Hedge Funds: Past, Present, and Future

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Abstract

Assets managed by hedge funds have grown faster over the last ten years than assets managed by mutual funds. Hedge funds and mutual funds perform the same economic function, but hedge funds are largely unregulated while mutual funds are tightly regulated. This paper compares the organization, performance, and risks of hedge funds and mutual funds. It then examines whether one can expect increasing convergence between these two investment vehicles and concludes that the performance gap between hedge funds and mutual funds will narrow, that regulatory developments will limit the flexibility of hedge funds, and that hedge funds will become more institutionalized.

Hedge funds often make headlines because of spectacular losses or spectacular gains. In September 2006, a large hedge fund, Amaranth, reported losses of more than $6 billion apparently incurred in only one month, representing a negative return over that month of roughly 66 percent. Earlier in the year, newspapers focused on the $1.4 billion compensation in 2005 of hedge fund manager Boone Pickens and the 650 percent return that year of his BP Capital Commodity Fund (Anderson, 2006a). The importance of hedge funds in the daily life of financial markets does not make the same headlines, but it has grown tremendously. According to recent estimates, hedge funds account for close to half the trading on the New York and London stock exchanges (Anderson, 2006b).

Chances are that you personally cannot invest in a hedge fund. Most investors in the U.S. cannot. Hedge funds are mostly unregulated. These funds can only issue securities privately and their investors have to be individuals or institutions who meet requirements set out by the Securities and Exchange Commission insuring that the investors are knowledgeable and can bear a significant loss. Most likely, however, you invest in mutual funds, which are heavily regulated in how they can invest their funds, how their managers can be paid, how they are governed, how they can charge investors for their services, and so on. The typical mutual fund in your portfolio cannot make the type of investments that provide the performance of Amaranth or the BP Capital Commodity Fund.

The economic function of a hedge fund is exactly the same as the function of a mutual fund. In both cases, fund managers are entrusted with money from investors who hope that when they withdraw their money, they will receive their initial investment back plus a healthy return. Mutual funds are divided into two types of funds. Some funds are indexed funds (also known as

passive funds). With these funds, the managers attempt to produce a return which tracks the return of a benchmark index, like the Standard & Poor's 500. However, most mutual funds and all hedge funds are active funds. Investors in such a fund hope that the manager has skills that will deliver a return substantially better than what they could have achieved on their own through judicious investments in passive funds or securities or by investing with other managers.

Hedge funds have existed for a long time. It is generally believed that Alfred W. Jones, who was a writer for Forbes and had a Ph. D. in sociology, started the first hedge fund in 1949, which he ran into the early 1970s. He raised $60,000 and invested $40,000 of his money to pursue a strategy of investing in common stocks and hedging the positions with short sales. However, hedge funds were not very visible for much of their history. Since the turn of the century, the assets under management of hedge funds have exploded – at least partly because of superior performance compared to traditional investments made by mutual funds. At the end of 1993, assets under management of hedge funds were less than 4 percent of the assets managed by mutual funds; by 2005, this percentage had grown to more than 10 percent. In 1990, less than $50 billion were invested in hedge funds; in 2006, more than $1 trillion was invested in hedge funds.[1]

Since hedge funds and mutual funds essentially perform the same economic function, why do they co-exist? Hedge funds exist because mutual funds do not deliver complex investment strategies. Part of the reason they do not is that they are regulated, but this is not the whole story. Mutual funds and other institutional investors benefit from managing large amounts of money and can gather a lot of funds by promoting strategies that are simple to understand.

[1] A well-established data provider on hedge funds, Hedge Fund Research (HFR), estimates assets under management at $973 billion at the end of 2004 and reported strong increases in assets under management subsequently. However, larger estimates exist – up to the estimate of $2.17 trillion of assets under management for 2005 from a survey by Hedgefundmanager and Advent.

Mass selling of hedge fund strategies is much harder because these strategies cannot be understood well without more financial background than the typical mutual fund investor has. It is therefore not surprising that the largest mutual funds dwarf in size the largest hedge funds. At the end of 2006, the largest mutual fund, the Growth Fund of America from American Funds, had assets under management of $161 billion and the largest mutual fund companies managed more than $1 trillion. In contrast, with a few exceptions, the largest hedge funds managed less than $10 billion. Goldman Sachs managed close to $30 billion in hedge funds and was apparently the largest hedge fund manager.

Can hedge funds and mutual funds co-exist in the long-run? Will regulators or market forces make these two vehicles more similar? There will always be hedge funds, but the bulk of the hedge fund industry will experience some convergence towards the more traditional mutual fund model. First, the prospects for greater regulation are very real; many policymakers have been intensely concerned about the risks created by hedge funds. Greater regulation of hedge funds will make them more similar to mutual funds. Second, changes in investor clienteles and the growth of the industry will lead to a greater institutionalization of hedge funds. Traditionally, hedge fund managers have had considerable discretion compared to mutual fund managers. However, as hedge funds acquire more institutional investors, the discretion of hedge fund managers will decline to satisfy the fiduciary responsibility of institutional investors. As hedge fund managers become more constrained, they will find it harder to post great performance. Finally, as hedge fund assets under management keep growing, some strategies will become unprofitable – which has already occurred.

To understand better how hedge funds can be expected to evolve, we start by examining how hedge funds are organized. We then review their evolution briefly. A critical issue is

whether hedge funds perform better than mutual funds. We discuss why that question is difficult to answer. We then discuss the risks posed by hedge funds to financial institutions and the broader economy and the extent to which these risks should be a source of concern. We conclude by summarizing the implications of our analysis for the future of hedge funds.

What Are Hedge Funds and How Are They Organized?

Hedge funds are unregulated pools of money managed by an investment advisor, the hedge fund manager, who has a great deal of flexibility. In particular, hedge fund managers typically have the right to have short positions, to borrow, and to make extensive use of derivatives (from plain vanilla options to very exotic instruments). To avoid the regulations that affect mutual funds under the Investment Company Act, hedge funds have to limit the number of investors who can invest and they cannot make public offerings. To bypass registration under the Securities Act of 1933, a hedge fund is restricted to having only "accredited investors consisting of institutional investors, companies, or high net worth individuals who can 'fend for themselves'" (Eichengreen, Mathieson, Chadha, Jansen, Kodres, and Sharma, 1998). In contrast, mutual funds generally do not have short positions, do not borrow, and make limited use of derivatives (Koski and Pontiff, 1999).

