

Hedge Funds and Their Role within a Diversified Investment Portfolio

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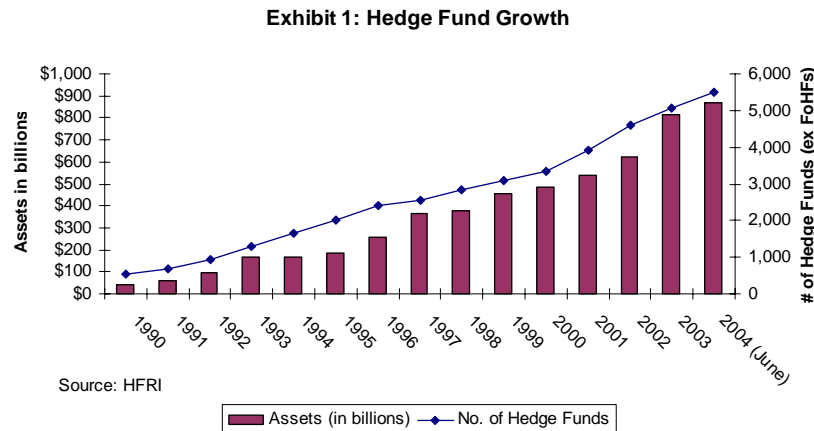
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Summary of Findings

1. U.S. institutional investors currently represent a small 8% (\$66 billion) of the rapidly growing \$900 billion hedge fund industry, but projections are that pension and endowment allocations may grow to \$250 billion over the next several years.
2. Hedge funds have proven to be a superior vehicle for management teams to earn excess return (“alpha”) and limit volatility from market movements. The consequences of their success include the migration of investment professionals from large money management organizations, the inflow of new institutional money, and the attention of regulatory agencies.
3. Hedge funds have returned 11.4% annually since 1994, when reliable data is first available, slightly higher than the 10.4% S&P 500 return. Over the same time period hedge fund risk has been one-half the S&P 500 risk level and, importantly, hedge funds did not lose value during the 2000-2002 bear market in stocks.
4. Hedge funds employ various techniques for earning returns and are commonly classified into styles, each with differing investment characteristics. Combining ten or more hedge funds enhances investment benefits as risk is lowered due to the low correlation – averaging 0.3 – between funds.
5. Fund sponsors are choosing to use hedge funds in two ways. A portfolio of hedge funds with broad style representation is treated as a separate asset class within the total portfolio. This first application is often referred to as an “absolute return” strategy. Alternatively, fund sponsors create a portfolio of lower risk hedge funds and overlay stock index futures or swaps to produce an enhance index fund, a potentially potent combination that is referred to as “portable alpha.”
6. Because of their flexibility and complexity, hedge funds require intensive monitoring and transparency and pricing issues can be a concern. Also, with asset growth comes the real concern that excess returns will not be available in the future or materially compressed.
7. Hedge fund-of-funds offer investors a turnkey entry into hedge funds. However, our research shows that performance is reduced, on average, by the fund-of-funds fee.
8. Cliffwater forecasts a 7.25% return for hedge funds, 0.50% below our forecast for stock returns, but at half the level of risk. However, hedge fund selection can easily add or subtract 3% or more to the expected return.

Introduction

Hedge funds, excluding fund-of-funds, total 5,485 in number with assets equal to \$866 billion.¹ Perhaps more impressive is their growth when you consider that hedge fund assets totaled a scant \$39 billion in 1990. Exhibit 1 illustrates that hedge fund growth has been steady and substantial over the past 15 years and is not just a recent byproduct of the 2000-2002 bear market.



Most of this growth came from high net worth and overseas investors. In fact, only \$68 billion, or 8% of hedge fund assets, come from U.S. pension funds, endowments, and foundations. Investors in hedge funds have been primarily wealthy individuals, financial institutions, and foreign investors.

Exhibit 2 shows U.S. institutional participation in hedge funds as well as the two largest alternative asset classes, real estate and private equity.

Exhibit 2: Alternative Investment Allocations by U.S. Institutions
(dollars in billions)

| | Total | | | | |
|--------------------|---------------|------------|----------|-----------|----------|
| | Institutional | Corporate* | Public* | Endowment | Union |
| Real Estate | \$192 | \$43 | \$107 | \$22 | \$20 |
| Private Equity | 164 | 43 | 79 | 40 | 2 |
| Hedge Funds | <u>68</u> | <u>15</u> | <u>5</u> | <u>47</u> | <u>1</u> |
| Total Alternatives | 424 | 101 | 191 | 109 | 23 |
| Total Assets | \$4,003 | \$1,166 | \$2,075 | \$497 | \$265 |
| % Alternatives | 10.6% | 8.7% | 9.2% | 21.9% | 8.7% |
| % Hedge Funds | 1.7% | 1.3% | 0.2% | 9.5% | 0.4% |

* Defined benefit assets only.

