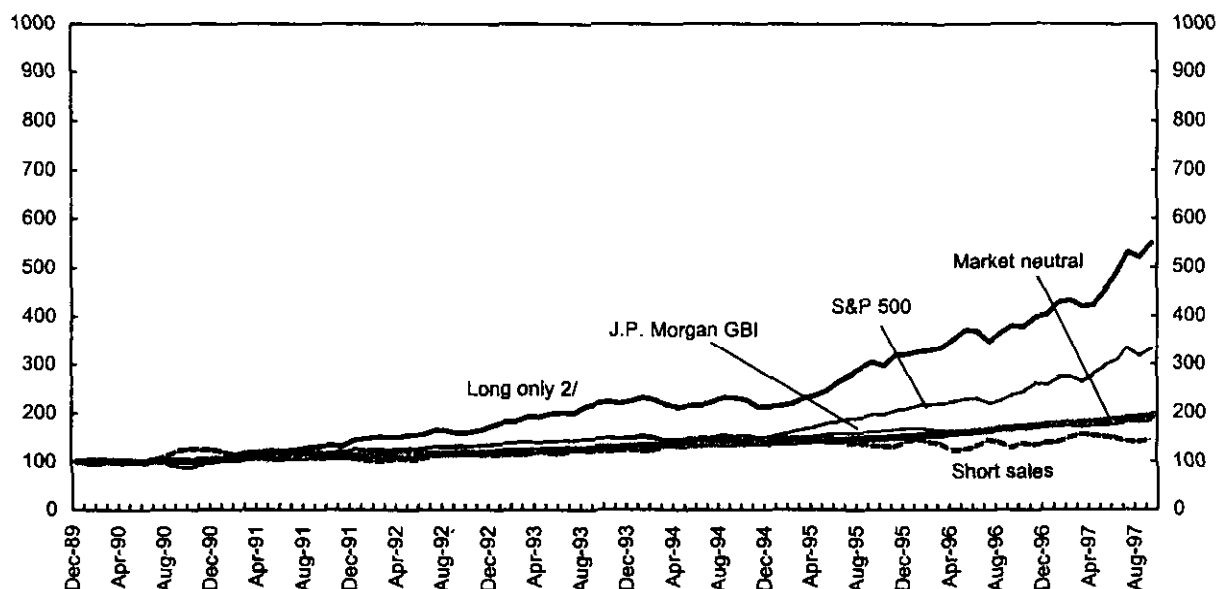
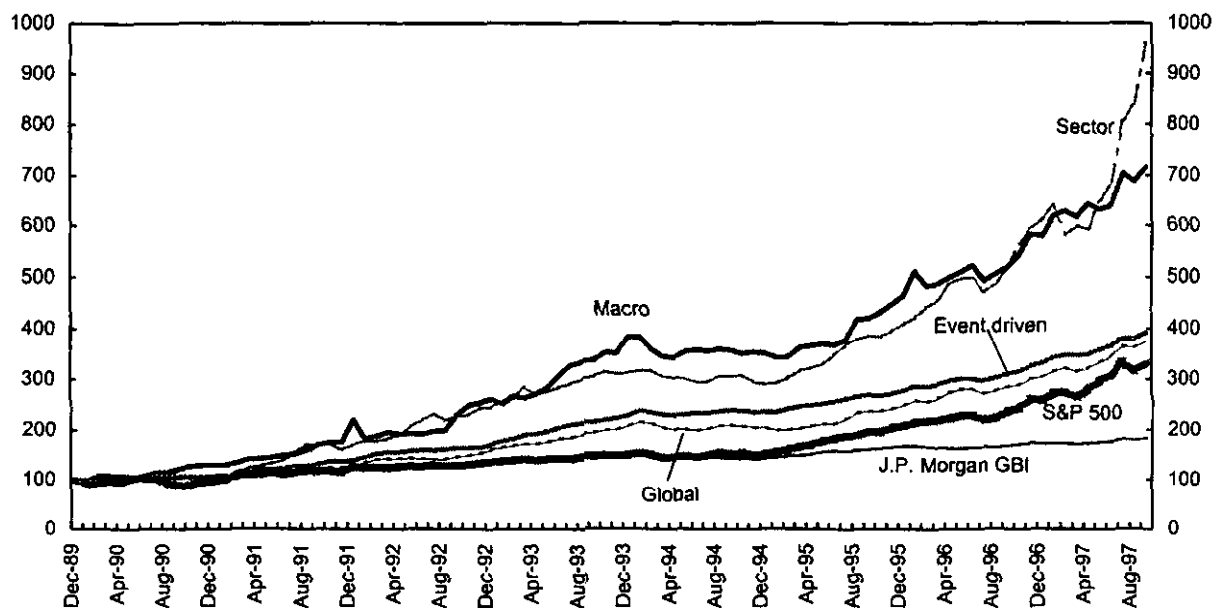
Source: MarHedge.

Figure 1. Hedge Funds: Assets Under Management by Investment Style, 1990-97 1/  
(In billions of U.S. dollars)



Source: MarHedge.  
1/ Excluding fund of funds.

Figure 2. Monthly Total Returns by Investment Style, December 1989-September 1997 1/  
(December 1989=100)

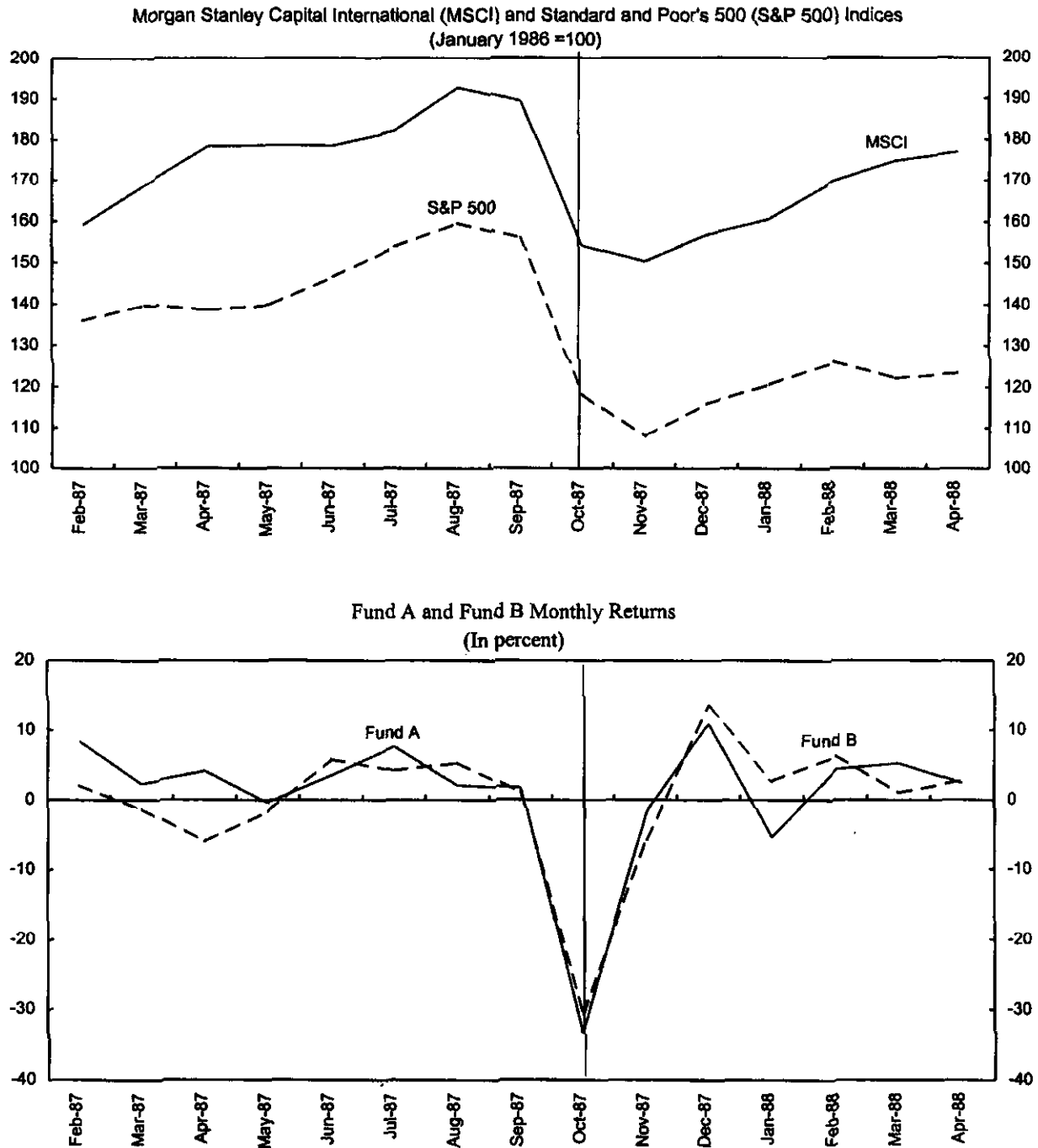


Sources: Bloomberg; and MarHedge.

1/ Weighted by assets under management.

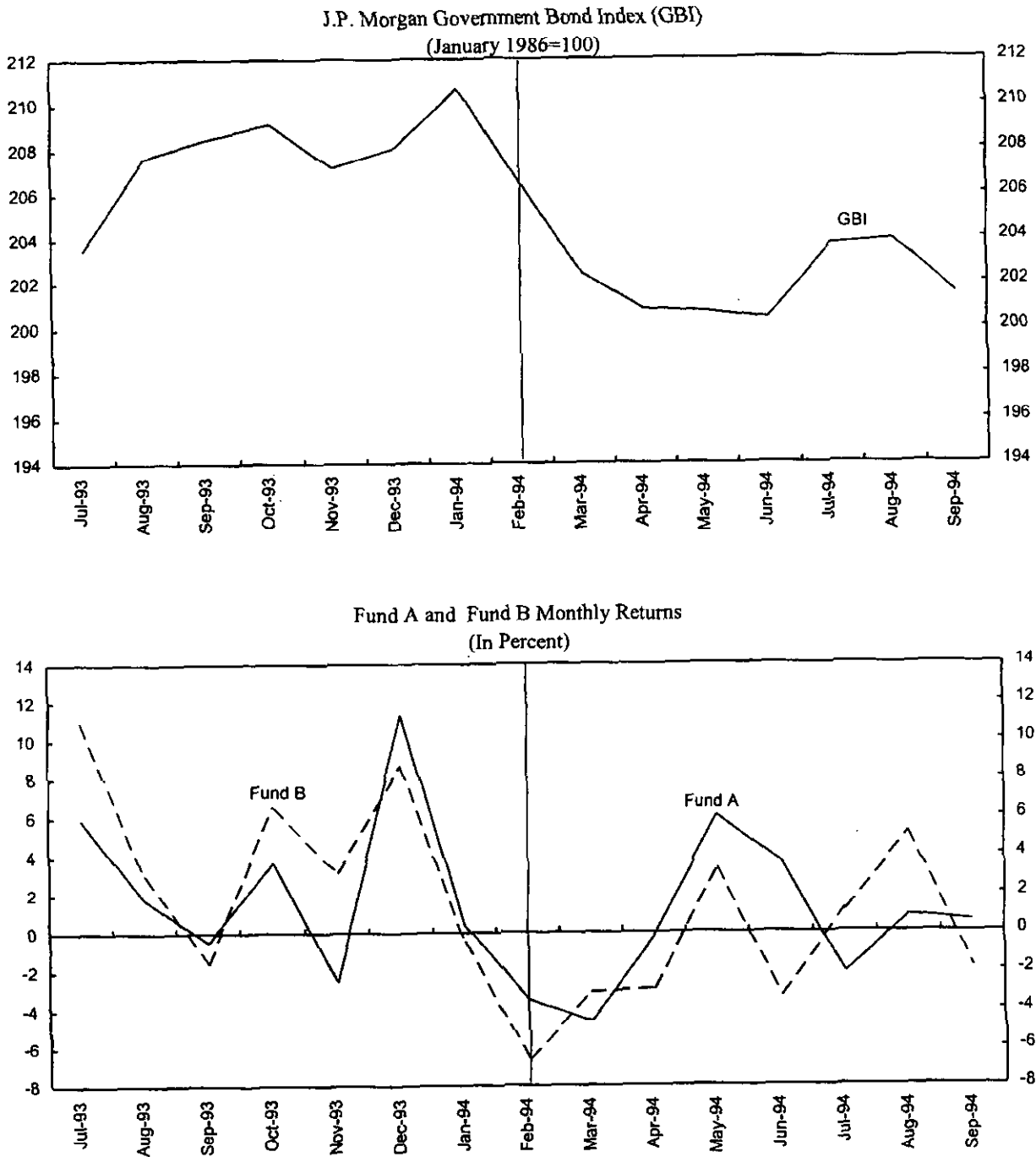
2/ December 1990=100.

**Figure 3a. Large Macro Hedge Fund Returns and Macro Economic Events**  
(The 1987 Stock Market Crash)



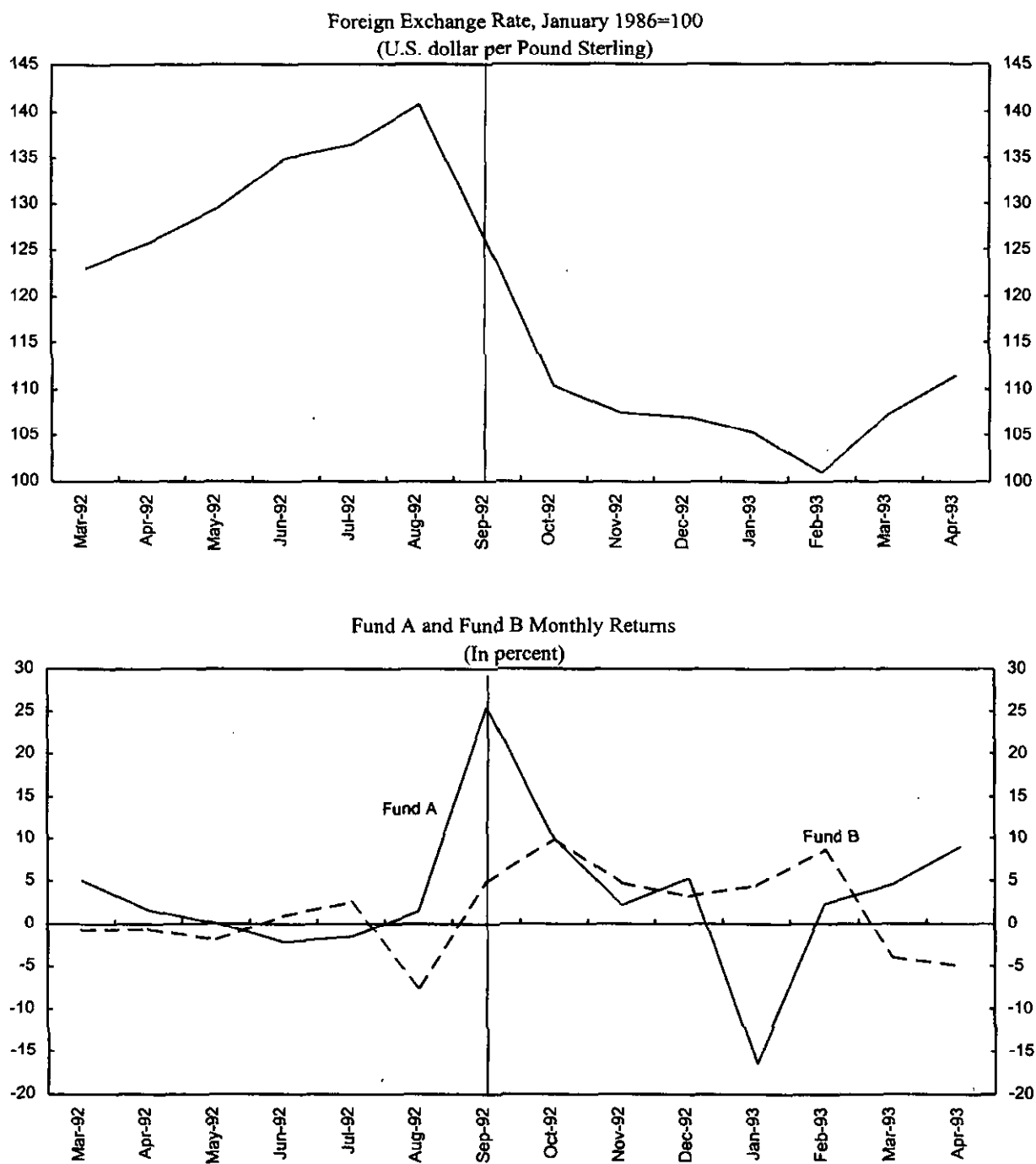
Sources: Bloomberg; and MarHedge.

Figure 3b. Large Macro Hedge Fund Returns and Macro Economic Events  
(The 1994 Turbulence in U.S. Bond Markets)



Sources: Bloomberg; and MarHedge.