A hedge fund is typically a collection of funds managed by the hedge fund manager – typically through a separately organized company, the management company. It is a collection of funds because the tax status of investors differs and each fund is designed to optimize taxes for investors. A typical large hedge fund with a U.S.-based management company will have an offshore fund for foreign investors and an onshore fund for U.S.-taxed investors. The onshore

fund is generally a limited partnership if investors are taxed, so that gains and losses flow through to investors and there is no taxation at the fund level. The offshore fund is generally based in a tax haven, such as Bermuda. A common structure is to have the onshore fund and the offshore fund invest in a so-called master fund. The onshore and offshore funds are then called feeder funds.

In the United States, investment advisors with less than 15 clients do not have to register with the Securities and Exchange Commission under the Investment Advisers Act of 1940. The management company in the case of a hedge fund has few clients – only the various funds it manages. Consequently, the management company does not have to register with the SEC under the traditional interpretation of "clients." In 2005, the SEC attempted to change this interpretation by making the hedge fund investors the "clients" of the management company, so that hedge fund management companies would have had to register with the SEC. The courts struck down this interpretation. Many management companies register anyway, perhaps because they believe that registration gives them credibility. Further, hedge funds in which U.S. pension funds invest must have registered management companies.

The incentives of hedge fund managers differ sharply from those of mutual fund managers. The compensation contract for mutual fund advisers is restricted by regulation so that the incentive compensation, if there is any, has to be symmetric – essentially, a dollar of gain has to have the opposite impact on compensation as a dollar of loss. As a result, relatively few mutual fund advisers have an incentive compensation clause in their contracts and the compensation of mutual fund managers depends mostly on the amount of assets under management (Elton, Gruber, and Blake, 2003). One of the most famous mutual funds is Fidelity's Magellan fund. The compensation to Fidelity for managing the fund is a fixed fee

(0.57% for the year ending March 2006) plus an adjustment depending on how the fund performs relative to the S&P 500 of up to minus or plus 0.20% of assets under management.

The incentive portion of the compensation of Fidelity for managing the Magellan fund is tiny compared to the incentive portion of the compensation of a hedge fund manager. Almost all hedge fund managers have an asymmetric compensation contract that specifies that they receive a substantial fraction of the profits they generate (Ackermann, McEnally, and Ravenscraft, 1999). Alfred Jones reorganized his fund in 1952 as a limited partnership and instituted the rule that the general or managing partner would keep 20% of the profits generated by the fund. Typically, hedge fund managers receive a fixed compensation corresponding to 1-2 percent of the net asset value of the fund (or of the limited partners' equity) and 15-25 percent of the return of the fund above a hurdle rate (which can be the risk-free rate).

The typical compensation contract of a hedge fund manager makes extremely high compensation possible – but only if the investors experience large returns. In 2005, at least two managers had compensation in excess of $1 billion: James Simons of Renaissance Technologies earned $1.5 billion and Boone Pickens mentioned earlier (Schurr, 2006). The 2005 hedge fund compensation report states that "the average take-home pay of the top 25 hedge fund earners in 2004 was over $250 million."

Generally, the compensation of hedge fund managers has a so-called "high water" mark – if they make a loss in one period, they can get the performance fee only once they have recovered that loss. The high water mark limits the risk taking of the fund. Without it, the manager gets all the upside from big bets but suffers little from the downside. With a high water mark, though, the manager may just close the fund if he makes a big loss. As long as the fund manager does not have a large investment in the fund, it is not always easy to resist the

temptation to take large risks. Doing so can be well rewarded. As an example, the trader at Amaranth apparently responsible for the large losses in 2006 is reported to have earned between $80 and $100 million in 2005. As long as no illegal actions took place, the trader will not have to return his past compensation to the fund – in fact, he is even planning to start a hedge fund of his own.

Investors in mutual funds typically can withdraw funds daily. This means that mutual funds have to stand ready to redeem shares, which typically decreases their performance as they have to have low-earning cash on hand. It is risky for them to invest in strategies that may take time to prove profitable because adverse developments in the short run may lead investors to take their money out. Hedge funds have rules that restrict the ability of investors to withdraw funds and, usually, investors can withdraw funds only at specific times during the year. For instance, a hedge fund might allow investors to withdraw at the end of a quarter provided that they give a 30-day notice. Depending on the fund, an investor may not be allowed to withdraw an initial investment before a period of several years. For example, Eton Park Capital, a fund launched in 2004 by a star Goldman Sachs trader, Eric Mindich, raised $3 billion even though investors had to commit to keep their money in the fund for at least three years.

Mutual funds have to disclose a lot of information to investors. They have to report their holdings to the Securities and Exchanges Commission (SEC) and must have audited statements. No regulation specifies what hedge funds have to disclose to investors.[2] Hedge funds may agree contractually to disclose some types of information and to provide audited financial statements, if they decide that it helps them to recruit investors, but they are not required to do so. For

[2] Since 1978, all institutions with over $100 million have to report stock holdings in excess of $200,000 or of more than 10,000 shares. Hedge funds are not exempt from this requirement. The requirement does not apply to derivatives and short positions. Further, institutions can ask that their positions be kept confidential for one year and hedge funds have been known to do so aggressively.

instance, referring to the Long Term Capital Fund (often referred to as LTCM, which standards for Long-Term Capital Management, the company which managed the fund), Lowenstein (2001, p. 32) states: "Long Term even refused to give examples of trades, so potential investors had little idea of what they were doing." The Long Term Capital Fund, founded in 1994, was spectacularly successful until the middle of 1998 (in 1995-1997, the fund's average yearly return net of fees was 33.4%). Its managing partners were star traders and academics. It had capital of $4.8 billion and assets of $120 billion at the beginning of 1998. In the aftermath of the Russian crisis in August 1998, the fund lost almost all its capital in the span of a month. Secrecy does help hedge fund managers protect their strategies from potential imitators; on the other hand, secrecy makes it harder to assess the risk of a fund.