Source: Geenwich Associates

Hedge funds currently represent only 1.7% of total institutional assets, mostly from the endowment sector where hedge funds average 9.5% of assets. Pension plans have very little invested in hedge funds. Corporate plans invest just 1.3% of assets in hedge funds while public plans invest only 0.2% of assets in hedge funds. However, that is changing rapidly. Recent surveys of pension fund sponsors suggest that future hedge fund growth will come from pension

plans and that total U.S. institutional hedge fund investment will grow to \$300 billion by 2008.² Our own estimate is that hedge fund investments will grow to \$250 billion by 2008, equal to approximately 5% of total assets. In either scenario, new investments of \$40-\$50 billion per year will likely make hedge funds the highest growth investment style.

What are Hedge Funds?

Hedge funds differ from traditional money management largely in (1) the investment flexibility given them to earn high excess returns and (2) the investment objective to earn high absolute returns rather than controlled index-relative performance.

The flexibility to short securities and use leverage are generally cited as defining characteristics of hedge funds. Equity long/short managers can invest two times their capital or more by borrowing (leverage) and selling short the stocks they view as overvalued. Fixed income arbitrage managers will do the same with bonds but often use more leverage – three to five times invested capital – but offset by higher levels of shorting that more fully control interest rate risk.

Equally important is the hedge fund manager's flexibility to invest in non-traditional securities or employ non-traditional strategies. Non-traditional investments can include convertibles, bank loans, structured notes, and a wide variety of credit, currency, and interest rate derivatives. A classic example is convertible arbitrage hedge funds that take advantage of convertible bonds that might be cheap because features for converting into stock are undervalued. Instead of simply buying and holding the convertible, a hedge fund manager may also short-sell the underlying stock to eliminate stock-specific risk, purchase a credit derivative to avoid possible credit deterioration, purchase an interest rate derivative to avoid losses from rising interest rates and, finally, leverage the combined holdings once satisfied that financing (borrowing) the positions can further enhance the expected alpha-to-risk ratio. The result can be a very dynamic portfolio with high return and low risk but with a lot of moving parts that can be challenging for a fiduciary to monitor. Hedge fund managers are purposefully without portfolio constraints in order to more creatively find excess return and control unnecessary risks.

Hedge Fund Performance

Unquestionably, the current interest in hedge funds stems from their ability to produce consistently attractive absolute returns with low volatility over the past ten years in comparison with lower and more volatile stock returns. Exhibit 3a plots cumulative returns for the HFRI Composite Index³, the S&P 500 Index, the Lehman Aggregate Bond Index, and 90-day T-bills for the period 1994 through July 31, 2004⁴. Exhibit 3b provides annualized return and risk statistics for this same period.

The hedge fund index returns reported throughout this report likely suffer in quality compared to other asset class indexes. Since hedge fund indexes are composites of managers, not securities, they are subject to an upward return bias when poor performing hedge fund stop reporting returns (called "survivorship bias"). This same problem is found in stock and bond manager return universes. Studies examining survivorship bias in mutual fund universes estimate that returns are roughly overstated by 1% per year. For hedge funds, the studies show an upward return bias from survivorship equal to 2% to 3% per year.⁵