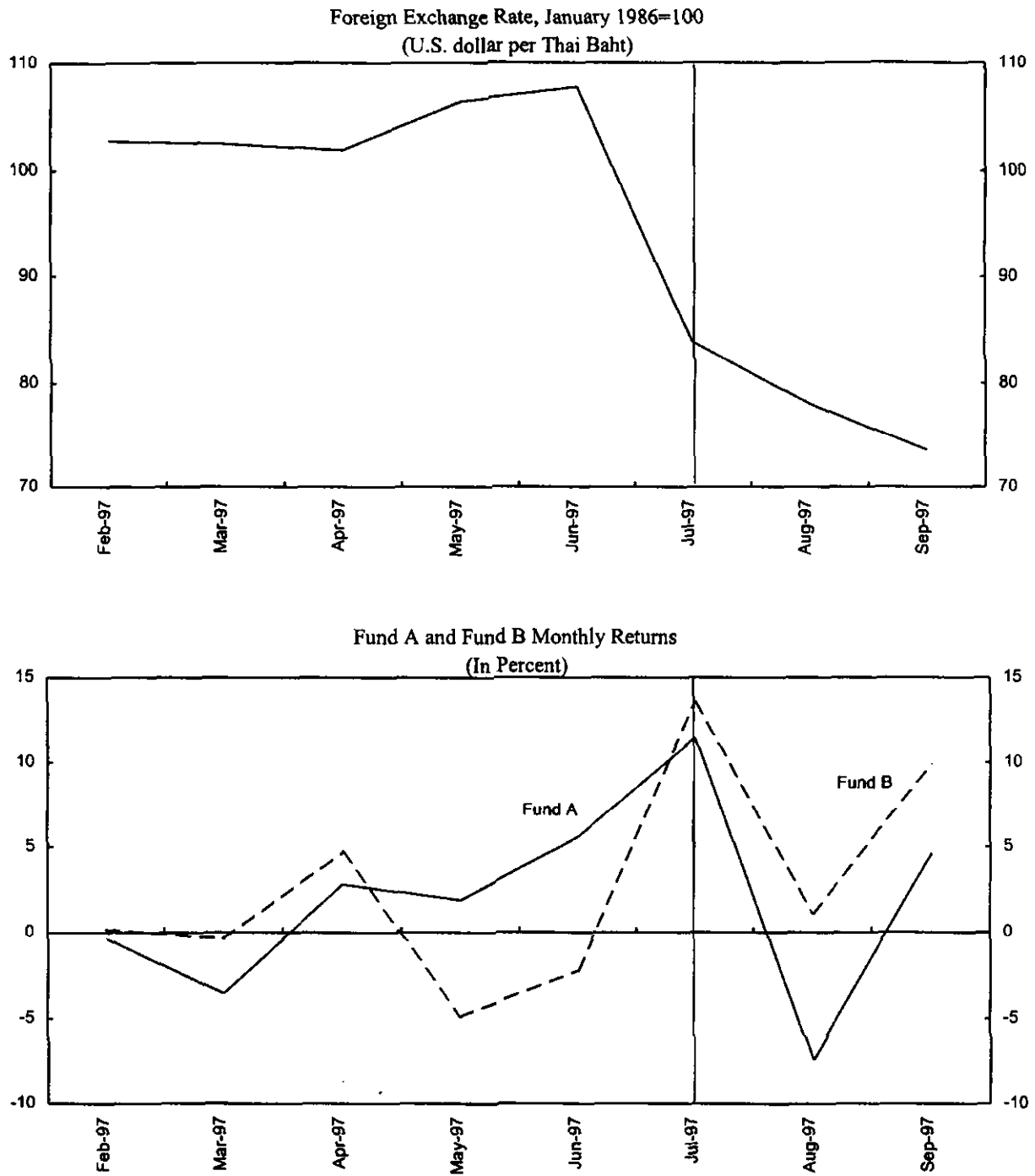
Figure 3c. Large Macro Hedge Fund Returns and Macro Economic Events  
(The 1992 Devaluation of Pound Sterling)



Sources: Bloomberg; and MarHedge.



Figure 3d. Large Macro Hedge Fund Returns and Macro Economic Events  
(The Devaluation of the Thai Baht)



Sources: Bloomberg; and MarHedge

## II. HEDGE FUND INVESTMENT STRATEGIES<sup>16</sup>

37. Perhaps one reason it is difficult to arrive at a definitive characterization of hedge funds is the wide variety of investment strategies they undertake. Hedge funds, as portrayed in most press reports, have been variously discussed as “gunslingers” and “swaggering buccaneers” who routinely test the resolve of authorities in various countries.<sup>17</sup> However, in truth, the managers of hedge funds employ a vast array of investment strategies with the goal of producing profits for themselves and their investors. Their strategies include trades aimed at taking a view about the macroeconomic policies of selected countries as well as seemingly arcane movements in the pricing of the cash/futures relationship for the 30-year U.S. Treasury bond: hedge funds operate both as speculators as well as hedgers. Since hedge fund investment strategies are only limited by the constraints imposed in their own prospectuses, it should not be surprising that their strategies cover a myriad of markets and instruments.

38. Although several data vendors classify hedge funds into as many as 28 different categories,<sup>18</sup> for the purposes here two main types are discussed—funds using arbitrage-type strategies and funds attempting to profit from perceived discrepancies in macroeconomic policies, the so-called “macro funds.” An “all-else” category that includes individual sectors and special strategies is discussed in general terms to convey the diversity in the mix of strategies. Some discussion of various categories of hedge funds is also presented in Chapter I, matching the data source used to analyze various features of hedge funds. It is worth stressing that most categorizations of hedge funds are done for the purpose of helping investors understand how funds intend to make money. However, while hedge funds may mostly use a given strategy, undoubtedly there are variations on the theme, and hedge funds are apt to assure themselves some latitude in their prospectus as to the types of strategies they can undertake. Thus, the characterizations below should not be taken too literally.

39. The types of instruments used by hedge funds to implement their strategies can be quite varied. As a general rule, however, the instruments can be divided into three types: (1) spot or cash instruments; (2) futures, forwards and swaps; and (3) options and contingent claims. The payoffs and risks inherent in these instruments are slightly different and thus it will be useful to separate them. Table 9 provides a very broad characterization of the types of instruments hedge funds are permitted to use, given their prospectuses. Since these data are based on the instruments that hedge funds claim they might use, the table should not be

---

<sup>16</sup>This chapter was prepared by Laura Kodres of the Capital Markets and Financial Studies Division of the Research Department.

<sup>17</sup>See Celarier (1994).

<sup>18</sup>Appendix I provides the classification and description of hedge funds provided by Hedge Fund Research, Inc.

interpreted as an indication of the frequency of their use. Further some of the hedge funds do not indicate the types of instruments they use in the data set.

40. Of the types of instruments hedge funds use, spot or cash market instruments are usually the simplest to understand. For the most part, a standard list of these instruments would be foreign exchange spot contracts, fixed-income and equity securities without any special features. The management of the risks of cash market positions is relatively straightforward in that one needs only have historical and current information about price levels (and perhaps forecasts of future values). This is not to say, however, that the actual risk is negligible, just that calculating various measures of risk can be undertaken relatively easily. For instance a position in Russian GKO government bonds or the Hungarian forint may be straightforward to value, but the risk of loss may be quite high. Many hedge funds use only spot or cash instruments to effect their strategies. Some use mostly spot or cash instruments, occasionally combining them with futures, forwards, or options to reduce certain risks.

41. Futures, forwards, and swaps are all instruments which have similar payoffs to spot and cash instruments in that their values either increase or decrease more or less one-for-one with the values of the instruments underlying them—that is, they have linear payoff structures. Since these instruments mature in the future, there is often additional risk, termed “basis risk” that their movements may not exactly move with the underlying spot or cash rate until close to maturity. Thus, controlling and monitoring risks in these instruments is slightly more difficult than for pure spot or cash instruments. Hedge funds are often large users of these instruments, particularly futures and forwards, as it allows them to take positions on the movement of the underlying spot or cash market without having to hold the instrument itself (until delivery). Most funds have no particular commercial interest in owning the underlying instrument, which can sometimes entail a commodity with special storage issues (such as oil or soybeans), and prefer to offset their positions prior to the maturity of the contract. Among the most commonly used instruments are currency forwards, fixed-income futures and swaps, and equity index products.

42. Options and other contingent claims are very different from both of the other two types of instruments because they have payoffs which are either zero or some positive amount, depending on the value of the underlying instrument. Because options provide the “option” but not the obligation to execute the contract, the payoff from options is called “convex” and is non-linear. This difference has several implications, the most important of which is that managing the risk in a portfolio of options is much more complicated than managing the risk of a set of spot or forward positions. Another feature of options is that while buyers are typically required to make an up-front payment of the cost of the option, if the strike price of the option<sup>19</sup> is substantially different from the current price then a given movement in the value of the underlying instrument may lead to a larger change in the value of the option. This

---

<sup>19</sup>The strike price of an option is the price at which a call buyer contracts to buy the underlying instrument or the price at which the put buyer contracts to sell the underlying instrument.

feature provides greater leverage, in the sense of a larger potential price move in the option than in the underlying instrument.

#### **A. Strategies Used by Arbitrage-type Hedge Funds**

##### **Analytics behind the strategies**

43. Arbitrage is defined as the ability to profit from current price discrepancies in two instruments that will, at their expiry or maturity, have the same value, or a value which is different by a known (uncertain) amount at the time the arbitrage is initiated. The use of the term “arbitrage” has been slowly loosened to refer to various misalignments or “mispricings” of similar instruments or instruments which are thought to have similar characteristics or underlying driving factors. Despite the weakening of the original definition, generally, hedge funds that view themselves as using an arbitrage strategy utilize some type of analytical model which values various instruments and attempts to profit from the discrepancy between their “model” value and the actual market price. The key is that this type of strategy always involves two transactions: a purchase of the “undervalued” instrument and a sale of the “overvalued” instrument. An outright purchase of an undervalued equity security, for example, would not qualify as an “arbitrage.”

44. There are many types of arbitrage strategies that can be undertaken. An obvious one involves the simultaneous purchase and sale of two instruments that are expected at expiry or maturity to have the same value. Many hedge funds that trade a cash instrument against its futures counterpart a classic case for arbitrage. The most popular in the United States is the U.S. Treasury Bond futures contract, in which self-declared, large participant hedge funds hold about 8 percent of the open interest.<sup>20</sup> In this case the object is to profit from a misalignment in the futures price of the cheapest-to-deliver bond, the one bond among those qualifying for delivery that would be cheapest for the seller of the futures contract to deliver,<sup>21</sup> and the current market price of another bond that is expected to maintain a certain pricing relationship to the cash market price of the cheapest-to-deliver bond. Similar, but less complicated, relationships exist between, say, an index of equity securities and the futures contract price based on such an index. Similarly, the strategy may be initiated for relationships between a currency spot price and its associated futures contract price. For hedge funds deemed to be large futures market participants for reporting purposes, the most popular futures contracts are the 5-year Treasury Note contract, where hedge funds account for about

---

<sup>20</sup>Open interest is a measure that accounts for the number of contracts initiated by futures market participants that are not offset by the end of a trading day, that is, the contracts are left “open.”

<sup>21</sup>The seller has the right to determine the maturity and coupon of the bond that gets delivered when the futures contract matures, assuming it meets the contract specifications. Typically, there are a number of different maturities and coupons that meet such specifications.

10 percent of open interest, and the S&P 500 Index contract, where hedge funds account for about 8 percent of open interest.

45. Another “arbitrage” strategy undertaken by hedge funds is a misalignment in prices of cash market fixed income securities. For example, a hedge fund might have a model for the levels of yields representing a number of bonds with various maturities. This model of the “yield curve” at a given time may differ from the yields of some of the maturities indicating that certain bonds may be “overpriced” or “underpriced” relative to the model. The fund would buy those bonds it thought were underpriced relative to a correctly priced bond and sell those that were overpriced relative to another correctly priced bond to gain the differences between those prices and the prices that would be consistent with their model. In principle, the hedge fund would attempt to hedge any other risks associated with such a trade. For example, the fund would enter into other transactions to make sure a shift in the entire yield curve or some other possible alteration in the slope of the yield curve would not affect the outcome of the trade, thereby allowing it to profit purely from the observed price discrepancy.

46. Another arbitrage would be a mispricing due to the credit quality of two instruments. For example, a corporate bond may have the same coupon, maturity as another except the second corporate entity has a different credit rating and the price does not appropriately reflect this credit risk difference. Perhaps the usual basis point differential between two such credit ratings is 30 basis points, but the current differential is 50 basis points (and the ratings are not expected to change). The “more expensive” bond, the one with the lower yield relative to the expected spread, would be sold and the “cheaper” bond would be purchased. These sorts of trades are routinely executed by hedge funds examining the differences in the credit worthiness of various U.S. corporate securities relative to the U.S. Treasury yield spreads. Emerging market hedge funds (to be discussed below in detail) may attempt to arbitrage the difference between two sovereign bonds that have the same price but different credit ratings.

47. Combining aspects of the fixed-income market and the equity market is a strategy called convertible arbitrage. This strategy involves purchasing convertible securities, mostly fixed-income bonds that under certain circumstances can be converted to an equity security. A portion of the equity risk embedded in the bond is hedged by selling short the underlying equity. Sometimes the strategy will also involve an interest rate hedge to protect against general fluctuations in the yield curve. Thus, this trade would be designed to profit from the mispricing of the equity component of the convertible bond relative to traded equity.

48. Another variant that combines fixed-income securities and other securities is the mispricing of the options or other features imbedded in mortgage back securities. Often the complicated structures can be decomposed into various components that have counterparts in the market, permitting hedge funds to profit from deviations in the prices of the underlying components and the structured product. For example, the prepayment risk, the risk that the mortgage holder will prepay the mortgage prior to its maturity, in collateralized mortgage obligations may be mispriced relative to this risk embedded in other similar securities or in a portfolio of similar mortgages.

49. Within the equity market, a core position of purchased equities may be offset with a short equity index futures position or a put option on an equity index to mitigate the general market movements. In this case, the objective is to profit from the firm-specific characteristics of the chosen equities and to eliminate the risk of general market-wide movements. Similarly, some funds choose to buy the strong firms in an industry and sell the weaker firms attempting to profit from the firm specific differences within a given industry. These funds are often referred to as market neutral funds.

50. The variety and complexity of various options contracts makes them fertile ground for arbitrage oriented hedge funds. Since options valuation depends on a number of different variables, often in complicated ways, there are profit opportunities arising from better models of forecasting the underlying variables, most notably the volatility of the underlying instrument, as well as improved models for combining the underlying variables into prices. For instance, the implied volatility associated with different strike prices varies, usually with at-the-money options (those whose strike price is close to the current price of the underlying instrument ) having lower implied volatility than other options with different strike prices. Analysis of the volatility relationship among strike prices may permit funds to see when specific options prices are out-of-line with their usual configuration.

51. Hedge funds also keep banks busy by arbitraging between their OTC derivatives quotes. The situation may arise not just with plain vanilla options but more complicated options. Hedge funds may compare the implied volatility in a structured product, for instance, a cap or floor structure with a barrier, or knock-out, option. A two-sided barrier option has a similar structure to a combined cap and floor but may have a different implied volatility, that is, a different price.

### **Strategy determinants**

52. Once a potential strategy looks promising, virtually all hedge funds examine whether the all-in return more than compensates for the degree of risk undertaken. Actually, many of the determinants of a viable strategy are not specific to hedge funds, but are common to many types of investors. The weighting of the determinants may differ however, because of the compensation structures of hedge fund managers as discussed below. Three elements of this calculation are performed, with different types of hedge funds weighting their outcomes differently. First, is an examination of market risk, usually including some type of "stress test" to assess the downside risks of the proposed strategy. Second, is an examination of the liquidity risk, that is, whether the hedge fund can enter and exit the markets for the instruments in a way which allows them to leave prices unaffected in normal times. Also important is whether they will be able to exit in a timely fashion during periods of market distress. Lastly, the timing and the cost of financing the position. If the expected duration of the trade is too long making the cost of financing the position prohibitive, the strategy will not be undertaken.

53. Since hedge funds attempt to provide higher than normal returns to their investors and themselves, the market risk component is, in all cases, of crucial importance. Many arbitrage-related hedge funds are explicitly attempting to profit from a particular type of market imperfection and thus try to minimize the other risks associated with the strategy. To do so, they must understand these risks and they typically have heavily invested in very sophisticated ways of measuring and monitoring risk. Many of the larger arbitrage funds perform very specific and extensive stress tests to observe what happens to their trades under various scenarios. In fact, one of the ways of testing the models on which the strategies are based is to perform such experiments. For instance, the appropriate number of bonds to sell of one maturity against another maturity to take advantage of a yield curve misalignment may be calculated by moving the yield curve by 100 basis points in both directions or by assuming a particular slope change and then using the number of contracts associated with the scenario thought most likely. In essence this is part of a stress test and would be typical of any reasonably sophisticated risk management system. Some of the larger hedge funds have daily value-at-risk models that calculate the amount of money the fund could lose assuming a certain distribution of returns of the underlying instruments held by the fund and a prespecified probability of loss. So, for example, a hedge fund's VAR model calculates that the fund could lose "x" or more dollars over a 1-day horizon, on 2.5% of the trading days (97.5% of the outcomes are losses less the "x"), assuming the underlying instruments follow a normal distribution.

54. Liquidity risk is also very important for arbitrage-type hedge funds. The ability to make money using arbitrage type strategies means that both legs of the arbitrage trade need to be executed together—both at initiation and at termination of the trade. Thus, the liquidity of both markets needs to be such so as to enable the fund to get in and get out without disrupting the prices: a liquid market is essential. In fact, most arbitrage-type hedge funds use only very liquid markets: the U.S. Treasury and agency markets, the U.S. and other G-10 equity markets, and the major currency markets (mostly the German mark and Japanese yen). This is not to say that arbitrage hedge funds never enter smaller, less liquid markets but that the potential profits have to be large enough to offset the price impact of entering and exiting the market. These type of hedge funds are very reluctant to enter into trades in which either side of a trade is in a market which could become illiquid during a period of stress.