In the past, investors typically invested in individual hedge funds. Investors who want to invest in a hedge fund usually have to commit a large amount of money – often at least $1 million ($5 million in the case of the Eton Park fund mentioned earlier). Since individual hedge funds can be highly risky, diversification can reduce risk, but diversification across hedge funds for a single investor requires a very large amount of investable wealth. Further, because hedge funds are unregulated, an investor has to investigate a hedge fund thoroughly before investing in it to make sure that he understands and is comfortable with the risks he would be exposed to. This investigation process is called due diligence. It is quite expensive for funds that are not well-established - $50,000 is a frequently heard price tag for a due diligence where the investor ends up investing in the fund. The process starts with the investor asking questions to the fund manager. Some of the questions might be answered, but some might not. A personal visit might

follow. The investor will also check through a variety of means whether the manager is reliable. In some cases, investors hire the service of an investigative firm.[3]

Many investors now invest in funds-of-hedge-funds rather than in individual hedge funds. A fund-of-funds is a hedge fund which invests in individual hedge funds and monitors these investments, thereby providing investors a diversified portfolio of hedge funds, risk management services, and the ability to share the due diligence costs with other investors. The compensation of fund-of-funds managers also has a fixed fee (typically 1 percent) and a performance fee (typically 10% percent above a hurdle rate). At the end of 2004, 30 percent or more of funds invested in hedge funds were managed by funds-of-funds (Fung, Hsieh, Naik, and Ramadorai, 2006).

What Do Hedge Funds Do?

In finance, an arbitrage is an investment strategy that takes advantage of the price discrepancies between securities without taking any risk. Most hedge funds attempt to find trades that are almost arbitrage opportunities – pricing mistakes in the markets that can produce low-risk profits. Once hedge funds have identified an asset that is mispriced, they devise hedges for their position, so that the fund will benefit from the correction of the mispricing but be affected by little else. To take an example, the LTCM specialized in identifying bonds that were mispriced. It would sell overvalued bonds short and hedge its position against interest rate risk and, if necessary, other risks. In principle, the return of the fund would depend only on the corrections in the mispricing of the bonds, not on changes in interest rates. Of course, not all

[3] See BusinessWeek Online, November 21, 2005, "Hedge Fund Sleuths."

positions hedge funds take are hedged. At times, they may choose to forget about hedging because hedging is expensive. At other times, they take positions that cannot be hedged.

Because hedge funds seek inefficiencies in the capital markets and attempt to correct them, they can play a valuable role in financial markets by bringing security prices closer to fundamental value. At the same time, it important to understand that there is little direct evidence on the extent to which the actions of hedge funds have this impact. We also do not know much about the impact of high-frequency equity trading hedge funds. Several hedge funds are known to account individually for several percents of the trading volume of the New York Stock Exchange. Their trading could make the market more efficient, but no study has been done to investigate the impact of these funds. Some funds have also been accused of making money in questionable ways, for instance by exploiting insider information or by late trading in mutual funds.

Mutual funds cannot contribute to making financial markets more efficient as effectively as hedge funds can: mutual funds are limited in their ability to hedge their positions through short-sales and derivatives use; they are subject to diversification restrictions that constrain their ability to exploit perceived opportunities; and they have to redeem shares on short notice. In contrast, the use of derivatives and short positions is critical in most hedge fund strategies. For instance, if a mutual fund manager concludes that firm A is valued too richly compared to firm B which is in the same business, that manager will typically buy more of firm B and less of firm A. In contrast, a hedge fund manager would react to a belief that firm A is overvalued compared to firm B by buying firm B and selling firm A short. With this strategy, the hedge fund portfolio will not be affected by changes in the market as a whole – or even in the industry. If the stock market drops sharply, the mutual fund would lose, but the hedge fund would not. Until 1997, the

tax code made short sales extremely expensive for mutual funds, but it no longer does. As a result, the binding short sale restriction for mutual funds is a restriction that funds put on themselves – in 2000, two-thirds of reporting funds prohibited short sales (Almazan, Brown, Carlson, and Chapman, 2004).

With their focus on arbitrage opportunities, hedge funds in principle pursue absolute returns rather than returns in excess of a benchmark, such as an index of the stock or bond markets. In principle, this approach tends to make them market-neutral over time: that is, hedge funds are expected to have average performance whether equity markets have extremely good or bad performance. It is therefore not surprising that hedge funds performed well when the U.S. equity markets registered sharp losses in the wake of the collapse of internet stocks. Many investors tend to extrapolate from past returns (see Barberis and Shleifer, 2003, for possible reasons and implications), so it is not surprising that investors were attracted to hedge funds when they performed so well compared to stocks. Also, hedge funds appear an attractive diversification vehicle for investors who hold stocks. However, over recent years, correlations of hedge funds with the broad markets have increased, so that evaluating the diversification benefits of hedge funds has become trickier (Garbaravicius and Dierick, 2005). Some hedge funds may have become mutual funds; that is, an investor in such a fund is paying hedge fund fees for mutual fund risks and returns.

Investment in a hedge fund is a bet on the skills of the manager to identify profit opportunities. A managers' strategy may be complex, so that it is difficult to communicate to the typical investor. In addition, however, the manager has incentives not to communicate too much – otherwise smart investors might not need the manager. Further, it is possible for a strategy to make losses before it eventually pays off. Viewed from this perspective, it is easier for

professional investors to evaluate hedge fund strategies and the skill of managers. Such investors are less likely to misinterpret losses in an arbitrage strategy as evidence of poor skills on the part of the manager. Arbitrage-like strategies can make losses in the short run even when they are profitable in the long run. When investors do not understand these strategies, they may withdraw their funds when they make losses and force managers to liquidate their positions at a loss (Shleifer and Vishny, 1997). It is therefore optimal for hedge funds to have restrictions on redemptions and to seek investors who are knowledgeable. It is not unusual for a hedge fund to reject potential investors, which would be unheard of for a mutual fund.

Hedge fund investment strategies are classified into style categories. One way to measure the popularity of the styles is to measure the funds under management for a style relative to the sum of the funds under management. According to the Tremont Asset Flows Report (Second Quarter, 2005), the four most popular styles and their strategies are: long-short equity (31 percent of total); event-driven (20 percent); macro (10 percent); and fixed-income arbitrage (8 percent).