55. Lastly, the timing and financing of trades can be of critical concern for some types of arbitrage hedge funds. For instance, suppose there appears to be a gap between the prices of an equity index futures contract for delivery nine months hence and the underlying equity securities such that the strategy would involve selling short the equities and buying the index futures contract. Short selling U.S. equities is a trade that has a margin requirement of 50% (established by Federal Reserve regulation, Regulation T), buying the futures contract has initial margin of about 2.5%, depending on the contract. Holding the trade for nine months, the longest one would need to in order to assure a risk-free return in this example, means tying up one-half of the notional amount of the trade for that duration, in addition to the futures margin. This may be deemed too expensive as the opportunity cost of the capital for

the short equity position may be quite high. Thus, the combination of the timing and the financing cost may mean that what initially look like profitable strategies are not.

56. Arbitrage hedge funds attempt to use the fact that they are using at least partially offsetting positions to obtain better financing arrangements. For instance, government dealers may be willing to finance a U.S. Treasury bond position at a lower rate if taken against the 10-year bond futures contract than if the position was an outright position. Netting is commonly used as a means of lower the cost of taking on positions as the lower risk on the netted position means that marked-to-market gains and losses will be commensurately lower. Along the same lines, hedge funds look for various instruments to profit from a given discrepancy between two markets, attempting to minimize the funding cost of the position by choosing the instrument with the lowest required margin.

### Examples

57. *Yield curve misalignment.* During January 1995, it became known that Orange County in California had incurred substantial losses associated with the purchase of some leveraged derivatives based on mortgage-backed security trades. The County was required to sell a large number of 2-year Treasury notes. At least one arbitrage-based hedge fund noted that this provided a classic arbitrage trade. They purchased 2-year Treasury notes while shorting 1-year Treasury bills and 5-year Treasury notes. Aside from making their investors a substantial profit with very little risk, they viewed themselves as supplying liquidity in a period in which an aberration had forced markets out of alignment.

58. *Equity market neutral investing.* A classic equity market strategy is called the market neutral portfolio. Essentially, these portfolios are constructed to eliminate the movement in equity indices, that is, general market movements. These strategies can take the form of number of purchased individual equities expected to outperform the equity market and a passive short equity index futures position or an active short equity position. When an active short position is maintained, the strategy is often referred to as a long/short strategy, in which the simultaneously short position is maintained in stocks with poor value, earnings or momentum characteristics. Portfolios can then be further fine-tuned to reduce both stock-specific or sector-specific exposure.

59. *Equity derivative arbitrage.* Another method of profiting from equities irrespective of the market's direction is to use derivative securities such as convertibles and equity warrants<sup>22</sup>.

---

<sup>22</sup>A convertible is a corporate bond or preferred equity issued by the company which allows the holder to exchange the bond for equity in a fixed ratio anytime prior to maturity of the bond. Sometimes the numbers of shares to be exchanged for each bond is lowered over time to accommodate a generally rising stock price. A warrant is an option to buy the equity security at a fixed price prior to a specific expiration date. Warrants differ from regular

(continued...)



For example, taking a positive view on a particular company can be expressed by buying the equity, the warrant, or the convertible. The latter two instruments provide an additional source of excess return, an element called "the derivative alpha," which is the value associated with the implicit leverage in the derivative instrument part of the security. Through these derivatives, which are both types of options, the investor "purchases" volatility in the equity. If the actual volatility experienced over the subsequent holding period is larger than the implied volatility embedded in the option's price at the time of purchase, there will be an additional return obtained from holding the equity derivative, over and above that obtained by holding the equity directly. This makes up part of the value of the derivative alpha. In addition, warrants and convertibles may appear cheap on a stock which is not borrowable (and thus has little downward pressure from short sales) or on a stock which is expensive due to other reasons.

60. *Bond basis arbitrage.* A very popular arbitrage is that between a specific U.S. Treasury bond and the Treasury bond futures contract traded on the Chicago Board of Trade. The futures contract specifies that a number of U.S. Treasury bonds can be delivered by the seller of the futures contract to the buyer at maturity of the contract. The seller prefers to deliver the bond which is "cheapest" to purchase in the cash market. Calculating the relative cheapness of various bonds is fairly complicated (involving the "conversion factor" assigned to the bond for futures market delivery on a particular date and the overnight financing rate, or repo rate, for that specific bond), but there are a few determinants that are discretionary. Thus, when particular bonds become popular (or unpopular) due to unrelated events in the cash market, the normal relationship relative to the futures contract becomes distorted and arbitrageurs can buy or sell the bond, taking the opposite position in the futures contract, to make a profit. Rumors in the futures market on October 27, 1997 suggested that several large hedge funds bought futures and sold Treasury bonds when prices of bonds responded to a "flight to quality" from the relatively large fall in equity prices on that day. That is, the cash bonds became "overpriced" relative to the futures prices as individuals flocked to buy U.S. Treasuries and an arbitrage profit became available.

61. *Italian tax-driven arbitrage.* Until mid-1996, the Italian government imposed a 12.5 percent withholding tax on investors from countries lacking a reciprocal tax treaty with Italy. Since reclaiming the taxed amounts were considered so cumbersome, the spreads between Italian government bonds and the rate for lira interest rate swaps traded as though the 12.5 percent could not be reclaimed; this added about 100 basis point to a fixed rate government bond issue yielding 8 percent. This meant that government bond yields were driven above lira swap rates. By buying the fixed rate Italian government bonds, financing them in the lira repurchase market and taking setting up a lira interest rate swap with offsetting payment

---

<sup>22</sup>(...continued)

options in that they are issued by the company and thus increase the number of shares outstanding when they are used. Often the warrants are attached to an issuance of equity and are not "separable" meaning that only current holders of equity can exercise them.

streams, arbitraguers were able to construct offsetting cash flows. The profits on the trade then stemmed from the ability of the arbitrageurs to obtain below-market rates on the repo transactions and then routinely file for the withholding tax rebate. Moreover, further gains were obtained when the spread between the Italian government bonds and the lira interest rate swaps converged as the withholding tax was eliminated.

62. *Credit duration risk via an options convexity trade.* This strategy compares foreign bonds with U.S. Treasury bonds and uses options to take advantage of a differential movement in bond prices due to the market's assessment of credit risk. For example, the trade may match a Mexican government bond (UMS) with a U.S. Treasury bond having the same set of cash flows (or a set of cash flows with the same duration). While changes in the bonds' prices will be the same for various interest rate changes (duration is matched) the UMS bond will respond more dramatically to perceived credit risk changes (the price is more sensitive to changes in volatility). The fund could implement this strategy by buying UMS option straddles<sup>23</sup> and selling U.S. Treasury option straddles. A weighting of UMS straddles to U.S. Treasury straddles would leverage the changes in a way that the larger movements (either up or down) in the UMS bonds will make the options even more valuable relative to the U.S. Treasury straddles, which will lose money if prices move dramatically up or down. However, the position is immune to a change in the convexity of the bonds from an interest rate change due to the offsetting options positions and their matched durations.

## **B. Strategies Used By Macro Funds**

63. The strategies of macro hedge funds differ from those of arbitrage funds in that they are typically based on models using information on economic fundamentals. The arbitrage funds, as their name implies, use arbitrage-based models of price determination to detect profitable differences in prices rather than attempt to ascertain whether the level of prices is appropriate to begin with. There are many different types of strategies employed by macro hedge funds but they are universally known for taking a "top down" global approach to their investments, whether they are in stock markets, fixed-income securities, foreign exchange markets or physical commodities. One macro hedge fund manager described the investment approach of macro funds as being "based on an understanding of economic cycles across a large number of countries (with particular focus on the G-7 nations); an assessment of where we are in these cycles; and how financial markets are likely to behave at various points in those cycles." More specifically, most macro funds purport to look for macroeconomic "imbalances" combined with changes in what might be termed "market psychology." They attempt to discern the types of events that might start a large trend or movement. When

---

<sup>23</sup>A straddle is a purchase of both a put and a call option at the same strike price giving the opportunity to profit from either an up move or a down move in the bonds' price by the maturity date relative to a strike price. The price of the option reflects the expected volatility: in a more volatile markets straddles will be relatively more expensive to purchase than in less volatile markets.

investing in foreign markets, many believe that it is important to keep track of what the local financial and industrial firms are doing as there is a feeling that when a trend is likely to change the market psychology of the locals plays an important role in furthering the "new trend." The larger macro funds routinely send individuals to the countries to perform "on the ground" analysis.

64. In currency markets, the classic macro fund strategy is to examine countries which maintain a pegged exchange rate to the dollar but have little economic reason for using the dollar for the peg. Then there is an examination of the underlying macroeconomic fundamentals to see if they are consistent with an exchange rate valued at the peg. Some funds use rather detailed macroeconomic modeling techniques, others use less quantitative techniques, examining historical relationships among the various variables of interest.

65. As a large part of their macroeconomic assessment, hedge funds examine the safety and soundness of the banking sector and its connections to other parts of the financial sector. Excess liquidity and credit growth within the banking sector are often cited by funds as leading indicators of subsequent banking problems. Extensive use of (and dependence on) unhedged foreign currency denominated debt of banks and other industrial groups is also a tip-off for hedge funds. Of course, a pattern of high and rapid appreciation of various assets is also used as a signal of a financial sector awaiting a downturn. These items all point to the difficulty a country would have if it were to implement a high interest rate defense of a currency or otherwise tried to tighten monetary policy.

66. Another aspect to the typical macro hedge fund's strategy is an analysis of political risk and the probability that their strategy may, or may not, be implemented or that after the positions are in place, the fund may be unable to withdraw from the markets. Political risk is also part and parcel of investing in the G-7 countries, as political events can change the prospects of some types of trades quite substantially. For example, the country composition of the European Monetary Union is related to the behavior of various markets, perhaps with profound consequences for hedge funds. Of course, political risk continues to be a large part of sovereign risk analysis and many macro hedge funds who enter into sovereign bond markets do extensive analysis of the sovereign risk underlying these trades. The global setting in which the macro policies of various countries are decided is also of critical importance to assessing the likelihood of various macroeconomic developments which, in turn, affect the positions of hedge funds. The recent increase in global liquidity (the large number of countries pursuing relatively loose monetary policies) is thought, for instance, to be driving a number of developments in both developed and developing financial markets.

### **Strategy determinants**

67. Once a strategy looks appealing, the next step is to determine how the trade will be undertaken and the amount of leverage to be associated with it. Moreover, these two aspects of implementation are highly dependent and are critical for the returns eventually reaped by hedge funds. The decision is no different than the one an arbitrage-based fund makes except

that leverage (which is synonymous with the method of financing the position) is of greater importance. Since hedge funds are less likely to use offsetting positions, as arbitrage funds do, they typically have positions with higher risk and the costs of financing the position will be commensurately higher.

68. Risk management by a large macro fund is often done on an integrated basis so that positions taken in one market can be related, through a correlation analysis, to those in other markets. Some funds perform four or five scenarios for each trading idea to explore what may happen when the assumptions underlying the trade are altered. As the technology for assessing large amounts of data improves, stress tests are becoming a common diagnostic technique. Further, there are often limits on the types of trades and the market exposures that can be taken by various traders within the fund based on a number of criteria including the recent track record of the trader, the risk the trade would entail relative to the rest of the portfolio, and the liquidity in the market in which the trade is to be executed. It is important to remember that even the largest hedge funds have a limited number of strategies being implemented at any one time and risk management is, in most cases, much simpler than for a large money center bank. One of the largest macro hedge funds is still able to produce a report at the end of each day with a profit/loss statement and position that fits on one letter-sized page.

69. After determining that the strategy fits within the portfolio of strategies and its risk characteristics are acceptable, the fund must determine the instrument. This decision is two-fold: both the financing characteristics (leverage) must be meshed with the liquidity concerns. For large hedge funds, the liquidity of the instrument is often a constraint. Since they are frequently taking outright bets on the directions of various markets and are expecting to generate higher than normal returns from doing so, they need to lever themselves. This makes the established positions larger and can disturb markets when they are either initiating or terminating a trade. The "market impact cost" needs to be factored in when the trade is initiated and more often than not means that plain-vanilla or "primary" instruments are likely to be the least costly. Thus, large macro funds use spot or cash, forwards, futures, and swaps. Occasionally, they use plain-vanilla options and seldom use complex derivatives. Usually a macro hedge fund is sophisticated enough to piece together its own complex derivative if that kind of payout is desired. Forward and futures markets have leverage characteristics that are typically more appealing than spot transactions, whereby only a small proportion of the face value of the trade needs to be put up in advance. In general, the leverage characteristics (margin requirements) of the instruments are determined in conjunction with the riskiness of the instrument and the riskiness of the hedge fund, as perceived by its counterparties. Thus, although leverage is higher for certain basic instruments—forwards greater than spot, for instance—the amount of leverage that can be obtained is generally lower for positions that entail higher risk. In some cases, the expected movement in the price of an instrument that would be necessary for a macro hedge fund to profit is not large enough relative to the costs of initiating the position to make it worthwhile. For instance, several hedge funds anticipated a fall in the Korean won but found that the costs of taking a position of a size that warranted the expected gains were too large to make the trade feasible.

## Examples

70. The examples below attempt to show how hedge funds use various instruments. Some of the examples could be correctly classified as arbitrage-related trades since some of the risk is transferred. However, since it is mostly macro hedge funds executing these trades they are included here. To the extent that hedge funds execute strategies in cash or spot markets, the outright purchase or sale of securities is relatively simple and is not discussed as a separate category, even though establishing short positions in some cash markets can be difficult.

71. *Short Currency Strategy.* A very typical strategy used by macro hedge fund is to sell a currency forward when the hedge fund expects it to depreciate. Since the forward market is an over-the-counter, interbank market, the hedge fund normally executes its sale through a bank or foreign exchange dealer. However, hedge funds could in principle, find corporate counterparties (or even central bank counterparties), thereby by-passing the bank intermediary.<sup>24</sup> A bank will normally establish a credit line with the hedge fund, meaning that the bank will be willing to execute forward trades (and other instruments) of a certain size based on a credit assessment of the hedge fund. Typically, the hedge fund must post a certain amount of collateral with the bank, 5 percent is an often-quoted number, to initiate the position. While forward contracts usually don't require payment until maturity, most banks dealing with hedge funds (and other financial counterparties) require two-way collateral agreements in which a daily mark-to-market assessment of the position is done and any losses owed by the hedge fund are paid by a set time to the bank intermediary. The two-way collateral agreement also means that when the bank is on the losing side of the transaction it makes payments to the hedge fund. These strategies typically use forwards with horizons that fit those of the hedge funds assessment of the likelihood for a depreciation. However, sometimes hedge funds use shorter-dated contracts and roll them over if the expected movement has not occurred by the time they expire. At an extreme, in five major currencies, there is a rolling spot contract traded at the Chicago Mercantile Exchange that permits a spot transaction to be rolled every day without making or taking delivery of the underlying currency.

72. In the Thai baht, hedge funds presumably acted through a number of counterparties to establish their short baht positions. Some hedge funds established positions early in 1997 and probably rolled them over prior to the actual decline in July. Others established their positions somewhat later and could execute trades in liquid 1-month or 3-month contracts without needing to roll them.

---

<sup>24</sup>There have been unsubstantiated rumors that in some Southeast Asian countries, where local banks were inhibited from executing forward contracts, domestic corporates and central banks were willing to take the other side of forward contracts. It is unclear whether hedge funds or foreign banks were the counterparties for these transactions.

73. *Put options strategies.* Another way in which to express an opinion that a currency is likely to depreciate is to buy put options. A put options provides the buyer the right, but not the obligation, to sell at a particular price (the strike price) during the period leading up to expiration of the option. To obtain this right to sell, the option buyer must pay the seller a premium, the option's price, which reflects the probability that the currency will depreciate below the strike price (in dollars per foreign currency terms). The assessment of the probability that the option is valuable when it expires is determined mostly by the volatility of the currency's movements and the length of time to maturity. If the currency has been tightly managed and most participants expect it to remain within a narrow trading range, the volatility embedded in the price of the option will be low and consequently the option will be relatively cheap. Apparently, such was the case for options written on the Thai baht. A number of large banks allegedly sold put options on the baht to hedge funds. The hedge funds purchased the options as part of the overall strategy of shorting the baht. Put options had the advantage that implied volatility was abnormally low, making them cheap, although they had the disadvantage that the premium had to be paid up front. There are some variants to the strategy, however, such as selling puts at strike prices which are cheaper than the purchased put (further out-of-the-money). This limits the profits as the currency depreciates but also lowers the cost of the original put option.

74. *Sovereign bond purchase.* A hedge fund may decide that holding Brazilian government debt is advantageous based on an assessment of its economic fundamentals. The fund may decide that a Brady bond purchase is the best way to take advantage of such a decision. These Brady bonds may be purchased outright from a counterparty investment bank or the hedge fund may decide it does not want the risk of an interest rate move in the U.S. that would affect the price of the bonds, in which case the fund would short U.S. Treasuries of a similar duration against the Brady bonds. The short position could be maintained by borrowing the U.S. Treasuries via a reverse repurchase agreement. Alternatively, the hedge fund could simply take a short position in the U.S. Treasury futures contract with approximately the same maturity date and then tailor the number of futures contracts sold to obtain the correct duration or convexity characteristics to match the Brady bond. In this case, the hedge fund has obtained the credit risk to Brazil it desired without an outright interest rate exposure.

75. *Credit derivatives strategies.* More recently, hedge funds have found it convenient to enter into a credit derivative known as a total rate of return swap. A total rate of return swap is structured so that the buyer swaps the "total return" on the reference asset for a regular-floating rate payment (in general LIBOR based). For example, the buyer agrees to pay the total return on an emerging market Brady bond, consisting of all contractual payments as well as any appreciation in the market value of the bond; the seller agrees to pay the buyer LIBOR plus a spread and any depreciation in the value of the Brady bond. The TROR swap protects the buyer against a deterioration of credit quality, which can occur even without a default. A hedge fund may be either a buyer or a seller depending on the credit risk they would like to take on.

76. A more recently developed credit derivative is the credit spread option. A credit spread option provides a payout to the buyer when the spread on two underlying assets exceeds a predetermined level. The buyer pays a premium for such protection and the seller provides a payment based on the spread. Since the credit risk of many fixed-income securities is often measured as a spread over a comparable maturity "risk-free" security, this derivative product is highly sensitive to the market's assessment of credit risk in these securities and is especially tailored to holders of emerging market debt and other high yielding debt instruments.

### **C. Strategies Used by Emerging Market Hedge Funds**

77. Some hedge fund experts believe that emerging market hedge funds are the fastest growing segment of the hedge fund industry. As one fund manager put it, "I see a new brochure every day regarding a new emerging market hedge fund." These funds are described as focussing on either equity or debt markets of developing or "emerging" countries. They are classified by region as most focus on a geographic region although their prospectuses may permit them to trade in a number of different areas.

#### **Combination macro funds and arbitrage funds**

78. Emerging market hedge funds execute strategies that depend on the economic fundamentals of various countries, but often have components that mitigate certain risks associated with these strategies. Many of these funds can be characterized as "value investors," looking for underpriced equities or bonds and investing in these plain vanilla instruments. Others take more sophisticated approaches attempting to profit from pricing discrepancies among a single country's bonds or among the bonds of a number of countries with related economic characteristics. Since many of the markets are underdeveloped and illiquid, the size of transactions is relatively small.<sup>25</sup> However, at the same time, the small and illiquid markets mean that inefficient pricing of various securities abound. Often the mispricing of bonds is due to a lack of understanding about how various repayment schedules or restructuring efforts operate. Sometimes a large supply of restructured bonds are held by commercial banks, pensioners and public sector suppliers whose selling behavior may be governed by their own liquidity needs rather than an understanding of the bonds underlying value. Bets on the outcomes of various political events also cause differences of opinion and different valuations.

---

<sup>25</sup>That said, the emerging Brady market is considered quite liquid and there are a number of derivative securities written on Brady bonds suggesting that counterparties view their ability to price and deliver the underlying Bradies as unimpeded.

### **Special considerations**

79. Relative to G-10 countries, emerging market hedge funds pay far more attention to credit risk. In many instances, the trades are executed to profit from differential opinions about the credit risk of the sovereign entity or local institution. Since the volatility of prices (and yields) is much higher in emerging markets, risk management and the timing of trades becomes even more critical. For instance, since 1993, market volatility has ranged from 9 percent to 25 percent for the Emerging Markets Bond Composite index while volatility in the U.S. 3-7 year Treasury composite index ranged from 3 percent to 5 percent.

80. With perhaps the exception of the Brady bond market, liquidity considerations are often present. Sometimes the desired purchase of equity in an emerging market may be so large that it involves acquiring a significant amount of the outstanding shares. In some countries this may trigger foreign holdings rules or other regulations designed to discourage foreign ownership. Also of concern to some countries, is the rapid growth of money managed by these types of funds. While not as large as the more traditional macro funds, emerging market hedge funds are quickly obtaining capital.

81. Political risk also receives special attention for emerging market hedge funds relative to those operating in G-10 countries. Although, clearly, there is an element of political risk in all investing, the effects of political risk on returns in emerging markets is far more evident. Emerging market hedge fund managers, though, often attempt to utilize their expertise about a region or specific country to profit from their political risk assessments.

### **D. Other Types of Hedge Funds Strategies**

82. While the main hedge fund categories have been outlined above, there are a number of niche funds that broaden the scope of activities pursued by hedge funds. These include a category loosely referred to as "event related" as well as three more traditional categories, value investing, short selling, and sector funds. Each will be discussed in turn below.

#### **Event related funds**

83. Hedge funds specializing in event investing focus on securities of companies undergoing some major structural change—merger, acquisition or reorganization. In some circles these strategies are referred to as "risk arbitrage" which is an oxymoron since, in principle, arbitrage is risk-free. Sometimes the fund is said to deal in "distressed" securities.

84. A typical example of the event investing would be for a hedge fund to observe that a merger has been proposed between two entities, often an announcement occurs after the potential acquirer files certain forms with various regulators or make public their intention to purchase another entity. The hedge fund then examines the market prices of the shares and the theoretical spread available on the deal. Often the equity price of the acquirer drops and the equity price of the firm to be acquired increases. Ultimately, the equity price will reflect both



firms after the merger is complete. The fund estimates the time to complete the merger and the annualized return on the investment if undertaken and compares these to a “baseline” yield that could be obtained from other investments. The annualized return includes the purchase and sale of the equity of the two merging companies and the cost of executing the short position, any dividends gained or lost and the commissions. After calculating the return the fund examines the probability that the deal will go through. Mergers require a shareholder vote and in many cases the further approval of the Justice Department in the U.S. and perhaps other regulators, such as bank regulators in the case of bank mergers. If the annualized return, taking into account the probability of completion, is greater than the baseline, the fund will execute the deal. Similar exercises are used to examine the securities of a firm undergoing a reorganization or other kinds of restructuring.

### **Value investing**

85. A strategy of value investing is little different from the typical mutual fund strategy of attempting to discern investments, mostly equity, that are undervalued relative to their potential. Hedge funds are probably more likely to use hedging methodologies designed to offset industry risk and reduce market volatility than their mutual fund counterparts. However, the basic strategy remains the same—comparing the market’s assessment of the value of a company with the hedge fund’s evaluation of the company’s real worth, also known as its intrinsic or private market value. This analysis involves both a quantitative and qualitative review of the company using such quantitative variables as the price/earnings ratio, price/cash flow ratio, balance sheet information and cash flow estimates and such qualitative elements as the competitiveness of the industry, their ability to price their product, the management capabilities, relationship to their labor force, availability of capital and so on. When a company appears undervalued in the market relative to the fund’s assessment by a margin that would imply a return acceptable to hedge fund investors, the fund buys the undervalued security. Depending on their view, the fund may hedge out the general market risk by selling an equity index futures contract or by other means.

### **Short selling funds**

86. The use of a short selling strategy is the primary reason why the limited partnerships and offshore funds that receive investments from wealthy individuals obtained their title as “hedge” funds. Some funds continue to use this strategy realizing that it matters little, from an economic perspective, whether you buy stock first and sell it later or sell it first and buy it later. Strategies that involve short selling include matched trading (selling some stocks short while buying other stocks of equivalent value), market neutral strategies (see above), hedging, and short only portfolios. Often leverage is added to the short sale, making the profit higher when the stock price falls, but also racking up larger losses when the price rises. Interestingly, though, because of the mechanics of short sales on equity in the U.S., a short sale strategy on low or zero dividend stocks will outperform a long only strategy in a market with moderate to high interest rates and symmetric increases and decreases in stock prices.

87. The mechanics of a short sale strategy is as follows. Suppose an investor has an amount of capital to invest and decides to undertake a short sale transaction. The investor sells short a stock at the current market price. The capital (the cash outlay that would otherwise be spent on the purchase of a long position) is invested in U.S. Treasury securities with the same holding period as that expected for the short sale. The proceeds from the short sale are held as restricted credit by the brokerage firm holding the account. Interest, called a short credit rebate, is paid on this amount. The amount of restricted credit is adjusted daily to reflect the change in the stock price. As the stock price declines, the restricted credit is released to become free cash which earns a slightly higher interest rate than the restricted credit. If the stock price increases, the restricted credit must be increased, either through the sale of the investments (the Treasuries) or by borrowing through a margin loan at an assumed interest rate higher than that on the short credit rebate. The reason that a short strategy would outperform the long only strategy on low or zero dividend stocks in an environment of moderate to high interest rates is due to the cushion provided by the interest on the collateral (the Treasuries) and the short rebate. These elements continue to provide a positive cash flow that exceeds that provided by the long stock position (since there is no dividend).

88. Of course it is useful to recognize that losses on a short position are unlimited since stock prices can continue to rise without bound, while losses on a long position are limited as the stock price can only fall to zero, no further. Moreover, since the losses on the short position must be paid as they are incurred, a short seller may run out of capital even if over the long run the stock price declines. Thus, the timing of trades and the depth of the short sellers pockets are important determinants of success.

### **Sector funds**

89. Categorizations of hedge funds, like mutual funds, often include subcategories for various industry groups or regions. The strategies undertaken in these funds are similar to the ones described above except that they apply only to the "sector" within which the fund agrees that it will trade. Some sectors may have characteristics that imply the strategies need to take a slightly different form, for instance, a swap taken by a fund specializing in commodities may involve a commodity swap and not an interest rate swap, but fundamentals are the same. Examples of sector funds are included in Appendix I. They are divided into emerging market funds specializing in various geographic regions (Asia, Eastern Europe and the former soviet union, and Latin America) and funds specializing in different industries (Energy, Financial, Health care/Biotechnology, Metals/Mining, Miscellaneous, Real Estate and Technology).

Table 9. Proportion of Hedge Funds Using Various Instruments Ranked by Quintile of Asset Size 1/

*(In percent)*

Quintile	Number of Hedge Funds	Stocks	Bonds	Currency	Warrants	Options	Futures
First	161	81	68	30	42	68	39
Second	161	91	61	22	47	66	34
Third	161	90	47	22	43	72	28
Fourth	161	94	43	17	40	60	19
Fifth	161	86	41	22	36	60	27

Source: Calculated from MARHedge database.

1/ 11 hedge funds did not have complete information on their use of various instruments, and hence, they are excluded from the sample.

### Characteristics of Hedge Fund Strategies

90. **This Appendix** provides the classification of hedge funds used by HFR (Hedge Fund Research). Other data providers and hedge fund consultants have their own classification schemes. HFR recently expanded their original classification of 15 “strategies” to 28 to accommodate recent developments in the hedge fund industry. In some cases, these classifications do indeed appear to be strategies; in others they appear to be a type a financial instrument or a geographic area for investment. The purpose in providing this information is to show that such classifications are relatively rough guides for investors since the scope of activities of hedge funds is so large as to make generalizations about their strategies necessarily incomplete as well as the large breadth of hedge fund investment styles. The descriptions of the classifications are verbatim from HFR’s Journal.

91. **Convertible Arbitrage** involves purchasing a portfolio of convertible securities, generally convertible bonds, and hedging a portion of the equity risk by selling short the underlying common stock. Certain managers may also seek to hedge interest rate exposure under some circumstances. Most managers employ some degree of leverage, ranging from zero to 6:1. The equity hedge ratio may range from 30 to 100 percent. The average grade of bond in a typical portfolio is BB-, with individual ratings ranging from AA to CCC. However, as the default risk of the company is hedged by shorting the underlying common stock, the risk is considerably better than the unhedged bond’s rating indicates.

92. **Distressed Securities** strategies invest in, and may sell short, the securities of companies where the security’s price has been or is expected to be affected by a distressed situation. This may involve reorganizations, bankruptcies, distressed sales and other corporate restructurings. Depending on the manager’s style, investments may be made in bank debt, corporate debt, trade claims, common stock, preferred stock and warrants. Strategies may be sub-categorized as “high-yield” or “orphan equities.” Leverage may be used by some managers. Fund managers may run a market spread using S&P put options or put option spreads.

93. **Emerging Markets** funds invest in securities of companies, or the sovereign debt of developing or “emerging” countries. Investments are primarily long. “Emerging Markets” include countries in Latin America, Eastern Europe, the former Soviet Union, Africa and parts of Asia.

94. **Emerging Markets: Asia** involves investing in the emerging markets of Asia.

95. **Emerging Markets: Eastern Europe/CIS** funds concentrate their investment activities in the nations of Eastern Europe and the CIS (the former Soviet Union).

96. **Emerging Markets: Global** funds will shift their weightings among these regions according to market conditions and manager perspectives. In addition, some managers invest solely in individual regions.

97. **Emerging Markets: Latin America** is a strategy that entails investing throughout Central and South America.

98. **Equity Hedge** investing consists of a core holding of long equities hedged at all times with short sales of stocks and/or stock index options. Some managers maintain a substantial portion of assets with a hedged structure and commonly employ leverage. Where short sales are used, hedged assets may be comprised of an equal dollar value of long and short stock positions. Other variations use short sales unrelated to long holdings and/or puts on the S&P index and put spreads. Conservative funds mitigate market risk by maintaining market exposure from zero to 100 percent. Aggressive funds may magnify market risk by exceeding 100 percent exposure and, in some instances, maintaining a short exposure. In addition to equities, some funds may have limited assets invested in other securities.

99. **Equity Market Neutral** investing seeks to profit by exploiting pricing inefficiencies between related equity securities, neutralizing exposure to market risk by combining long and short positions. Typically, the strategy is based on quantitative models for selecting specific stocks with equal dollar amounts comprising the long and short sides of the portfolio. One example of this strategy is to build portfolios made up of long positions in the strongest companies in several industries and taking corresponding short positions in those showing signs of weakness. Another variation is investing long stocks and selling short index futures.

100. **Equity Non-Hedge** funds are primarily long equities, although they have the ability to hedge with short sales of stocks and/or stock index options. These funds are commonly known as "stock-pickers." Some funds employ leverage to enhance returns. When market conditions warrant, managers may implement a hedge in the portfolio. Funds may also opportunistically short individual stocks. The important distinction between equity non-hedge funds and equity hedge funds is that the former do not always have a hedge in place. In addition to equities, some funds may have limited assets invested in other types of securities.

101. **Event-Driven** is also known as "corporate life cycle" investing. This involves investing in opportunities created by significant transactional events, such as spinoffs, mergers and acquisitions, bankruptcy reorganizations, recapitalizations and share buybacks. The portfolio of some Event-Driven managers may shift in majority weighting between Merger Arbitrage and Distressed Securities, while others may take a broader scope. Instruments include both long and short common and preferred stocks, as well as debt securities and options. Leverage may be used by some managers. Fund managers may hedge against market risk by purchasing S&P put options or put options spreads.

102. **Fixed Income (Total)** is a composite of the various Fixed Income Indices, namely Fixed Income: Arbitrage, Fixed Income: Convertible Bonds, Fixed Income: High Yield, Fixed Income: Miscellaneous and Fixed Income: Mortgage-Backed

103. **Fixed Income: Arbitrage** is a market-neutral hedging strategy that seeks to profit by exploiting pricing inefficiencies between related fixed income securities while neutralizing exposure to interest rate risk. Fixed Income Arbitrage is a generic description of a variety of strategies involving investment in fixed income instruments, and weighted in an attempt to eliminate or reduce exposure to changes in the yield curve. Managers attempt to exploit relative mispricing between related sets of fixed income securities. The generic types of fixed income hedging trades include: yield-curve arbitrage; corporate versus Treasury yield spreads; and cash versus futures.

104. **Fixed Income: Convertible Bond** funds are primarily long only convertible bonds. Convertible bonds have both fixed income and equity characteristics. If the underlying common stock appreciates, the convertible bond's value should rise to reflect this increased value. Downside protection is offered because if the underlying common stock declines, the convertible bond's value can decline only to the point where it behaves like a straight bond.

105. **Fixed Income: High-Yield** managers invest in non-investment grade debt. Objectives may range from current income to acquisition of undervalued instruments. Emphasis is placed on assessing credit risk of the issuer. Some of the available high-yield instruments include extendible/reset securities, increasing-rate notes, pay-in-kind securities, split-coupon securities and usable bonds.

#### **Fixed Income: Miscellaneous**

106. **Fixed Income Mortgage-Backed** funds invest in mortgage-backed securities. Many funds focus solely on AAA-rated bonds. Instruments include: government agency, government-sponsored enterprise, private label fixed- or adjustable-rate mortgage pass-through securities, fixed- or adjustable-rate collateralized mortgage obligations (CMOs), real estate mortgage investment conduits (REMICs) and stripped mortgage-backed securities (SMBSs). Funds may look to capitalize on security-specific mispricings. Hedging of prepayment risk and interest rate risk is common. Leverage may be used, as well as futures, short sales and options.

107. **Macro** involves investing by making leveraged bets on anticipated price movements of stock markets, interest rates, foreign exchange and physical commodities. Macro managers employ a "top-down" global approach, and may invest in any markets using any instruments to participate in expected market movements. These movements may result from forecasted shifts in world economies, political fortunes or global supply and demand for resources, both physical and financial. Exchange-traded and over-the-counter derivatives are often used to magnify these price movements.

108. **Market Timing** involves allocating assets among investments by switching into investments that appear to be beginning an uptrend, and switching out of investments that appear to be starting a downtrend. This primarily consists of switching between mutual funds and money market funds. Typically, trend-following indicators are used to determine the direction of a fund and to identify buy and sell signals. In a up move "buy signal," money is transferred from a money market fund into a mutual funds in an attempt to capture a capital gain. In a down move "sell signal," the assets in the mutual fund are sold and moved back into the money market fund for safekeeping until the next up move. The goal is to avoid being invested in mutual funds during a market decline.

109. **Merger Arbitrage**, sometimes called Risk Arbitrage, involves investment in event-driven situations such as leverage buyouts, mergers, and hostile takeovers. Normally, the stock of an acquisition target appreciates while the acquiring company's stock decreases in value. These strategies generate returns by purchasing the stock of the company being acquired, and sometimes, selling short the stock of the acquiring company. Managers may employ the use of equity options as a low-risk alternative to the outright purchase or sale of common stock. Most Merger Arbitrage funds hedge against market risk by purchasing S&P put options or put options spreads.