A *long-short equity hedge fund* takes both long and short positions in stocks. The fund started by Alfred Jones was a long-short fund. These funds tend to hedge their positions against market risks. For example, a hedge fund of this type might have only long positions in stocks but use options and futures contracts so that fund returns will be unaffected by changes in the market as a whole. A typical strategy is to identify undervalued and overvalued stocks.

Event-driven hedge fund strategies attempt to take advantage of opportunities created by significant transactional events, such as spin-offs, mergers and acquisitions, reorganizations, bankruptcies, and other extraordinary corporate transactions. Event-driven trading involves attempting to predict the outcome of a particular transaction as well as the optimal time at which to commit capital to it.

Macro hedge fund strategies attempt to identify mispriced valuations in stock markets, interest rates, foreign exchange rates and physical commodities, and make leveraged bets on the anticipated price movements in these markets. To identify mispricing, managers tend to use a top-down global approach that concentrates on forecasting how global macroeconomic and political events affect the valuations of financial instruments.

Fixed-income arbitrage hedge funds attempt to find arbitrage opportunities in the fixed-income markets.

Another 13 percent of the amount invested in hedge funds is invested in multi-strategy funds. Other strategies involve emerging markets funds, funds that trade futures contracts, and convertible arbitrage funds (convertible debt is debt convertible into stock and these funds exploit mispricings in the debt relative to the stock). All these strategies are small compared to the other ones we have highlighted.

The arbitrage opportunities identified by hedge funds are often small. As a partner of Long-Term Capital Management put it before the fund collapsed, their strategies amounted to vacuuming pennies – though others have described hedge fund strategies as picking pennies in front of a steamroller. Many hedge funds use leverage, both to take advantage of more investment opportunities and to increase the return to the funds invested. To illustrate, if a hedge fund starts with equity of $100 million invested in a strategy that earns $5 million, its return on equity is 5%. However, if the fund borrows an additional $300 million to take advantage of three similar strategies and the cost of borrowing is $2 million per $100 million, its return on equity becomes 14% on the original $100 million invested (the income becomes $14 million, or $5 million + 3 x $3 million). The LTCM fund had an extremely high degree of leverage – more than twenty dollars of assets were supported by a dollar of equity capital. The typical hedge fund has

much lower leverage – a dollar of equity supports two or three dollars of assets. Mutual funds do not have the same ability to use leverage without restrictions.

The Growth, Risk, and Performance of Hedge Funds

How does the performance of hedge funds compare to the performance of mutual funds? A widely used index of the hedge fund industry is the Credit Suisse/Tremont Hedge Fund index. This value-weighted index begins in January 1994. As Figure 1 shows, an investor in the hedge fund index in January 1994, who held that investment until the middle of 2006, would have earned 259 percent (net of all performance fees and expenses), or an average annual return of 10.8 percent. Since actively managed stock mutual funds, as a group, do not perform better than the stock market after fees, hedge funds beat the actively managed stock mutual funds if they beat the stock market as a whole. A hypothetical investor who would have invested in the Standard & Poor's 500 would have earned 241 percent for an annual return of 10.3 percent. An investor invested in the Financial Times World Index, which captures the performance of stocks across the world, would have earned less. If the hedge fund index had exactly the same risk as the S&P 500 index, the two investments would have similar risk-adjusted performance. However, if risk is measured by volatility, the hedge fund index is much less volatile than the S&P 500 – the annualized standard deviation of the hedge fund index is 7.8 percent versus 14.5 percent for the S&P 500. Per unit of volatility, an investor who could have invested in the hedge fund index would have done about twice as well as an investor who invested in the S&P 500.

As Figure 1 shows, the hedge fund index lagged the S&P 500 index from 1994 until 2000 and then outperformed it. The spectacular growth of the hedge fund industry took place mostly

after 2000. An industry report estimates that at the end of 2000, $218 billion were invested in hedge funds (Tremont Asset Flows Report, Second Quarter, 2005). By June 2005, assets under management were $735 billion. Other industry reports have the assets under management exceeding $1 trillion in 2005. During that period of time, mutual fund assets grew much less – from close to $7 trillion at the end of 2000 to about $8.5 trillion at the end of 2005 (Investment Company Institute, Factbook, 2005).

However, investing in the hedge fund index from 1994 to 2006 would have been very difficult. Index funds of the hedge fund universe do not exist. Investors can only put their money in individual hedge funds or invest in funds-of-funds. Investing in a portfolio that replicates the S&P 500 over that period would have been straightforward; for instance, Vanguard has had an S&P 500 index fund since 1976.

Since investors cannot invest in an index of the hedge fund universe, it is critical to focus on the performance of individual funds. Do individual hedge funds beat the market? Do they outperform mutual funds? The young academic literature on hedge funds – the first paper, Hsieh and Fung (1997) was published ten years ago – demonstrates that answering these questions is difficult. We review the four main reasons why it is difficult to answer this question, then attempt to reach a conclusion.

First, reports of hedge fund performance are based on *biased samples***.** Since hedge funds are not regulated, they need not disclose their performance. Databases only report the performance of hedge funds that voluntarily send their returns to the sponsoring organizations. A hedge fund might not report its performance for a number of reasons. For instance, it might be closed to investors, so it would not benefit from advertising its performance. Its performance might have been poor. Or it might have forgotten to send in the form. Hedge funds that survive

and do well might start sending in their performance after having existed for a number of years; hedge funds that are liquidated might never send in their performance. Indeed, for a number of years, some databases dropped the returns of liquidated funds, so that funds with poor performance disappeared from the database. The range of estimates of these biases is wide, from roughly less than 100 basis points per year (Ackerman, McEnally, and Ravenscraft, 1999) to more than 400 basis points at the high end (Malkiel and Saha, 2005).

Second, a fair estimate of hedge fund returns must *adjust performance for market exposures.* Suppose you found that a hedge fund's performance mimics the performance of the S&P 500 index in both returns and volatility. In this case, the hedge fund manager did not add value because you could have achieved a better net return by investing in an indexed fund which has dramatically lower fees than a hedge fund. Because hedge funds can go long and short, can use derivatives, and can borrow, their exposure to market risks can vary tremendously over a short period of time, which makes it difficult to assess these exposures based on a limited sample of monthly returns. In addition, techniques that work well to assess risk exposures for mutual funds do not work so well when applied to hedge funds. An equity mutual fund's return is typically best viewed as the return of a basket of stocks, plus some component that is unique to the fund. A hedge fund's return, in contrast, is best viewed as a basket of derivatives – and often rather exotic derivatives with nonlinear payoffs (for discussion and references, see Fung, Hsieh, Naik and Ramadorai, 2005). For instance, a fund might not be exposed to interest rates when they are low but might be when they are high.