110. **Relative Value Arbitrage** attempts to take advantage of relative pricing discrepancies between instruments including: equities, debt, options, and futures. Managers may use mathematical, fundamental or technical analysis to determine misvaluations. Securities may be mispriced relative to the underlying securities, related securities, groups of securities, or the overall market. Many funds use leverage and seek opportunities globally. Arbitrage strategies include dividend arbitrage, pairs trading, options arbitrage and yield curve trading.

111. **Sector (Total)** is a composite index of the Energy, Financial, Healthcare/ Biotechnology, Metals/Mining, Miscellaneous, Real Estate and Technology sectors Indices.

112. **Sector: Energy** is a strategy that focuses on investment within the energy arena. Investments can be long and short in various instruments with funds either diversified across the entire sector or specializing within a sub-sector, i.e. oil field service.

113. **Sector: Financial** is a strategy that invests in securities of bank holding companies, banks, thrifts, insurance companies, mortgage banks and various other financial services companies.

114. **Sector: Healthcare/Biotechnology** funds invest in companies involved in healthcare, pharmaceutical, biotechnology and medical device areas.

115. **Sector: Metals/Mining** funds invest in securities of companies primarily focused on mining, processing, and dealing in precious metals and other commodities. Some funds may employ arbitrage strategies on a worldwide basis.

#### **Sector Miscellaneous**

116. **Sector: Real Estate** involves investing in securities of real estate investment trusts (REITs) and other real estate companies. Some funds may also invest directly in real property.

117. **Sector: Technology** funds emphasize investment in securities within the technology arena. Some of the sub-sectors include multimedia, networking, PC producers, retailers, semiconductors, software and telecommunications.

118. **Short Selling** involves the sale of security not owned by the seller; a technique used to take advantage of an anticipated price decline. To effect a short sale the seller borrows securities from a third party in order to make delivery to the purchaser. The seller returns the borrowed securities to the lender by purchasing the securities in the open market. If the seller can buy that stock back at a lower price, a profit results. If the price rises, however, a loss occurs. A short seller must generally pledge other securities or cash with the lender in an amount equal to the market price of the borrowed securities. This deposit may be increased or decreased in response to changes in the market price of the borrowed securities.

119. **Fund of Funds** invest with multiple managers through funds or managed accounts. The strategy designs a diversified portfolio of managers with the objective of significantly lowering the risk (volatility) of investing with an individual manager. The Fund of Funds manager has discretion in choosing which strategies to invest in for the portfolio. A manager may allocate funds to numerous managers within a single strategy, or with numerous managers in multiple strategies. The minimum investment in a Fund of Funds may be lower than an investment in an individual hedge fund or managed account.



### III. EFFECTS OF HEDGE FUNDS' STRATEGIES ON PRICE DYNAMICS<sup>26</sup>

120. This Chapter discusses the potential effects that hedge fund strategies may have on prices in various markets. Strategies implemented by hedge funds, and other institutional investors, can be put into two categories—those that act to stabilize prices and those that may potentially destabilize prices. There are also a number of institutional practices which may inadvertently act to destabilize prices. A short description of their attributes are included since many market participants, including hedge funds, may be subject to these practices. While understanding how strategies *can* affect prices is important, the implications for financial stability hinge on whether such strategies do, in practice, make prices more volatile. Existing empirical evidence directly relating hedge fund activity to price volatility is slim to non-existent. However, there are several studies that examines whether large market participants, including hedge funds, “herd” with other participants or with their own kind—that is, whether they take similar positions simultaneously or following one another. Circumstantial evidence can also be obtained from a study that examines the returns earned by hedge funds, their stated strategies, and the returns of standard asset classes. A third study, analyzing the actions of a set of large foreign currency market participants (which may include hedge funds) also provides insight into the connection between these large players’ activities and subsequent exchange rate volatility.

#### A. Stabilizing Strategies

121. Among the types of strategies employed by hedge funds and other market participants there are two broad types that are stabilizing—contrarian strategies and arbitrage strategies. Contrarian strategies, in which an investor buys when prices are deemed to be too low and sells when they are too high, contrary to current market movements, is an obvious case where prices would be naturally pushed back to their perceived fair value, thereby stabilizing prices.

122. By some accounts, arbitrage strategies may be viewed as neither stabilizing nor destabilizing in that the actions of arbitrageurs simply connect one market to another. For instance, arbitrage between a portfolio of stocks and a stock index futures contract limits the variability of the spread between the two prices but has no particular implication for the volatility of the price levels in the two markets. The two markets may move violently side-by-side, but the spread between them may be constant. However, several studies have shown that stock index arbitrage activity is in fact stabilizing, in the sense of reducing volatility of the underlying stocks.<sup>27</sup>

---

<sup>26</sup>This chapter was prepared by Laura Kodres of the Capital Markets and Financial Studies Division of the Research Department.

<sup>27</sup>See Neal (1993) for example.

123. Due to their ability to both execute short positions and add leverage, in the 1960s and '70s, hedge funds traded by holding long and short positions simultaneously, providing profits for investors in both rising and falling markets.<sup>28</sup> In fact, their contrarian trading strategies won them the title "hedge" fund. In current markets, however, the incidence of contrarian strategies is difficult to gauge although there is some circumstantial evidence, presented below, that a number of funds continue to use them. Moreover, there is ample anecdotal evidence that hedge funds attempt to search for markets in which prices have overshot their equilibrium values, based on fundamental or technical analysis. Anecdotal evidence, as well as the number of hedge funds identifying themselves with particular strategies, suggests that hedge funds are extensive users of arbitrage-based strategies.

### **B. Destabilizing Strategies**

124. For the purposes of discussion, destabilizing strategies will be divided into those strategies that use existing prices to decide how to trade and those that use the positions of other market participants as the basis for trading decisions. Destabilizing trading that is based on prices is often referred to as positive feedback trading, a strategy in which participants buy after price increases and sell after price declines. If there are no offsetting forces, these participants can cause prices to "overshoot" their equilibrium value, adding volatility relative to that determined by fundamental information.<sup>29</sup>

125. There are a variety of circumstances under which positive feedback trading can arise—some of which can be related to various institutional features of markets. These include dynamic hedging, stop loss orders, and collateral or market calls. On a less sophisticated level, positive feedback strategies also incorporate general trend-following behavior whereby investors use various technical rules to determine trends and reinforce them with their buying and selling behavior.

126. Among the strategies that induce positive feedback type behavior, dynamic hedging is the most complex. Dynamic hedging is the practice of altering the amount of the hedging instrument through time to make sure that losses on the underlying instrument are offset, as closely as possible, by gains on the hedging instrument (or vice versa). When hedging options, a hedge ratio, the amount of the hedging instrument needed, is provided by the option's

---

<sup>28</sup>See "Evaluating Opportunities in Europe: The Institutional Investor's Perspective" (1996), p. 129.

<sup>29</sup>See DeLong, Shleifer, Summers and Waldmann (1990) for a model of destabilizing positive feedback trading.

delta.<sup>30</sup> The delta changes over time requiring the hedge to be adjusted—sometimes causing the hedging instrument to be sold at the same time as the underlying instrument's price falls.

127. Using currency options as an example, the underlying intuition is as follows. Since options sellers know that, with some probability, they will incur losses as the currency depreciates, they sell, in advance, a certain proportion (measured by the delta) of the amount of currency underlying the options contract. Assuming the currency does, in fact, depreciate, options sellers have some profits on their short (sold) currency position with which to offset the losses incurred due to the buyers' exercise of the put options. However, as the currency depreciates it becomes more probable that the put options will be exercised. The options seller will then sell increasing amounts of spot currency to cover these potential losses until the amount sold is almost equivalent to the amount underlying the contract. Thus, to hedge themselves, options sellers would be required to sell the currency in a falling market to maintain a hedged position, potentially exacerbating the original movement.

128. Hedge funds are typically buyers of options and do not need to hedge using dynamic hedging techniques. However, dealers (mostly large commercial and investment banks) who sell options to hedge funds either need to offset these positions with other interested parties or need to hedge themselves. Usually, options dealers hold portfolios in which they are net short options, requiring them to manage the associated risk. Their ability to dynamically hedge depends on the liquidity underlying the option. The theory underlying dynamic hedging requires that price changes be continuous and that hedging will be most effective when adjustments to the amount of the underlying instrument are made on an ongoing basis.

129. The use of dynamic hedging techniques in Southeast Asian currencies purportedly caused a positive feedback response, adding volatility to some of these currencies. Apparently, put options on the Thai baht were priced relatively cheaply prior to the depreciation, encouraging hedge funds and other buyers to purchase them as another means of selling the baht. These trades left dealers with less premium with which to offset possible losses than if the puts had been appropriately priced. Moreover, without offsetting positions from another client base, dealers were net short the options. However, the extent of dynamic hedging is not verifiable and since the Southeast Asian currency markets were known to be somewhat illiquid compared to the major currency markets some dealers may have been reluctant to use the technique. Of course, leaving the positions unhedged may have had even larger profit/loss consequences for the dealers than inefficiently hedged positions.

---

<sup>30</sup>The "delta" measures the change in the options' price for a given change in the price of the underlying instrument: mathematically, the first derivative of the option's price with respect to the underlying instrument. The change in the delta is measured by "gamma." Gamma measures the sensitivity of the hedge ratio to changes in the price of the underlying instrument: mathematically, the second derivative of the options' price with respect to the underlying instrument. A negative gamma means the hedging instrument needs to be reduced when the underlying price falls (or vice versa), leading to a positive feedback response.

130. Several other institutional features may also lead to positive feedback response. These are common to many markets and the participants that use them: they are not specific to hedge funds. Stop loss orders can give rise to positive feedback dynamics by having a previously submitted order to sell as losses are generated by price declines. The selling to limit losses continues to put downward pressure on prices. Similar dynamics exist for losses generated by price increases if short positions need to be closed out. Collateral calls or margin calls can sometimes lead to a positive feedback response as well. Collateral holders may require additional collateral or margin from their customers when prices fall and losses are incurred. Usually the collateral can be obtained by selling any number of instruments. However, a customer may have to sell the instrument whose price declined and caused the collateral call in the first place, possibly causing further price declines and losses. Although these market features are no different for hedge funds than other investors, some intermediaries that provide margin to hedge funds keep the funds on a very tight leash—margin calls are made daily and margin can be called intraday if necessary. To the extent that this is the case, hedge funds may sell into falling markets (or buy into rising markets) sooner than other of the intermediaries' counterparties—and any leverage could potentially exacerbate the amount of margin or collateral that needs to be posted. On the other hand, since many hedge funds maintain short positions, positive feedback responses by hedge funds in market downswings may be less likely as these funds would have profits, not losses, in this environment.

131. Another class of destabilizing trading behavior is the result of participants taking similar positions to those of other market participants rather than basing their decisions explicitly on prices. Positions can be mimicked by directly observing other market participants' positions or indirectly using the same set of information and analysis as other participants. When similar position-taking is undertaken strictly by following others' positions, it is frequently termed "herding."<sup>31</sup> For example, herding may result from money managers rationally mimicking each other to make it more difficult to evaluate their competence as in Scharfstein and Stein (1990), or they may herd if their performance is measured against a common peer group or benchmark as in Maug and Naik (1996). In particular, managers may rationally ignore their own private information when they perceive that their reputations in the labor market are based, in part, on whether when they make unprofitable decisions other managers, too, have low returns. Consequently, if one manager mimics the behavior of others this suggests to the labor market that he is more likely to be smart, whereas if he takes a contrarian position it is perceived that he is more likely to be "dumb," all else equal. It is far from clear that hedge fund managers have the same incentives to mimic each other as, say, mutual fund or pension managers, since hedge fund managers have their own wealth invested in the fund and are not compensated relative to a benchmark but on total return. However, many hedge funds probably have access to the same information and one could imagine,

---

<sup>31</sup>"Herding" often connotes blindly (irrationally) following others' movements. However, in most financial models of herding the participants are rationally following the behavior of others.

especially for macro hedge funds, that hedge funds could arrive at a similar assessment at approximately the same time, creating the illusion that they collude and purposely execute similar positions.

132. A second issue is not the question of whether hedge funds herd among themselves but whether other investors herd with them or follow their lead into various markets. Anecdotes abound that hedge funds are the "leaders" and other institutions, including proprietary trading desks and other investors, follow them closely. Some hedge funds refute that they are leaders, citing that proprietary trading desks of commercial and investment banks are looking at the same information as they are. Others suspect that other institutions are able to detect their positions and ride their coattails. Virtually all hedge funds adamantly deny the claim that they discuss their strategies among themselves.

### **C. Empirical Evidence**

133. While there is little evidence linking hedge fund strategies to excess market volatility, there is some evidence regarding similar-position taking and the incidence of various investment styles among various institutional groups. Kodres and Pritsker (1997) use daily position data from the U.S. futures market to examine whether some classes of large market participants appear to herd or alter their positions similarly over time. The data provide not only a portrayal of large participants, but also allow examination of several institutional subgroups, including hedge funds. The study was originally undertaken to assess whether specific institutional groups were more or less likely to move their positions in concert. The data, obtained from the Commodity Futures Trading Commission, span August 3, 1992 to August 15, 1994, covering the two exchange rate crises in the Exchange Rate Mechanism of the European Union and the early 1994 period of turbulence in world bond markets.

134. The study estimates a necessary but not sufficient condition for herding: the propensity of large participants to buy (or sell) futures when other large participants buy (or sell). The institutional categories examined include: broker-dealers, foreign banks, commercial banks (domestic), pension funds, mutual funds, and hedge funds.<sup>32</sup> Statistically significant positive comovement of positions was detected for several contracts and for several institutional groups. It was found most consistently in the S&P 500 Index contract for broker-dealers, pension funds, and hedge funds, meaning that these groups' position changes were similar to the position changes of a randomly selected subset of their type of institution. Similar position taking was also detected in the Deutsche mark and Japanese yen contracts for broker-dealers and foreign banks. In addition, a subgroup consisting of the smallest one-third participants was separated in the data set to examine whether smaller participants herd with larger ones.

---

<sup>32</sup>The categorization was done by the CFTC and, while the accounts are individually identifiable in the data, the names and some other characteristics were suppressed to preserve confidentiality.

The results showed little difference: positive comovement was found for the same contract markets and participant types.

135. For hedge funds, the results suggest that similar position taking occurs in the S&P 500 Index contract and the 3-month Eurodollar contract. When the hedge fund group is split into large and small hedge funds, similar position taking is present in the S&P 500 Index contract and the Japanese yen contract. Interestingly, however, when the lagged daily price change is added to the model, the results suggest that while hedge funds are mirroring the positions of other hedge funds they are also negative feedback trading—they are (together) trading against the price trend in a contrarian fashion. Interestingly, hedge funds appear to engage in negative feedback trading for six of the seven contract in which they are active.

136. For purposes of this Board Paper, the analysis was extended to investigate whether other market participants' position changes were positively correlated with those of hedge funds. The results, presented in Table 10, show that the opposite is true. For the futures contracts and institutional groups that showed a statistically significant correlation between position changes of institutional groups' and those of hedge funds', the correlation was negative, not positive, implying other institutional groups alter their positions in the opposite direction to those of hedge funds. One might suspect that these other institutional groups are slow to alter their positions and follow the hedge funds with a lag. Using the lagged position changes of hedge funds in the model results in statistically insignificant correlations with position changes of other institutions in most markets, with the lone exception of the Japanese yen where, again, broker-dealers change their position in the opposite direction.<sup>33</sup> (See Table 11).

137. The study is subject to several caveats. First, the number of large participants classified as hedge funds in some of the contracts is very small. For example, for S&P 500 contract and the Japanese yen contract, where the results are relatively strong, the results depend on only 7 and 2 hedge funds, respectively. Second, hedge funds are typically small users of futures markets. Among the large participants, the proportion of open interest held by hedge funds is highest for the 5-year Treasury note (about 10 percent) and is less than 2 percent in the currency contracts where, in general, the market in currency futures represent a minuscule part of the overall foreign exchange market. Moreover, the currency results only apply to the five major currencies (British pound, Canadian dollar, Deutsche mark, Japanese yen and Swiss franc) as there are few listed futures contracts on other currencies and the volumes for those that are listed are too small to be of interest to hedge funds. More generally, to attribute a

---

<sup>33</sup>Since every contract sold is offset by one purchased, position changes of all participants must be offsetting. Some may suspect, therefore, that a negative correlation of position changes would be forthcoming. However, the data consist of a subset of participants (large ones) and there is no mathematical or statistical reason why any offsetting position changes should be identifiable by institutional group.

positive environment of positions to a potentially destabilizing situation, one would need to control for the arrival of market news and have a broader view of the institutions' portfolios.

138. Using the model to predict the proportion of volume that could be attributed to correlated position taking, shows that the amounts never exceed 16 percent and are more often around 4 to 5 percent. This suggests that the extent of herding found in the study is unlikely to pose a systemic risk. More importantly, the correlated position-taking uncovered could be attributable to other trading strategies related to potentially offsetting cash positions held by the participants, such as index arbitrage or covered interest rate arbitrage.

139. Fung and Hsieh (1997) analyze investment styles of hedge funds and CTA pools using data on monthly returns. Their purpose is to extend a model of mutual fund investment styles to the more dynamic, leveraged trading strategies of hedge funds, aiming to attribute hedge fund returns to a broader array of "styles." They find that, unlike mutual funds, whose returns are highly correlated with standard asset classes (such as U.S. equity returns, U.S. bond returns, etc), "hedge fund managers and CTAs generate returns that have low correlations to the returns of mutual funds and standard asset classes" (p. 277). To accommodate the sensitivity of the results to outliers, they divide the returns of each asset class into five "states" and find that three of the five styles they empirically identify, including one titled "global/macro," are not sensitive to changes in chosen asset class returns during "normal states" but can be sensitive to selective markets during extreme states (when asset class returns are in the "tails" of their distribution). They conclude that funds classified as global/macro do not use buy-and-hold strategies in U.S. bonds, currencies, or emerging market equities. One of the identified strategies, termed "Systems/Opportunistic" delivered positive performance in the states when extreme negative outcomes were recorded in equities and bonds, suggesting a contrarian strategy may have been employed. Taken together, Fung and Hsieh show that hedge funds use a diverse set of strategies that are uncorrelated with the buy-and-hold strategies used by U.S. mutual funds. This leave open the possibility that instead of contributing to excess volatility, hedge funds, acting as contrarians, lower volatility.