A third difficulty in assessing hedge fund returns is that the past performance of a particular hedge fund may give a very selective view of its risk. Hedge funds may have strategies that yield payoffs similar to those of an insurance company which sells *earthquake insurance*;

that is, most of the time the insurance company makes no payouts on its insurance policies and has a nice profit, but from time to time disaster strikes and the insurance company makes large losses that may exceed its cumulative profits from good times. Though investors in an insurance company know that it sells earthquake insurance, investors in hedge funds may find it impossible to assess that the hedge fund takes the risk of large losses before these losses have materialized. Most years, a fund taking such risks will generate positive returns, because no catastrophic event occurs, so an unwary investor considering this fund will conclude that it has almost no volatility and no exposure to market risk. However, there is some chance that this fund will make a large loss. Most approaches to control for risk in evaluating performance will miss the risk taken by the hedge fund, so that the hedge fund will look like it is a great performer. Investors used to focus on volatility will conclude that the fund has low volatility because they look at returns before a disaster occurs. The example shows why volatility is a poor measure of individual hedge fund risk: the hedge fund would appear to have low volatility compared to a mutual fund, but a much higher probability of losing all its assets.

The fourth difficulty in calculating hedge fund returns involves problems of *valuation*. Computing the return of a mutual fund invested in U.S. stocks is straightforward. The fund can compute the daily value of its portfolio by using the closing prices of the stocks. Investors can redeem shares at that value. In contrast, hedge funds often hold securities that are not traded on exchanges. For instance, many derivatives are traded over-the-counter. For securities not traded on an exchange, no closing price exists. A hedge fund may need to rely on theoretical models to estimate the value of some securities, or rely on quoted prices rather than actual transaction prices. In an efficient market, one would not expect the return of a fund during one month to have information for the return of the fund over the next month. In general, mutual fund returns

are not serially correlated but hedge fund returns are. There can be valid reasons for hedge fund returns to be serially correlated, but obviously such serial correlation can arise when hedge fund managers use the flexibility that they have in valuing the securities they hold to massage the returns and present a picture of low risk and consistent performance (Getmansky, Lo, and Makarov, 2004). It is also somewhat disturbing that Santa Claus is so much kinder to hedge funds than to mutual funds – the average monthly return of hedge funds in December is more than twice what it is for the rest of the year (Agarwal, Daniel, and Naik, 2006).

With these four problems, it is not surprising that the performance of hedge fund managers is controversial. A common way to evaluate hedge fund investment strategies is to estimate the "alpha" of the strategy, which is the performance of the strategy that cannot be explained by beta risk. Beta risk is the risk arising from exposure to common market movements – in other words, beta risk is a measure of market risk exposure. The skill of a hedge fund manager is required to produce alpha returns, but not to take beta risk. For instance, a fund that moves on average one for one with the stock market has a beta of one with respect to the stock market. It should compensate investors for risk by earning at least the same return as the stock market. If a fund has an annualized alpha of 5 percent, this means that the fund earns 5 percent more than the risk-free rate after taking into account the compensation earned through the fund for taking beta risk. Another way to see this is the following. Suppose that a fund invests all its money in the S&P 500. The alpha before fees of such a hedge fund would be zero, because investors would earn exactly the compensation for bearing the beta risk of the S&P 500. After fees, the alpha of such a fund could be substantially lower. If a hedge fund net of fees outperforms the S&P 500 by 2 percent but has exactly the same beta risk as an investment in the S&P 500, it has an alpha of 2 percent for the investor.

The bottom line of hedge fund research is that, at the very least, hedge funds have a non-negative alpha net of fees on average. Another way to phrase this conclusion is that hedge fund managers earn at least their compensation on average. The debate in the literature centers on two points: the size of the average alpha and the persistence of the alpha of individual funds. If alphas are persistent, then it becomes possible to form portfolios of hedge funds that are expected to have positive alphas according to their past returns.

Ibbotson and Chen (2005) examine the performance of hedge funds from January 1999 to March 2004. Their study uses 3,538 funds. After adjusting for various sample biases, they conclude that the equally-weighted compound average return of hedge funds is 9.1 percent after fees. The average return before fees is 12.8 percent, so that on average investors pay fees of 3.7 percent per year. The net-of-fee return is divided into two components. The first component is the return earned for exposure to broad markets – "beta risk." They find that exposure to broad market indexes accounts for a return of 5.4 percent. The return net of fees of 9.1 percent minus the return attributable to exposure to market indexes of 5.4 percent equals the average alpha of the funds of 3.7 percent. With this estimate, the alpha of hedge funds is particularly impressive when compared with the alpha of equity mutual funds. Malkiel (1995) estimates the alpha of all equity mutual funds with continuous data from 1982 to 1991. He finds that these equity mutual funds significantly underperformed the S&P 500 index with a significant alpha of -3.20 percent. None of these mutual funds had a significant positive alpha.

A study by Kosowski, Naik, and Teo (2005) using an extremely large database comes to the conclusion that the average alpha across hedge funds from 1994 to 2002 is 0.42 percent per month after adjusting for the problems in evaluating hedge funds we discussed. However, the alpha in this study is not statistically significant. The study finds that the funds in the top

performance bracket have an average alpha, depending on the approach used, of between 1 and 1.25 percent per month. This alpha is highly significant.

Fung, Hsieh, Naik and Ramadorai (2006) investigate the performance of funds-of-funds. The authors argue that the data is much better for funds-of-funds than it is for individual hedge funds and does not suffer seriously from the problems discussed earlier. They consider three separate periods: January 1995 to September 1998, October 1998 to March 2000 and April 2000 to December 2004. They find that the average fund-of-funds has a significant positive alpha during the second period they consider, but the alpha is insignificant in the two other periods. The study finds that there are really two different groups of funds-of-funds. Roughly 20 percent of funds have managers with valuable skills as evidenced by their positive and significant alpha; the other managers do not have a positive significant alpha.