140. While not directly related to hedge funds, Wei and Kim (1997) examine the correlation of positions taken by large foreign exchange participants (as a whole) and subsequent movements in exchange rates. The data, collected and published by the U.S. Treasury, records weekly and monthly positions in the spot, forwards, futures, and options for the five major currencies.<sup>34</sup> They find that these large participants, of which 29 were commercial banks and the remaining 7 were other financial institutions, were unable to forecast subsequent movements in the exchange rate—neither the direction nor the magnitude of future changes. They did, however, find a positive association between the absolute value of positions and a subsequent increase in exchange rate volatility, measured as the standard deviation of daily returns over various time horizons. The authors interpret these results as suggesting that the positions of large participants are taken, at least in part, to speculate on the level of exchange

---

<sup>34</sup>See Chapter IV for more detail on the data.

rate movements. Whether the seven remaining financial institutions in the study, or some subset of them, are hedge funds and how these institutions influence the results is not known and thus it is difficult to assess the relevance of these results to hedge fund activities. Perhaps the best way to evaluate the results is to note that hedge funds are probably not alone in pursuing speculative positions in currency markets and that no one group of large participants seems to excel at making directional predictions.



Table 10. Multiple Probit Models: Contemporaneous Herding by Selected Institutional Groups with Hedge Funds

	Model 1 Propbuys	Model 2		Model 3		# of Individual Participant-Type
		Propbuys	Netbuys	Propbuys	$\Delta P_{t-1}$	
5-year T-note						
Broker-dealer	0.6187 (0.2680)	1.1674 (0.1215)	-1.3762 (0.9156)	0.6847 (0.2468)	1.4943 (0.0675)	35
Foreign bank	-0.2039 (0.5808)	0.1835 (0.4272)	-0.8398 (0.7995)	-0.2894 (0.6139)	-1.2272 (0.8901)	22
Commercial bank	-2.3210 (0.9899)	-1.2042 (0.8857)	-1.9517 (0.9745)	-1.8098 (0.9648)	1.9781 (0.0240)	13
10-year T-note						
Broker-dealer	-0.9390 (0.8261)	0.8866 (0.1876)	-3.7083 (0.9999)	-0.8062 (0.7899)	2.5920 (0.0048)	38
Foreign bank	-1.0758 (0.8590)	0.9725 (0.8346)	-0.1575 (0.5626)	-0.8928 (0.8140)	-0.2626 (0.6036)	15
Commercial bank	-0.5063 (0.6937)	-0.1373 (0.5546)	-0.2055 (0.5814)	-0.3504 (0.6370)	0.8185 (0.2065)	11
30-year T-bond						
Broker-dealer	-4.2063 (>0.9999)	-1.3307 (0.9084)	-6.4781 (>0.9999)	-3.6510 (>0.9999)	2.7539 (0.0029)	46
Foreign bank	0.6594 (0.2548)	1.5504 (0.0605)	-2.2942 (0.9891)	0.9430 (0.1728)	0.6657 (0.2528)	28
Commercial bank	0.1235 (0.4509)	1.2239 (0.1105)	-1.8091 (0.9648)	0.4390 (0.3303)	1.9738 (0.0242)	14
Mutual fund	-3.0921 (0.9990)	-2.3196 (0.9898)	-1.6062 (0.9459)	-2.1882 (0.9857)	4.3893 (>0.9999)	18
Pension fund	-0.1104 (0.5440)	0.2885 (0.3865)	-0.6487 (0.7417)	-0.5796 (0.7189)	-1.9948 (0.9770)	23
S&P 500 index						
Broker-dealer	-6.0282 (>0.9999)	-0.4638 (0.6786)	-8.2784 (>0.9999)	-5.8270 (>0.9999)	1.1633 (0.61224)	32
Mutual fund	-1.7777 (0.9623)	0.2245 (0.4112)	-3.1753 (0.9993)	-1.7877 (0.9631)	-1.7212 (0.9574)	54
3-month Eurodollar						
Broker-dealer	-2.8760 (0.9980)	0.0205 (0.4918)	-5.9120 (>0.9999)	-2.9730 (0.9985)	-1.0098 (0.8437)	58
Foreign bank	-3.4412 (0.9997)	-1.7996 (0.9640)	-2.7306 (0.9968)	-3.4841 (0.9998)	-1.1316 (0.8711)	113
Commercial bank	-2.4899 (0.9936)	-1.4979 (0.9329)	-1.7395 (0.9590)	-2.5211 (0.9941)	0.4147 (0.3392)	24

Table 10. Multiple Probit Models: Contemporaneous Herding by Selected Institutional Groups with Hedge Funds

	Model 1	Model 2		Model 3		# of Individual Participant-Type
	Propbuys	Propbuys	Netbuys	Propbuys	$\Delta P_{t-1}$	
Broker-dealer	-5.7500 (>0.9999)	-1.9241 (0.9728)	-4.8076 (>0.9999)	-6.6422 (>0.9999)	-4.3710 (>0.9999)	34
Foreign bank	-4.9194 (>0.9999)	-2.1794 (0.9853)	-4.0511 (>0.9999)	-5.6114 (>0.9999)	-4.4999 (>0.9999)	27
Japanese yen						
Broker dealer	-4.0407 (>0.9999)	-1.4742 0.9298	-2.7890 0.9974	-4.6910 (>0.9999)	-4.5583 (>0.9999)	31
Foreign bank	-2.3485 (0.9906)	1.0571 (0.1452)	-4.4592 (>0.9999)	-3.2414 (0.9994)	-7.0324 (>0.9999)	21

Note: The sample period is August 3, 1992 through August 15, 1994. *Propbuys* is the Z statistic associated with the variable measuring the proportion of buys relative to total trades executed by hedge funds representing the "herd." *Netbuys* is the Z statistic associated with the variable measuring the net number of contracts purchased by hedge funds representing the "herd."  $\Delta P_{t-1}$  is the Z statistic associated with the lagged price change variable, measuring the degree of positive (or negative) feedback. The Z statistic is an aggregated statistic representing the sensitivity of the selected institutional group's buy/sell decision to the explanatory variables in models 1 through 3. The number of individual participants included in the estimation is given in the final column. The number in parentheses is the probability (p-value) associated with a one-tailed test that the Z statistic is greater than zero. For a detailed description of the techniques used, see Kodres and Pritzker (1997).

Table 11. Herding by Selected Institutional Groups following Hedge Funds by One Day

	Model 1	Model 2		Model 3		# of Individual
	Propbuys <sub>t-1</sub>	Propbuys <sub>t-1</sub>	Netbuys <sub>t-1</sub>	Propbuys <sub>t-1</sub>	$\Delta P_{t-1}$	Participant-Types
5-year T-note						
Broker-dealer	1.5054 (0.0661)	1.3933 (0.0818)	-0.1359 (0.5540)	1.4913 (0.0679)	1.6263 (0.0519)	35
Foreign bank	-1.3564 (0.9125)	-1.5123 (0.9348)	0.4214 (0.3367)	-1.4351 (0.9244)	-1.3680 (0.9143)	22
Commercial bank	0.4268 (0.3348)	1.2527 (0.1052)	-1.7087 (0.9562)	0.7770 (0.2186)	2.2084 (0.0136)	13
10-year T-note						
Broker-dealer	-0.3356 (0.6314)	-0.8056 (0.7898)	0.8053 (0.2103)	-0.2685 (0.6059)	2.6884 (0.0036)	38
Foreign bank	0.7945 (0.2135)	1.3887 (0.0825)	-0.8777 (0.8099)	0.5838 (0.2797)	0.0585 (0.4767)	15
Commercial bank	-0.1379 (0.5548)	-0.0853 (0.5340)	-0.1739 (0.5690)	-0.1869 (0.5741)	0.9334 (0.1753)	11
30-year T-bond						
Broker-dealer	0.7541 (0.2254)	-0.2697 (0.6063)	2.0132 (0.0220)	0.4021 (0.3438)	3.7567 (0.0001)	46
Foreign bank	0.4009 (0.3442)	0.4822 (0.3148)	0.0096 (0.4962)	0.3608 (0.3591)	0.6062 (0.2722)	28
Commercial bank	-0.9957 (0.8403)	-1.1864 (0.8823)	0.8416 (0.2000)	0.9825 (0.8371)	2.0368 (0.0208)	14
Mutual fund	1.1678 (0.1214)	0.7442 (0.2284)	0.2401 (0.4051)	1.0063 (0.1571)	4.7019 (0.0000)	18
Pension fund	0.3681 (0.3564)	0.9508 (0.1708)	-1.2516 (0.8946)	0.7410 (0.2293)	-1.8140 (0.9652)	23
S&P 500 index						
Broker-dealer	1.3872 (0.0827)	0.2690 (0.3940)	1.5087 (0.0657)	0.7251 (0.2342)	1.5179 (0.0645)	32
Mutual fund	-0.3499 (0.6368)	0.0221 (0.4912)	-0.3434 (0.6343)	0.3037 (0.3807)	-1.8417 (0.9672)	54
3-month Eurodollar						
Broker-dealer	-1.4842 (0.9311)	-0.8635 (0.8061)	-1.0168 (0.8454)	-1.3717 (0.9149)	-0.6234 (0.7335)	58
Foreign bank	-1.4853 (0.9313)	-0.4770 (0.6833)	-2.1722 (0.9851)	-1.3048 (0.9040)	-0.4781 (0.6837)	113
Commercial bank	1.0952 (0.1367)	0.7691 (0.2209)	0.4280 (0.3343)	1.0811 (0.1398)	0.8282 (0.2038)	24

Table 11. Herding by Selected Institutional Groups following Hedge Funds by One Day

	Model 1	Model 2		Model 3		# of Individual Participant-Types
	Propbuys <sub>t-1</sub>	Propbuys <sub>t-1</sub>	Netbuys <sub>t-1</sub>	Propbuys <sub>t-1</sub>	$\Delta P_{t-1}$	
Broker-dealer	0.4343 (0.3320)	0.7801 (0.2177)	-0.7816 (0.7828)	1.2162 (0.1120)	-3.4869 (0.9998)	34
Foreign bank	0.5007 (0.3083)	-0.5357 (0.7039)	1.6224 (0.0524)	1.2419 (0.1071)	-3.5713 (0.9998)	27
Japanese yen						
Broker dealer	-2.1024 (0.9822)	-2.0742 (0.9810)	0.6304 (0.2642)	-1.5493 (0.9393)	-3.5814 (0.9998)	31
Foreign bank	-1.9971 (0.9771)	-0.8830 (0.8114)	-1.2416 (0.8928)	-1.2444 (0.8933)	-6.0769 (>0.9999)	21

Note: The sample period is August 3, 1992 through August 15, 1994. *Propbuys* is the Z statistic associated with the variable measuring the proportion of buys relative to total trades executed by hedge funds lagged one period representing the "herd." *Netbuys* is the Z statistic associated with the variable measuring the net number of contracts purchased by hedge funds lagged one period representing the "herd."  $\Delta P_{t-1}$  is the Z statistic associated with the lagged price change variable, measuring the degree of positive (or negative) feedback. The Z statistic is an aggregated statistic representing the sensitivity of the selected institutional group's buy/sell decision to the explanatory variables in models 1 through 3. The number of individual participants included in the estimation is given in the final column. The number in parentheses is the probability (p-value) associated with a one-tailed test that the Z statistic is greater than zero. For a detailed description of the techniques used, see Kodres and Pritzker (1997).

## **IV. REGULATION OF HEDGE FUNDS**

### **A. Introduction<sup>35</sup>**

141. Most hedge funds, even those domiciled offshore, operate in developed financial markets and utilize the infrastructure of large financial centers to implement their investment strategies. In this chapter, we describe in greater detail the regulation of hedge funds in the United States and the United Kingdom. The frameworks in these two countries should be seen as examples of rules and surveillance procedures, which are evolving to be sure, but which to date, have allowed operation of hedge funds and other collective investment vehicles while maintaining the integrity of markets.

142. Hedge funds, like other institutional investors, are potentially subject to three general types of prudential regulations: (i) those intended to protect investors; (ii) those designed to ensure the integrity of markets; and (iii) those meant to contain systemic risk. In many cases, particular regulations promote multiple objectives.

143. Investor protection regulations are employed in cases where the authorities perceive that investors lack the sophistication to understand certain kinds of transactions or instruments, or where they lack the information needed to properly evaluate them. Hence, such regulations generally either ensure that sufficient information is properly disclosed or exclude certain types of investors from participating in certain investments. Regulations to protect market integrity seek to ensure that markets are designed so that price discovery is reasonably efficient, that market power is not easily concentrated in ways that allow manipulation, and that pertinent information is available to potential investors. Systemic risk is often the most visible element of the regulation of financial markets because it often requires coordination across markets and across regulatory and geographical boundaries. Regulations to protect market integrity and/or limit systemic risk, which include capital requirements, exposure limits, and margin requirements, seek to ensure that financial markets are sufficiently robust to withstand the failure of even the largest participants.

### **B. Regulation of Hedge Funds in the United States**

144. The term hedge fund is not legally defined by financial regulators in the US. It has typically been a limited partnership that is essentially "defined" by exemptions to certain laws.<sup>36</sup> More recently, some hedge funds have been organized as limited liability companies. The term itself is reputed to have entered the financial lexicon in the 1960s when it was used to refer to investment partnerships that used sophisticated arbitrage techniques to invest in

---

<sup>35</sup>This chapter was prepared by Sunil Sharma of the Emerging Markets Studies Division of the Research Department.

<sup>36</sup>See Holum (1994) and LaWare (1994).

equity markets. The adjective “hedge” is due to the fact that at the time a commonly used technique of these vehicles was the simultaneous buying and selling of related securities.

145. Federal regulation of financial instruments and market participants in the United States is based on a number of (frequently amended) Acts of Congress, including the Securities Act of 1933, the Securities Exchange Act of 1934, the Investment Company Act of 1940, the Investment Advisors Act of 1940 and the Commodity Exchange Act of 1974. However, by accepting investments only from institutional investors, companies or high net worth individuals, hedge funds are exempt from most of the investor protection elements of these regulations. This means that hedge funds and their operators, unlike U.S. regulated mutual funds, are generally not registered and are not required to (and do not) publicly disclose data on their financial performance or transactions (Box 1 summarizes the main differences between mutual funds and hedge funds). They are not, however, exempt from reporting requirements applicable to large traders or commodity pools.

### **Investor Protection Rules**

146. According to the Securities Act of 1933, shares in hedge funds are securities. However, by issuing such securities through a private placement, hedge funds are exempt<sup>37</sup> from registering their units of participation. They are therefore not required to make extensive disclosure and commitments in the detailed prospectuses required of registered investment funds.<sup>38</sup> A private placement consists of an offering of securities made to investors on an individual (bilateral) basis rather than through broader advertising. Regulation D offerings are not permitted to offer for sale their securities by any form of general solicitation or advertising—as interpreted by the Securities and Exchange Commission (SEC) to include almost all nonpersonal communication. A private placement can be made to an unlimited number of “accredited investors” but to only 35 or fewer non-accredited investors.<sup>39</sup>

---

<sup>37</sup>Section 4(2) of the Securities Act exempts private offerings of securities from registration.

<sup>38</sup>The Investment Company Institute (1997) estimated that the costs of initial filings and registration could exceed \$150,000.

<sup>39</sup>Rule 506 under SEC Regulation D is a nonexclusive safe harbor provided to issuers relying on the Section 4(2) exemption of the Securities Act. An accredited investor is defined to include: any saving and loan association; any broker-dealer; any employee benefit plan with total assets in excess of \$5 million; any private business development company; any organization, corporation, trust or partnership not formed for the specific purpose of acquiring the securities offered, with total assets in excess of \$5 million; any natural person with individual net worth, or joint net worth with that person’s spouse, of \$1 million; any natural person with individual income of \$200,000 in each of the two most recent years or joint income with that person’s spouse in excess of \$300,000 in each of these years, and has a

(continued...)

147. This exemption does not free the fund from all reporting requirements. They must still provide investors with all material information about their securities and will generally do so in an offering memorandum. Moreover, non-accredited investors would have to be given essentially the same information that would have been provided had the offering been conducted as a registered offering. For that reason, hedge funds generally do not accept investments from non-accredited investors.

148. The Securities Exchange Act of 1934 regulates broker-dealers and requires them to become members of a registered national securities exchange or registered national securities association to ensure that they are part of the self-regulatory structure of the brokerage industry.<sup>40</sup> Registered broker-dealers must maintain an extensive set of records of their own financial position and customer transactions, maintain segregated accounts in approved custodians, file detailed financial reports with the SEC and their self-regulatory organization, satisfy minimum qualifications and satisfy a minimum capital adequacy requirement, among other conditions. However, most hedge funds are considered to be traders, and not “dealers,” and are exempt from broker-dealer registration.<sup>41</sup> This exemption is available to entities that trade securities solely for their own investment account and not on behalf of other entities and do not carry on a public securities business.<sup>42</sup>

149. Although the Securities Act does not limit the number of potential investors in an unregistered hedge fund, until recently the Investment Company Act did. It provided an exception from the definition of an investment company for funds that (i) had no more than 100 beneficial owners and (ii) were not making, and did not intend to make, a public offering of their securities.<sup>43</sup> For hedge funds, not being deemed an investment company is extremely

---

<sup>39</sup>(...continued)

reasonable expectation of reaching the same income level in the current year; and any entity in which all of the equity owners are accredited investors. Generally, any non-accredited investor would be counted towards the 35 investor maximum.