We now turn to the issue of whether the performance of hedge fund managers persists. Jagannathan, Malakhov, and Novikov (2006) use a large database of hedge funds and account carefully for the various problems in estimating hedge fund performance we have discussed. The study concludes that about half of the performance of hedge funds over a three-year period spills over to the next three-year period. Thus, if a fund has an alpha of 2% during a three-year period, it can be expected to have an alpha of 1% during the next three-year period. This paper therefore suggests that investing in high alpha funds is profitable.

The academic bottom line on hedge fund performance is captured well by these studies. If one picks randomly a hedge fund, one should have a positive insignificant alpha after fees. Such performance appears better than the performance of a randomly selected mutual fund. In contrast to mutual funds, there is a significant fraction of hedge funds with significant positive alpha. Being able to pick good hedge funds can therefore be highly rewarding. There is some

evidence that past history helps to pick good hedge funds. However, the caveat that it is much harder to evaluate the performance of hedge funds than to evaluate the performance of mutual funds should never be forgotten. A hedge fund that implements a strategy akin to selling earthquake insurance and whose risk is not captured well by commonly used risk factors will have a significant positive alpha – but only until it blows up.

Mutual funds are rarely closed to investors, so that an investor with money to invest can typically put the money in the fund of her choice. An investor who thinks he has identified a winning hedge fund may not be able to invest in it because the manager does not want the investor. For instance, a very successful hedge fund manager told me that he did not want individuals as investors because they require too much hand-holding when things go poorly.

Do Hedge Funds Pose Significant Risks for the Economy?

It is often argued that many hedge funds have low return volatility compared to an investment in the stock market. For instance, from February 1977 to August 2004, the average annualized standard deviation of the monthly returns of fixed-income arbitrage hedge funds was 7.76 percent, or slightly more than half the standard deviation of the S&P 500 return over the 1994-2006 period (Chany, Getmansky, Haas and Lo, 2006). However, even funds with a history of low volatility can end up losing most of their money, an outcome that is almost inconceivable for a mutual fund. The LTCM fund had lower volatility than the S&P 500 for almost all its existence, but this low volatility did not prevent it from losing most of its capital in the span of a month – a striking example of the "earthquake insurance" type of payoff discussed earlier.

Regulators are concerned about the risks of hedge funds for at least four reasons: investor protection, risks to financial institutions, liquidity risks, and excess volatility risks. We review and evaluate these reasons in turn.

The SEC wanted to force registration of hedge fund managers because hedge fund collapses had generated large losses for their investors, arguably indicating a need for greater *investor protection.* Each year, roughly 10 percent of hedge funds die. A fund might die because the investors withdraw funds following significant losses. Some funds disappear because fraud or misreporting becomes apparent. However, aggregate losses from hedge fund fraud seem relatively small. The SEC brought 51 hedge fund fraud cases from 2000 to 2004. The SEC (2003) estimates the damages in these cases to amount to $1.1 billion.

Banking regulators are concerned that hedge funds may create *risks to financial institutions.* Hedge funds create credit exposures for financial institutions in several ways: they borrow, they make securities transactions, and they are often counterparties in derivatives trades. Because of leverage, a fund might get in trouble if its assets experience a sharp drop and the market for these assets lacks liquidity, so that the fund cannot exit its positions. The collapse of a hedge fund could have far-reaching implications if the fund is large enough, possibly leading to a chain reaction of collapses in the financial system. When the Long-Term Capital Fund lost more than $4 billion in August and September 1998, the Federal Reserve Bank of New York organized a rescue by private banks to avoid possible widespread damage from a possible disorderly liquidation or bankruptcy of the fund. However, the debacle at the hedge fund Amaranth in late 2006, the largest known sudden hedge fund loss, had only a trivial impact on the markets. Nonetheless, the Amaranth losses led to calls for regulation of hedge funds. For instance, the New York Times published an editorial stating that “regulators need to act now to translate their

various calls for hedge-fund oversight into enforceable rules and, in some instances, into concrete proposals for Congress to enact" ("Regulating hedge funds," 2006).

Hedge funds rely on their ability to move out of trades quickly when they turn against them, which raises an issue of *liquidity risk*. If too many funds have set up the same trades, they may not all be able to exit their positions at the same time. In that case, two adverse developments can ensue. First, prices may have to overreact for investors to be willing to take the other side of the trades that hedge funds wish to make. Second, liquidity may fall sharply. With low liquidity, hedge funds that rely on trading quickly to control their risks cannot do so. Hence, such hedge funds become more risky, which increases threats to financial institutions and can lead to further overreaction in prices as financial institutions have to reduce their positions as well. Further, when hedge funds use leverage, they cannot just ride out a serious adverse shock; instead, they must reduce their exposures to satisfy the banks from which they borrowed. As a result, a concern arises that adverse shocks lead hedge funds to dump securities and cash out precisely when things are going poorly, which could make things worse.

Finally, hedge funds could lead prices to overreact by making trades that push prices away from fundamental values and lead to *excess volatility risks*. Though hedge funds have certainly been accused of creating volatility, the case that they have actually done so is far from ironclad. For example, hedge funds were net buyers during the stock market crash of 1987, so that they helped stabilize markets at that time (Presidential Task Force on Market Mechanisms, 1998). During the Asian currency crisis of 1997, the prime minister of Malaysia launched a personal attack against George Soros for causing the crisis. However, an IMF study concluded that hedge fund positions were too small to have much of an impact on emerging markets (Eichengreen, Mathieson, Chadha, Jansen, Kodres and Sharma, 1998). Earlier, the same George

Soros had apparently taken a $10 billion bet against the British pound, which effectively forced the British pound out of the European exchange rate mechanism, and won $1 billion in the process. There is some evidence that hedge funds did not sell internet stocks when their valuations were high (Brunnermeier and Nagel, 2004), but the evidence is not completely clear because the data available is incomplete, in that it does not include various hedges that hedge funds might have used.