<sup>40</sup>Currently, the National Association of Securities Dealers, Inc. is the only registered national securities association.

<sup>41</sup>A dealer may deal directly with public investors, and may also provide other services such as quoting a market and being willing to buy and sell securities on a continuous basis.

<sup>42</sup>It is possible, however, that a general partner of the fund, or an independent solicitor, whose primary function is to raise money from investors might have to register as a broker. For further discussion see Roth (1995).

<sup>43</sup>These exemptions are contained in Section 3(c)1 of the Investment Company Act. In applying the 100-investor rule, fund managers must in some cases “look through” an entity  
(continued...)

important, since registered investment companies are required to have a board of directors—at least 60 percent must be independent—and the board must approve the investment advisory contract, custodial arrangements and other matters of fund operation. Investment company status would also preclude certain types of transactions, including certain affiliated transactions, the use of “leverage” and other elements of hedge fund strategies. Hence, it is the exception from the definition of an investment company that provides the latitude in setting investment strategies, a freedom that is the hallmark of hedge funds.

150. In April 1997, the SEC implemented provisions of the National Securities Markets Improvement Act of 1996 that introduced a new exception from the definition of an investment company under the Investment Company Act to funds that (i) sold their securities only to “qualified purchasers” and (ii) were not making, and did not intend to make, public offerings of their securities.<sup>44</sup> A “qualified purchaser” is defined by the Act to include: natural persons or family owned companies with investments of at least \$5 million; trusts not formed for the specific purpose of acquiring the securities offered and whose trustees and all settlors and contributors to the trust are qualified purchasers; and any other investor acting for its own account or for other qualified purchasers, with investments of at least \$25 million. Hence, by raising the qualification standard, the Act has eliminated the quantitative limit on the potential number of participants in a hedge fund.

151. The Investment Advisers Act of 1940 seeks to protect shareholders in collective investment vehicles by regulating the activities of the adviser. It restricts the ability of registered investment advisers to receive performance-based compensation and imposes certain disclosure requirements. Some hedge fund managers are required to register under this Act, while others use an exemption from registration which applies if the adviser does not solicit business from the general public and if in the preceding year it has had less than 15 clients.<sup>45</sup> All anti-fraud rules embodied in the Act, of course, always apply.

152. In the US, most hedge funds operators and advisers are likely to be subject to regulation under the Commodity Exchange Act (CEA) due to their activity as commodity pool operators and/or as large traders in the exchange-traded futures markets. The CEA and the Commodity Futures Trading Commission (CFTC) regulations have no general exemptions for privately offered funds comparable to those under the securities laws. Also, the definition of a “commodity pool” is quite encompassing and includes any entity that solicits or accepts funds or other property for investment purposes and uses them to take positions in futures

---

<sup>43</sup>(...continued)

investor and count the number of investors in that entity. The Act (and, through past decisions, the SEC) provides guidance on when a “look-through” would be required.

<sup>44</sup>Section 3(c)(7) of the Investment Company Act.

<sup>45</sup> Advisers can count a bona fide limited partnership as a single client.



contracts and commodity options.<sup>46</sup> However, some investment vehicles which are subject to regulation under the Commodity Exchange Act may qualify for exemptions from certain disclosure and reporting requirements, either because of the sophistication of their investors or to avoid duplicate or inconsistent regulation of vehicles set up primarily for trading securities. Also, certain offshore funds that do not market or sell to U.S. participants and that are not operated by U.S. persons need not register with the CFTC.

153. The registration, disclosure and reporting requirements for commodity pools and commodity pool operators (CPO) can be summarized as follows:

- Registration: (i) The Commodity Exchange Act precludes persons with a criminal record or civil disciplinary history from being a CPO or its salesperson; (ii) applications for registration are processed by the National Futures Association (NFA), a self-regulatory organization, under authority delegated by CFTC; (iii) a CPO applicant or AP must generally pass a NFA administered proficiency exam.
- Disclosure and reporting: (i) The CPO must file disclosure documents containing specific information with the CFTC and provide prospective participants with copies of the filed disclosure documents before accepting funds for participation in the pool. Such documents include information on risks relevant to the pool; its CPO's and CTA's historical performance; fees incurred by participants; business background of

---

<sup>46</sup>Section 1(a) of The Commodity Exchange Act (CEA) defines a *commodity pool operator* (CPO) as: any person engaged in a business that is of the nature of an investment trust, syndicate, or similar form of enterprise, and who, in connection therewith, solicits, accepts, or receives from others, funds, securities, or property, either directly or through capital contributions, the sale of stock or other forms of securities, or otherwise, for the purpose of trading in any commodity for future delivery or commodity option on or subject to the rules of any contract market, except that the term does not include such persons not within the intent of the definition of the term as the CFTC may specify by rule, regulation or order. The same section defines a *commodity trading advisor* (CTA) as: any person, who for compensation or profit engages in the business of advising others, either directly or through publications, writings or electronic media, as to the value of or the advisability of trading in any contract of sale of a commodity for future delivery made or to be made on or subject to the rules of a contract market, any commodity option authorized under [CEA] Section 4© or any leverage transaction authorized under Section 10, or who for compensation or profit and as part of a regular business, issues or promulgates analyses or reports concerning any of the above. An *associated person* (AP) of a commodity pool operator is defined by CFTC Rule 1.3(aa) to be: any partner, officer, employee, consultant or agent (or any natural person occupying a similar status or performing similar functions) who is involved in any capacity involving solicitation of funds, securities, or property for participation in a commodity pool or the supervision of any person or persons so engaged. (See, Commodity Exchange Act, September 1997).

CPO, CTA and APs; any conflicts of interest on the part of the CPO, CTA and APs; and any legal proceedings against the CPO, CTA and APs; and (ii) the pool operator is also required to file with the CFTC, and provide participants with, periodic account statements and certified annual reports.<sup>47</sup> For pools with net assets exceeding \$0.5 million at the beginning of the fiscal year, monthly account statements must be distributed; otherwise, these statements must be distributed quarterly.

- Maintenance of records: At the head office, CPOs are required to maintain books for inspection by the CFTC and the Department of Justice. Detailed records, in many cases for every transaction conducted for each pool operated by the CPO, transactions of the CPO, and for the personal trading accounts of its principals,<sup>48</sup> are required.

154. In general, exemptions are authorized mainly to avoid unnecessary or duplicative regulation and to allow certain small and limited commodity pools, operated by family members or run as informal clubs, greater relief from the disclosure, reporting and recordkeeping requirements. In particular, the rules exempt CPOs with all of the following characteristics from registration: those receiving no compensation other than for administrative expenses; who operate only one pool; do not otherwise fall under the registration requirement; are not affiliated with any person who is required to be registered with the CFTC; and do not engage in advertising the commodity pool. An exemption also applies to CPOs who operate pools with 15 or fewer participants each and whose aggregate gross capital contributions is less than \$200,000.

155. While most operators of hedge funds engaged in futures transactions are likely to be registered with the CFTC, relief from certain disclosure, reporting and record-keeping requirements is granted if a commodity pool's futures activities are limited in nature or because of the sophisticated nature and the magnitude of financial resources needed to be a participant. Disclosure, reporting and record keeping requirements are weaker for pools which: (i) fall under the Securities Act of 1933 or an exemption from it; (ii) are mainly involved in trading securities; (iii) commit less than 10 percent of their assets to taking positions in commodity futures and options; and (iv) trade commodity interests solely incidentally to the pool's securities business. Similar relief is provided to pools which are offered to sophisticated investors, defined legally as *qualified eligible participants* (or QEPs). CFTC rules classify QEPs generally into three categories: (i) registered commodity and securities professionals; (ii) accredited investors as defined in the Securities Act of 1933 with

---

<sup>47</sup>Note that neither the CEA nor the CFTC rules impose any capital requirement on the CPO. Hence the reports concern the operations of the commodity pool and not those of the commodity pool operator.

<sup>48</sup>The CFTC rules define a *principal* to include key persons such as directors, officers, branch managers, and persons contributing ten percent or more of the CPO's capital.

investments in securities and derivatives of \$2,000,000; (iii) business entities in which all owners/participants are QEPs.

156. Most off-shore funds, to the extent that they operate in the U.S. futures markets or are managed by CPOs based in the U.S., are subject to CFTC registration and other requirements. However, CPOs registered in the U.S. can obtain relief from certain disclosure and reporting if: (i) the pool is organized and operated outside the U.S.; (ii) no participant is a U.S. citizen; (iii) no U.S. sources, directly or indirectly, commit capital to the pool; and (iv) the pool is not marketed in the U.S. It should be noted that offshore funds remain subject to anti-fraud, certain reporting, and large trader reporting requirements.

### **Regulations to Protect Market Integrity**

157. Although hedge funds can opt out of many of the registration and disclosure requirements of the securities laws, they are subject to all the laws enacted to protect market integrity. The main purpose of such laws is to minimize the potential of market manipulation by increasing transparency and limiting the size of positions that a single participant may establish in a particular market. Many of these regulations also help in containing the spillovers across markets and hence in mitigating systemic risks.

158. The Treasury monitors "large" participants in the foreign exchange market. Holdings of five major currencies—Canadian dollar, German mark, Japanese yen, Swiss franc, and U.K. pound sterling—are reported to the relevant Federal Reserve Banks which act as the fiscal agents for the Treasury.<sup>49</sup> Besides spot transactions, these reports contain information on derivative instruments used to establish positions in the foreign exchange market, including foreign exchange forwards and futures bought and sold, and one half the notional amount of foreign exchange options bought and sold. The exchange of principal under cross currency interest rate swaps is also reported, as part of purchases and sales of foreign currencies. Participants covered by this reporting requirement include U.S.-based banking institutions, subsidiaries and branches of foreign banking institutions, domestic corporations and nonprofit institutions, subsidiaries and branches of foreign nonbanking concerns, broker-dealers, mutual funds and hedge funds. U.S.-based institutions file a consolidated statement for domestic and foreign subsidiaries and branches, while U.S.-based subsidiaries and branches of foreign institutions file individually or on a U.S. consolidated basis, and not for the foreign parent.

159. Weekly and monthly reports are required of large participants defined as players with more than \$50 billion equivalent in foreign exchange contracts at the end of any quarter (that is, end-March, June, September, December) during the previous year, calculated using exchange rates prevailing at the time. Quarterly reports must be filed by participants who had more than \$1 billion equivalent of foreign exchange contracts at the end of any quarter in the previous year. Exemptions from monthly and weekly reporting are available to banking

---

<sup>49</sup>Filing is required by law (31 U.S.C. 5315; 31 C.F.R. 128, Subpart C).

institutions that file certain other reports. In addition to these entities, major nonbank players are allowed exemptions to the quarterly submission requirement if they are already filing monthly and weekly reports. The Treasury puts out the *aggregate* data in its monthly bulletin<sup>50</sup> but the disaggregated data by participant is not published or revealed to the public.

160. For government securities, the Government Securities Act and amendments allow the US Treasury to impose reporting requirements on entities having large positions in to-be-issued or recently issued Treasury securities. Such information is deemed necessary for monitoring large positions in Treasury securities and making sure that large players are not squeezing other participants and are in accord with the Securities Exchange Act. The reports are filed with the Federal Reserve of New York and provided to the SEC and Treasury on a timely basis.

161. The Securities Exchange Act also requires the reporting of sizeable investments in registered securities.<sup>51</sup> It obliges any person who, directly or indirectly, acquires more than 5 percent of the shares of a registered security to notify the SEC within 10 days of such an acquisition. It also makes institutional investment managers exercising investment discretion over accounts containing more than US \$100 million in exchange-traded and NASDAQ-quoted securities on the last trading day of any month to provide (on a quarterly basis) information on the securities in the portfolio, the names of the issuers and the number of shares or principal amounts.<sup>52</sup>

162. Market integrity is also protected by regulations such as margin requirements on stock purchases imposed by the Federal Reserve Board and the self-regulatory organizations. These requirements insulate registered broker-dealers against losses stemming from customer defaults on borrowing. Clients are generally also required to maintain collateral in excess of the amount borrowed, with excess collateral being determined by the nature of the investment and the associated market risk. At the larger brokerage houses, credit committees manage exposure of the firm by overseeing the extension of credit to customers and counterparties.

---

<sup>50</sup>See, for example, U.S. Department of the Treasury (1997).

<sup>51</sup>The SEC has considered the idea of a large trader reporting system for equities and a dialogue with market participants is still continuing. Under such a system, a "large trader" would be required to file a notification with the SEC, inform its broker-dealer of such a filing and the SEC identification number assigned, and thereafter would be obligated to update the notification over some time interval. The broker-dealer would be required to maintain a record of all transactions on such an account. This activity-based system would capture information on all large traders irrespective of the size of end-of-day positions. However, it should be noted that this system would apply only to entities transacting through registered broker-dealers and in securities listed on an exchange or quoted on NASDAQ.

<sup>52</sup>Section 13(f) of the Securities Exchange Act.

Transactions exceeding certain pre-assigned levels need to have special approval. The SEC monitors the risk management policies and discusses the methodologies adopted at the major US securities firms. Futures exchanges and intermediaries are regulated to prevent market manipulation and ensure against disruptions in the face of dramatic price movements. Investors, including hedge funds, must respect position limits imposed by the CFTC, futures exchanges, or self-regulating organizations that restrict the number of contracts that an investor or group of investors can own or control.

163. In overseeing the futures markets, the CFTC attempts to identify large traders in each market, their positions, interaction of related accounts, and sometimes, even their trading intentions: (i) CFTC rules require that all futures positions above certain pre-specified thresholds be reported daily. Although the futures position of hedge funds cannot always be distinguished from the those of other commodity pools, the CFTC seeks to monitor selected hedge funds as well as the aggregate position of all identified money managers; (ii) With respect to large traders, the CFTC also has extensive inspection powers. For reportable futures positions, the rules require complete details of all transactions, positions, inventories and commitments, and names and addresses of all individuals involved. Such records can at any time be inspected by the CFTC and the Department of Justice; (iii) To prevent the distortion of futures markets, the CFTC or the exchanges also have rules to limit the speculative positions of market participants in a number of markets. Exemptions to such rules are given only if the participant can satisfy the CFTC or the appropriate exchange that it has risks associated with cash positions which need to be hedged or that the arbitrage being affected is eligible for exemption. In certain markets, for example, the U.S. Treasury bond, foreign exchange, and precious metals futures, speculative position limits have been replaced by "position accountability rules." For large positions, these rules permit the exchange to request information, including cash market information, from the trader.

164. To reinforce CFTC surveillance, each exchange is required to have its own system for identifying large traders. For example, the Chicago Mercantile Exchange, requires position reports for all traders with over 100 S&P500 contracts while CFTC rules require such reporting if the trader has over 600 contracts. Market disruptions from large price declines are limited by CFTC and SEC approved circuit breaker rules which halt trading in securities, options on securities, and stock index futures and options when the Dow Jones Industrial Average falls by pre-specified amounts.<sup>53</sup> The regulators have the authority to take emergency action if it suspects manipulation, cornering of a market, or any hindrance to the operation of supply and demand forces.

165. Futures clearing organizations are regulated by the CFTC to ensure clearance and settlement. Customers' positions on an exchange are bolstered by the segregation of customer

---

<sup>53</sup>However, theoretically the New York Stock Exchange could re-open with no price limit after a trading halt triggered by a decline in the Dow Jones Industrial Average in the pre-specified amount.

from house funds, and the capital of the clearing member, which in turn assesses the customers ability to meet the incurred obligations. Clearing organizations generally impose capital requirements on members which are much higher than those required by CFTC rules. Credit risk is alleviated by daily marking-to-market and allocation of gains and losses on all positions; most exchanges collect margins on an intra-day basis and all exchanges have the authority to do so in volatile markets. Also, the CFTC can change the initial and maintenance margins for stock index futures and options.

### **Reducing Systemic Risk**

166. The key systemic question is to what extent are large, and possibly leveraged, investors, including hedge funds, a source of risk to the financial institutions that provide them with credit and to the intermediaries, such as broker-dealers, who help them implement their investment strategies.

167. Banks provide many services to hedge funds, including foreign exchange trading facilities, repo arrangements and other collateralized credit lines, uncollateralized direct credit, custodial services, and sometimes even advice on fund management. These banks accept hedge funds as customers because they view the relationship as profitable and the associated risks as controllable. An assessment is made to what extent and which products a bank will trade with a particular client. Due diligence determine examining the structure of the collective investment vehicle, the disclosure documents submitted to regulators and those offered to clients, the financial statements, the fund's performance history, and often an on-site inspection of risk management systems and capabilities.

168. Generally, a large proportion, if not all, of the credit extended by banks to hedge funds consists of collateralized lending. Market risk assumed by the sale of foreign exchange or other products would as a matter of course be hedged. However, if the contract moved in favor of the bank there would be an "implicit" extension of credit to the client which would be settled at the maturity of the contract. Such credit risk is collateralized against and banks monitor collateral values on a daily basis. If margin calls are not met, and on occasion for other reasons, banks have the right to close out the contracts. For established customers, banks sometimes set "loss thresholds" which allow the extension of (uncollateralized) credit up to the amount of the limit set. But once such thresholds are breached, clients are expected to post collateral or settle their outstanding positions in cash. It is possible when margin calls are not met, that banks could be saddled with collateral worth less than expected, resulting in a loss for the bank. Such "potential" credit exposures are monitored by banks and tolerance limits set to contain it.