How concerned should one be about these four types of risks that hedge funds supposedly create? Investor protection should not motivate the SEC to regulate the hedge fund industry, because the small investors who are supposedly the focus of the SEC are already not allowed to invest in hedge funds. There is no reason to believe that the hedge fund losses of investors, however painful they may be to these investors, have a social cost. Savvy and well-to-do investors do not need hand holding. They can choose not to invest in a fund, and they also have legal recourse against acts of fraud. If hedge funds contribute to economic efficiency, then creating costs for investing in such funds would reduce economic efficiency.

The risks posed to financial institutions are real, though overstated. Brokers and banks have greatly improved their systems to evaluate their exposures to hedge funds in recent years. Derivatives contracts are much better designed for defaults than they were in the past. Financial institutions are already regulated. Moreover, a bank that takes on too much risk through a hedge fund could also take on too much risk with an individual or a proprietary trading desk that employ hedge fund strategies; in either case, the problem is not really a hedge fund issue, but rather involves the regulation of financial institutions.

Liquidity risk is a serious issue. Though adverse shocks may force hedge funds to contract, hedge funds have strong incentives not to be caught in a situation in which they would

have to make distress sales of securities. Empirically, hedge funds do not have their worst performance when large shocks affect capital markets (Boyson, Stahel, and Stulz, 2006). It is not clear how well banks monitor concentration risks in the positions of investment managers they deal with – be they hedge funds or other investors. Regulators could encourage them to do so more actively. There is no reason to believe that regulation of hedge funds would be a more efficient approach.

The fact that hedge funds can cause volatility in prices is a potentially valid concern, but needs to be based in facts and experience. The adverse impact of hedge funds on volatility is mostly hypothetical, while the benefits to the markets from hedge funds are real. Hedge funds often make profits by providing liquidity to the markets – by buying securities that are temporarily depressed because of market disruptions. The role of hedge funds in making markets more liquid and in reducing market inefficiencies makes it necessary for those who want to restrict their activities to have a compelling case that their possible adverse impact on market volatility outweighs their positive effects on markets. So far, this case has not been made. At the same time, however, one should not overstate the extent to which hedge funds make markets efficient. Though they do well at eliminating small price discrepancies in prices that can be arbitraged, the liquidity they provide may disappear quickly in the presence of a systemic shock and this liquidity withdrawal may worsen the shock. Further, if asset prices depart systemically from fundamentals, one cannot count on hedge funds to bring them back to fundamentals.

The Future of Hedge Funds

Over recent years, the hedge fund industry has grown sharply and regulatory concerns about the industry have increased. In this section, we examine the implications of these developments for the industry. We expect: 1) the hedge fund industry as a whole will perform less well over the next ten years than over the last ten; 2) the hedge fund industry will become more institutionalized; and 3) the hedge fund industry will become more regulated. These changes will reduce the gap between mutual funds and hedge funds, but not for all hedge funds. Some hedge funds will choose their investors and how they organize themselves so that they will be less affected by the increasing institutionalization and regulation of the industry.

How Will the Hedge Fund Industry Perform Over the Next Ten Years?

As discussed earlier, Ibbotson and Chen (2005) estimate the average alpha of the hedge fund industry to be above 3% per year. Large funds seem to have performed somewhat better. As a rough estimate, suppose that the value-weighted alpha for hedge funds is 4%, net of fees. During their sample period, the yearly average size of the hedge fund industry is $262 billion according to one consulting firm. Thus, the skills of hedge fund managers were contributing on average $10 billion a year to investors. The industry is now at least three times as large. For the performance of hedge funds to generate 4% net of fees for investors, the skills of hedge fund managers have to produce an additional $20 billion of alpha.

However, as more money enters the hedge fund industry, it gets put to use in existing strategies, to fund new strategies that typically cannot be as good as the ones already implemented, and to fund new managers. To the extent that hedge funds eliminate price

discrepancies from rational pricing, more hedge funds chasing such discrepancies means that these discrepancies get eliminated faster, so that the profits of hedge funds that find them are smaller. Similarly, there is a limited demand for the liquidity that hedge funds provide, so that having more funds providing that liquidity may be valuable for the capital markets but not for the performance of individual hedge funds. Hence, additional money entering hedge funds in the future will typically not find average returns as high as in the past.

A clear example of this problem is the recent performance of convertible arbitrage funds. The typical trade for a convertible arbitrage fund is to buy convertible bonds issued by a firm and to hedge the purchase with short sales of the stock of the firm. As more funds buy convertible bonds, the strategy becomes less profitable because the funds push the price up, so that the performance of this strategy falls. Not surprisingly, the increase in convertible arbitrage funds, from 26 in 1994 to 145 in 2003 according to one database, eventually led to poor performance and a drop in the number of such funds.

How Will the Organization of Hedge Funds and Mutual Funds Change?

Twenty years ago, most of the money invested in hedge funds came from individuals. An investor would entrust money with a manager based on his knowledge of the manager and would largely give the manager a free hand. In 2003, roughly 40 percent of the money invested in hedge funds came from individuals (SEC, 2003). This percentage has fallen since. As a larger fraction of the assets under management of the hedge fund industry comes from institutional investors – from pensions and endowments directly or from funds-of-funds – the rules of the game change.

Investors with fiduciary duties cannot give managers a completely free hand. Institutional investors have to be able to justify their investments and explain the outcomes. Therefore, they must be concerned about the risk management of the funds. They must worry about the risk that a manager will do something else than what he committed to do. They fear large losses in individual funds, because they could be criticized for having such funds in their portfolio. They have to monitor the manager closely. As a result, hedge funds have to provide more information to investors if they want investors with fiduciary duties to invest in them. Some funds-of-funds require and are able to obtain full transparency from the funds they invest in, which means that they know the securities positions of the funds they invest in, sometimes daily. Providing more information is costly, both because it requires a larger administrative staff and because the information could be used against the fund. Hedge funds have to make sure that their largest "drawdown" (the loss a hedge fund makes before the loss is recovered through performance) is palatable to their investors. Institutions can pull money because large current gains make them worried about future risk – a large institutional investor reportedly pulled funds after Amaranth reported large gains early in 2006.

Individual investors often seek returns that are high in absolute terms; institutional investors are more likely to measure performance relative to benchmarks such as hedge fund indices. As benchmarks become more important, it becomes less advantageous for a hedge fund manager to take risks that could lead to a performance that greatly exceeds the benchmark if doing so entails a substantial risk of falling short of the benchmark. As hedge funds are held to a similar standard of performance, performance will become more similar across funds with similar styles. As institutional investors become more important, the manager's skills will matter less compared to the other services provided to investors – reporting, risk management,

transparency, liquidity, ability to absorb large new investments. Moreover, many of these services can be obtained by institutions without paying a large performance fee to a hedge fund. Perhaps most strikingly, there is increasing evidence that the performance of hedge fund indices can largely be replicated by machines (Kat and Palaro, 2006), so that investors who want to achieve a hedge fund benchmark may do well by hiring low cost quants as opposed to high cost hedge fund managers.

As a hedge fund succeeds, it faces pressure to become essentially a diversified financial institution. To understand this pressure, consider a highly successful hedge fund manager that is specialized in one strategy. Now, the manager's net worth is largely invested in the fund. The manager runs an organization with substantial fixed costs that has access to large-scale investors and that provides services to these investors. To maximize the value of the assets the hedge fund manager has built – reputation, access to investors, organization – the manager can expand this organization through diversification. The hedge fund manager can start new products that rely on different strategies. He or she can also rely on reputation to sell products that are more similar to actively managed mutual funds. As the hedge fund manager diversifies the organization, the management company not only becomes more valuable but it also develops a value that is independent of the initial hedge fund strategy employed by the manager. As hedge fund management companies evolve by expanding their range of products, they will behave more like financial institutions and less like single-strategy hedge funds.

Mutual funds face obstacles in replicating hedge fund strategies. However, mutual funds can implement some hedge fund strategies. To the extent that investors in general become more familiar with these strategies, there will be a growing demand for mutual funds to offer products with such strategies. As a result, some mutual funds will become more like hedge funds. Over

the last ten years, the number of mutual funds that implement hedge fund "lite" strategies has grown substantially. These funds do not perform as well as hedge funds, but their performance is more similar to the performance of hedge funds than of plain vanilla mutual funds (Agarwal, Boyson, and Naik, 2006). Institutional investors who cater to the pension fund industry and to endowments will also develop more strategies involving short positions and the use of derivatives that will compete with hedge funds but charge much lower fees. If investors can get hedge fund strategies by paying mutual fund fees, the demand for plain vanilla hedge funds will drop.

Will Hedge Funds Become More Regulated?

Both Europe and the United States have experienced substantial pressure for increased regulation of hedge funds. We also discussed the systemic risk concerns and the investor protection concerns of regulators. Currently, mutual funds are at a substantial disadvantage compared to hedge funds. Regulation imposes costs on mutual funds and limits what they can do. One way for mutual funds to establish a level playing field is to push for more constraints on hedge funds.

In addition, as more money is invested in hedge funds, managers have to branch out in new strategies, some of which may increase the pressure for regulation of hedge funds. For example, over the last few years, more hedge funds have become activist investors. In some countries, such activism has led to demands for regulation. Some hedge funds have also specialized in lending. Again, regulatory authorities are unlikely to allow unregulated hedge funds to compete with regulated banks. Recently, much concern has arisen from the fact that hedge funds borrow shares to vote in corporate control contests without bearing the risks of stock

ownership (Hu and Black, 2006) – when a fund borrows shares and holds them to vote, it pays a fee to the lender, but the lender keeps the price risk of the shares. Regulations may be enacted to prevent such actions. Finally, we saw that as hedge funds succeed, strong forces will push them to become more like financial institutions. However, as hedge fund management companies compete with regulated financial institutions, regulated financial institutions seem certain to express concerns about the lack of a level playing field.

Conclusion

We still have much to learn about hedge funds. We are not very good yet at assessing the risk-adjusted returns and the absolute returns of individual hedge funds. We have yet to understand fully the risks that hedge funds pose to financial institutions and to financial markets. Though we know that hedge funds can make markets more efficient, no analysis has yet reliably quantified the social costs and benefits of hedge funds. This being said, hedge funds on average have performed well over the last 15 years compared to mutual funds or to the stock market as whole.

Indeed, the hedge fund industry may have played more of a role in creating liquidity and making markets efficient than the mutual fund industry. The hedge fund industry could do so because it was generally not regulated, so that funds were free to take whatever positions they wanted and to make full use of financial innovations. As the hedge fund industry grows, regulation becomes more likely, and large hedge funds are likely to become more similar to financial institutions. However, regulation should leave alone financial innovators who dream of

new strategies and find savvy and well-funded investors to bet on them. Without such financial innovators, capital markets will be less efficient.

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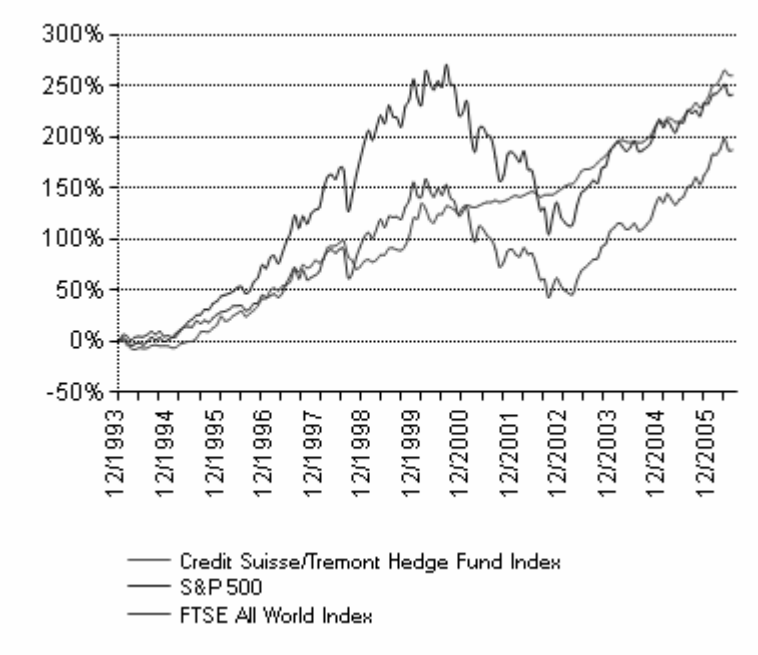

Figure 1

Cumulative Returns to Hedge Fund Index and Stock Indices