169. Credit exposures of broker-dealers are monitored by the SEC and there are regulations to promote broker-dealer stability during intervals of system-wide stress. The net capital rule fortifies a broker-dealer against defaults by setting minimum net capital standards and requiring it to deduct from it's net worth the value of loans which have not been fully

collateralized by liquid assets. Margin rules based on market risk provide similar insulation to broker-dealers and through them to the wider financial system.

170. Following the Market Reform Act of 1990, the SEC has strengthened its examination of the risk management practices of broker-dealers.<sup>54</sup> Reporting rules enable a periodic assessment and, at times, continuous monitoring, of the risks posed to broker-dealers by their material affiliates, including those involved in OTC derivatives. Every quarter, on a confidential basis, broker-dealers provide the SEC with certain information on the volume of the derivatives business done by their affiliates. If credit risk exposure exceeds a materiality threshold of US \$ 100 million or 10 percent of net capital, they are expected to report a counterparty breakdown of certain OTC derivative products.

171. Large firms also have the information systems capable of analyzing credit risk by product, counterparties and other categories to assess concentrations in exposure. The SEC also reviews credit risk controls used by major US securities firms. It evaluates the capacity to do credit analysis, setting of credit limits for clients, authorization procedures for large transactions, calculation and monitoring of overall credit exposure, and provisioning for defaults. Along with the bank and broker-dealer credit structures that protect against excessively large uncollateralized positions, the Treasury and CFTC large position and/or large trader reporting requirements by automatically soliciting information, provide continuous monitoring of large players in key markets and hence allow early detection of stresses in the system.

172. It is the view of U.S. regulators that hedge funds do not pose any unique challenges as far as systemic risk is concerned and that the regulatory apparatus in place combined with the surveillance procedures was sufficient to ferret out any problems in this regard.<sup>55</sup> They acknowledge that while the position of large traders operating through organized exchanges is routinely available, information on the operations of such traders in other markets is not always available and hence, at times, it is difficult to determine to what extent problems in other markets, for example, the unregulated over the counter market, could spillover into the regulated markets. But imposition of reporting requirements needs to balance the timeliness of the data one might receive with the impact such requirements may have on the privacy of the participants and therefore on the liquidity of markets. Less timely, but more extensive data collection is possible, but may be useless for many problems. However, timely data is expensive for the industry to produce and may make participants less likely to use a particular market.

---

<sup>54</sup>See, Levitt (1994).

<sup>55</sup>See, Holum (1994) and Levitt (1994).

173. The authorities also feel that banking institutions take considerable care in controlling the risks involved in their interaction with hedge funds and other large clients and that increased disclosure and regulatory reporting in this regard is not warranted.<sup>56</sup>

### **C. Regulation of Hedge Funds in the United Kingdom<sup>57</sup>**

174. In the U.K., the Financial Services Act of 1986 "draws a fundamental distinction between authorized U.K. unit trusts and recognized overseas collective investment schemes, on the one hand, and 'unregulated' schemes on the other."<sup>58</sup> The first category of funds are granted promotional freedom, reflecting the regulatory discipline to which they are subject—disclosure of scheme particulars, restrictions on permissible investments, and restrictions on the pricing of units or shares and the management and constitution of such trusts. In contrast, unregulated schemes are not subjected to such rules and as a consequence cannot be promoted to the general public.<sup>59</sup>

175. The Financial Services Act, however, allows exemptions for business and professional investors, experienced investors, established customers, existing participants and other exempted persons.<sup>60</sup> An exacting test is applied to determine whether a customer qualifies for

---

<sup>56</sup>See, LaWare (1994).

<sup>57</sup>The U.K. is currently in the process of creating a new single regulator for the financial system. This organization, the Financial Services Authority (FSA), will eventually combine the regulatory and other functions performed by the Securities and Investments Board (SIB), Supervision and Surveillance Division of the Bank of England, Securities and Futures Authority (SFA), Investment Management Regulatory Organization (IMRO), Personal Investment Authority (PIA), Insurance Directorate of the Department of Trade and Industry, Building Societies Commission (BSC), Friendly Societies Commission (FSC), and the Registry of Friendly Societies (RFS). Two pieces of legislation (currently under preparation) will be instrumental in completing the creation of the FSA--the Bank of England bill will transfer to the FSA the responsibility for supervision of banks, money market institutions and related clearing houses; and the financial regulatory reform bill will create the statutory regime under which the FSA will become the single financial regulator.

<sup>58</sup> See, for example, Securities and Investments Board (1990).

<sup>59</sup> Section 76(1) of the Financial Services Act prohibits promotion by authorized persons and the Sections 3, 57 and certain SIB conduct of business rules prohibit promotion by unauthorized persons.

<sup>60</sup> See, Sections 76(2), 76(3) and rules promulgated under these laws by the SIB—Promotion of Unregulated Collective Investment Schemes, 1988, and The Financial Services (Promotion (continued...))



“experienced investor” status. Also, such status is relative to a particular type of investment and a particular type of transaction. It can be conferred only if the investor has frequently conducted a certain type of transaction over some time period that it can be expected to be cognizant of the risks involved, is made aware of the investor protection implications, and on being notified by the firm has not declined to be regarded as an experienced investor. Further, this exemption does not apply unless the investor is deemed to be an experienced investor for each category of transaction that an investment vehicle may conduct for it. The “established customer” exemption as interpreted by the SIB, allows promotion only to known clients with whom a firm has a “settled, ongoing” relationship. The “existing participant” exemption allows sales of additional units to persons “reasonably believed to be a participant in a scheme already.” It prohibits promotion of another scheme, in which the person is not a participant.

176. If an unregulated scheme or hedge fund sought to issue securities, it would be subject, where applicable, to the Public Offer of Securities Regulations 1995, Listing Rules of the London Stock Exchange, and the admission rules of the exchange on which the securities are traded. Any advertising of such securities would be subject to the rules of the Financial Services Act.

177. Also, hedge funds transactions in markets operated by recognized investment exchanges (the London Stock Exchange, London International Financial Futures Exchange (LIFFE), the London Metal Exchange, the International Petroleum Exchange, OMLX and Tradepoint) are subject to the rules and transparency requirements of those exchanges. If a hedge fund is also a member of the exchange, it must satisfy the relevant exchange rules in addition to the rules of the self-regulating organization that authorizes it to do investment business. Under the Financial Services Act, recognized investment exchanges are required to meet specific regulations. These requirements cover financial resources, rules to ensure proper and orderly markets, transaction recording and settlement, monitoring and enforcement rules, the investigation of complaints and co-operation with other regulators. It appears that because of the capital requirements, few hedge funds are members of organized exchanges and generally conduct their business through other exchange members.

178. In the U.K., dealing in currencies (including gold and silver bullion) or commodities for spot delivery does not, in general, constitute investment business. However, dealing in other instruments of interest to hedge funds is construed as investment business, such as dealing in commodity and currency futures, and options. In order to operate in these markets, hedge funds would therefore need authorization under the Financial Services Act, and would be subject to the relevant conduct of business regulations and financial resource rules covering prudential capital and reserve requirements.

---

<sup>60</sup>(...continued)  
of Unregulated Schemes) Regulations 1991.

179. 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.

180. Directives of the Council of the European Communities have led to some harmonization of rules and regulations in the European Union. The approach has been to effect essential harmonization only to the extent that it is required for the "mutual recognition of authorization (of institutions) and prudential supervision systems" and establishing a minimum common framework. If warranted, individual member countries are generally allowed to adopt rules that are stricter than those specified in the directives.

181. The coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS)—broadly corresponding to mutual funds in the U.S.—has been accomplished by a 1985 directive (85/611/EEC) and subsequent amendments in 1988 and 1995.<sup>61</sup> More recently, the directive on investment services in the securities field further defined the authorization of investment firms by home country competent authorities, the different requirements for protection of various categories of investors, and rules to ensure the smooth operation of markets in money market instruments and transferable securities (93/22/EEC). Pending coordination of laws that apply to categories of collective investment vehicles *not* covered by these directives, national authorities of EU member countries lay down the specific rules to which such undertakings are subject to while doing business within their territory.

182. Directive 88/627/EEC covers information that is required to be published when a major holding in a listed company is acquired or disposed of. It requires a natural person or legal entity that acquires or disposes of, directly or through intermediaries, a holding in a listed company that exceeds or falls below any one of the thresholds of 10, 20, 33 1/3, 50 and 66 2/3 percent to notify the company and the competent authorities within 7 calendar days of

---

<sup>61</sup>Transferable securities are broadly defined as "those classes of securities which are normally dealt in on the capital market, such as government securities, shares in companies, negotiable securities giving the right to acquire shares by subscription or exchange, depositary receipts, bonds issued as part of a series, index warrants and securities giving right to acquire such bonds by subscription." UCITS are defined as vehicles "whose sole objective is the collective investment in transferable securities of capital raised from the public and which operate on the principle of risk-spreading, and the units of which are, at the request of holders, re-purchased or redeemed, directly or indirectly, out of those undertakings' assets." These undertakings may be constituted under the law of contracts (as common funds managed by management companies), under trust law (as unit trusts), or under statute (as investment companies).

crossing a threshold.<sup>62</sup> This directive does not apply to the acquisition or disposal of holdings in collective investment vehicles.

183. Limits and reporting of large exposures of credit institutions are addressed by the directive on the monitoring and control of large exposures of credit institutions (92/121/EEC). A credit institution's exposure to a client or group of connected clients is considered to be large if it equal or exceeds 10 percent of the institutions own funds.<sup>63</sup> The law requires credit institutions to follow one of the following methods of reporting:

- report all large exposures at least four times a year,
- report all large exposures at least once a year and report during the year all new large exposures and any increases in existing large exposures greater than 20 percent from previously reported levels.

184. The limit on large exposures of credit institutions to a client or group of connected clients is defined to be 25 percent of the institutions own funds. This limit is reduced to 20 percent if the client is the parent undertaking or a subsidiary of the credit institution and/or one of the subsidiaries of the parent undertaking. Exemptions from this limit can be obtained for these clients if the institution puts in place specific monitoring procedures and informs the European Commission and the Banking Advisory Committee of these procedures. A credit institution is prohibited from incurring large exposures which in total exceed 800 percent of its own funds.<sup>64</sup>

---

<sup>62</sup>A professional dealer in securities, who is a member of a stock exchange approved and supervised by the competent authorities of a country in the EU, may be given an exemption from such a declaration if the acquisition or disposal of a holding is done in the context of dealing in securities and not used for purposes of control or management of a company.

<sup>63</sup>The capital adequacy directive (93/6/EEC) combined with the directive on own funds of credit institutions (89/299/EEC) coordinate the definition of own funds of investment firms, the establishment of the amounts of their initial capital and the establishment of a common framework for monitoring the risks incurred by investment firms and credit institutions.

<sup>64</sup>Subject to certain conditions being simultaneously met, the competent authorities may authorize the limits laid down in this directive to be exceeded. See Annex VI of the capital adequacy directive (93/6/EEC).

### **BOX 1: Differences Between Mutual Funds and Hedge Funds in the U.S.**

While mutual funds in the U.S. are strictly regulated to ensure that they are operated in the interests of their shareholders, hedge funds are private investment pools which are subject to much less regulatory oversight. The key differences between these collective investment vehicles are:

**Regulatory requirements:** The main objectives of mutual fund regulation under the Securities Act of 1933, the Securities Exchange Act of 1934, the Investment Company Act of 1940, and the Investment Advisers Act of 1940 are to ensure investors are provided with timely and accurate information about management, holdings, fees, and expenses, and to protect the integrity of the fund's assets. To this end, mutual fund holdings and strategies are also regulated. In contrast, hedge funds are typically unregistered private investment pools governed by their partnership agreement, that use exemptions under the laws to free themselves of many regulations that apply to registered investment vehicles, including those on the composition of their portfolios and the nature of their investment strategies.

**Fees:** Federal law requires detailed disclosure and standardized reporting of mutual fund fees and expenses. Also, sales charges and distribution fees are subject to specific limits imposed by the National Association of Securities Dealers. In comparison, there are no rules limiting hedge fund fees, which generally are between 15-20 percent of returns plus about 1-2 percent of net assets.

**Leverage:** The Investment Company Act restricts the leveraging practices of mutual funds. SEC rules also limit the extent to which they can use derivative products to enhance returns or reduce risks. There are no such restrictions on hedge funds and the use of leverage is a defining characteristic of many of the funds.

**Pricing and Liquidity:** Although some prices based on fair value as determined by the fund are sometimes allowed, mutual fund shares are generally priced daily and this is designed to ensure that redemptions and new investments are made at fair values. The law requires that shareholders be allowed to redeem shares on at least a daily basis. No specific rules govern hedge fund pricing, and redemption of shares can also be restricted by the partnership agreement.

**Characteristics of Investors:** Typically, the minimum initial investment in a mutual fund is between \$1000-2500 and much smaller amounts can be added subsequently. To own shares in an unregulated investment pool, an investor has to make a much higher initial commitment, commonly in excess of \$1 million. Since much weaker investor protection rules apply to hedge funds, such measures are designed to restrict share ownership to sophisticated and/or high net worth individuals.

Source: Investment Company Institute.

## REFERENCES

- 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, Michelle, 1994, "How the Banks caught Hedge Fund fever," *Global Finance*, March, pp. 48-53.
- Chadha, Bankim and David Folkerts-Landau, 1997, "The Evolving Role of Banks in International Capital Flows," paper presented at NBER conference on international capital flows held in Woodstock, Vermont, October, 17-18, 1997.
- Commodity Exchange Act As Amended and Regulations Thereunder, 1997, (Chicago: Commerce Clearing House), September.
- De Long, Bradford J., Andrei Shleifer, Lawrence H. Summers, and Robert J. Waldmann, 1990, "Positive Feedback Investment Strategies and Destabilizing Rational Speculation," *Journal of Finance*, 45:2, 379-395.
- European Union Council, 1985, "Directive on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities," (85/611/EEC), Official Journal of the European Communities, No. L 375 (Brussels: European Union).
- \_\_\_\_\_, 1988, "Directive on the information to be published when a major holding in a listed company is acquired or disposed of," (88/627/EEC), Official Journal of the European Communities, No. L 348 (Brussels: European Union).
- \_\_\_\_\_, 1989, "Directive on the own funds of credit institutions," (89/299/EEC), Official Journal of the European Communities, No. L 124 (Brussels: European Union).
- \_\_\_\_\_, 1992, "Directive on the monitoring and control of large exposures of credit institutions," (92/121/EEC), Official Journal of the European Communities, No. L 124 (Brussels: European Union).
- \_\_\_\_\_, 1993, "Directive on the capital adequacy of investment firms and credit institutions," (93/6/EEC), Official Journal of the European Communities, No. L 141 (Brussels: European Union).
- \_\_\_\_\_, 1993, "Directive on investment services in the securities field," (93/22/EEC), Official Journal of the European Communities, No. L 141 (Brussels: European Union).

- Fung, William, and David A. Hsieh, 1997, "Empirical Characteristics of Dynamic Trading Strategies: The Case of Hedge Funds," *The Review of Financial Studies*, 10:2, 275-302.
- Hedge Fund Research, (1997), "Statistical Explanations and Definitions," HFR Journal, Vol. 4, No. 1, p. 34-49.
- Holum, Barbara P., 1994, Testimony Concerning Hedge Fund Activities before the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, April 13.
- Jaffer, Sohail, 1996, "Evaluating Opportunities in Europe: The Institutional Investor's Perspective," in *Evaluating and Implementing Hedge Fund Strategies*, edited by Ronald A. Lake (Euromoney Books: Great Britain).
- Kodres, Laura E., and Mathew Pritsker, 1997, "Directionally-Similar Position Taking and Herding By Large Futures Market Participants," Unpublished working paper, June.
- LaWare, John P., 1994, Testimony Concerning Hedge Fund Activities before the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, April 13.
- Levitt, Arthur, 1994, Testimony Concerning Hedge Fund Activities Before the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, April 13.
- Loomis, Carol J., 1966, "The Jones Nobody Keeps Up With," *Fortune* (April), pp. 237-247.
- Rohrer, Julie, 1986, "The Red-Hot World of Julian Robertson," *Institutional Investor* (May), pp. 86-92.
- Maug, Ernst, and Narayan Naik, 1996, "Herding and Delegated Portfolio Management: The Impact of Relative Performance Evaluation on Asset Allocation," Working Paper 223-1996, London Business School.
- Neal, Robert, 1993, "Is Program Trading Destabilizing," *Journal of Derivatives*, 1, 64-77.
- Roth, Paul N., 1995, "Critical Legal and Regulatory Issues," in *Hedge Funds: Investment and Portfolio Strategies for the Institutional Investor*, ed. by Jess Lederman and Robert A. Klein, (New York: McGraw Hill), pp. 145-197.

- Scharfstein, David S., and Jeremy C. Stein, 1990, "Herd Behavior and Investment," *American Economic Review*, 80, 465-479.
- Securities and Investments Board, 1990, Promotion of Unregulated Collective Investment Schemes, Consultative Paper 32, January.
- U.S. Department of the Treasury, 1997, Treasury Bulletin, (Washington: U.S. Government Printing Office), September, pp. 97-104.
- Warner, Alison, 1994, "Hedging and Ditching," *The Banker* (April), pp. 43-48.
- 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 6256, November.
- White, David A., 1995, "Investing in Hedge Funds: Investment Policy Implications," in Jess Lederman and Robert A. Klein (eds), *Hedge Funds: Investment and Portfolio Strategies for the Institutional Investor* (Chicago: Irwin), pp. 29-40.