**Exhibit 3a: Hedge Fund Returns versus Stocks, Bonds, & Bills
January 1994 through August 2004**

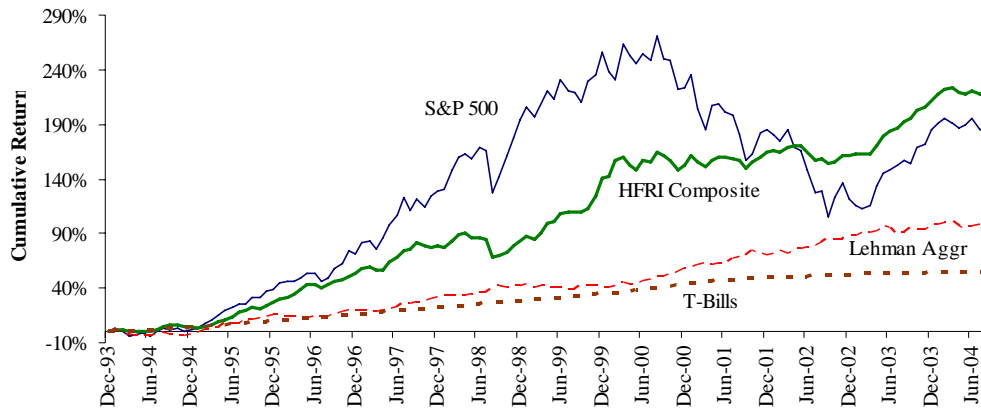


Exhibit 3b: Annualized Return and Risk*

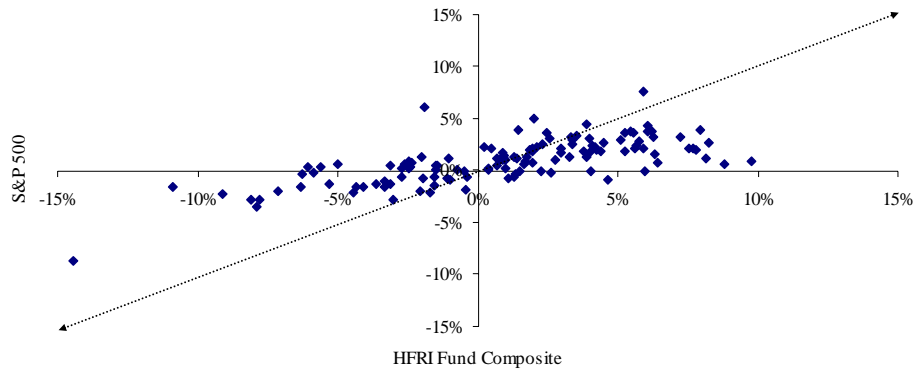
| | Annual Return | Standard Deviation |
|------------------|------------------|-----------------------|
| S&P 500 | 10.39% | 15.44% |
| HFRI Composite | 11.44% | 7.31% |
| Lehman Aggregate | 6.80% | 4.00% |
| 90 day T-bills | 4.22% | 0.53% |

*1994 to August 2004

The HFRI Composite Index of hedge funds earned an annual return of 11.44% over this 10+ year period, exceeding the S&P 500 index return of 10.39% as well as bond and T-bill returns. Return volatility was half the level of stocks, 7.31% versus 15.44%, respectively.

Hedge fund managers and investors place a heavy emphasis on the downside risk protection provided by hedge funds, even introducing a new lexicon of risk measures – including drawdown, recovery, semi-deviation, Sortino ratio, skew and kurtosis – that describe different and often beneficial features of risk found in hedge funds that are not captured by standard deviation. Exhibit 4 presents perhaps the most straightforward way to understand how hedge fund risk differs from stock market risk. The horizontal axis plots monthly S&P 500 Index returns and the vertical axis plots HFRI Fund Composite returns covering the same study period as Exhibit 3. Points that plot on the dashed 45 degree arrow running from bottom left to top right would represent months where hedge fund returns equaled equity market returns.

Exhibit 4: Stock versus Hedge Fund Return Scatter



The dispersion of points in Exhibit 4 illustrates the unique risk characteristics of hedge funds. First, and foremost, hedge funds are managed to avoid, or limit, negative returns. While it is virtually impossible to prevent losses, Exhibit 4 shows that hedge fund returns are generally either positive or fall far less than stocks during stock market declines. In fact, except for the month of August 1998 when stocks fell almost 15% and hedge funds dropped over 8%, hedge fund returns hold up very well with only small monthly losses in the face of significantly negative stock returns. Many of these monthly observations occurred during the 2000-2002 bear market. August of 1998 was the Russian debt crisis that ignited a “flight to quality” that sent all markets down except Treasuries.

Hedge funds generally do not perform as well as stocks in months when equity market returns are positive. Exhibit 4 shows that the majority of plot points are below the 45 degree line when S&P 500 returns are positive. This is because hedge funds either do not hold stocks or hedge a significant portion of their stock exposure through short positions.

Investors are attracted to hedge funds because of the left-hand characteristics found in Exhibit 4. For many portfolios with over 50% of assets allocated to stocks, asset classes that perform relatively well during bear stock markets become very valuable from a risk management perspective. Traditional asset classes that were thought to offer diversification benefits, most notably non-U.S. equities, failed to mitigate losses during the past five years and, in fact, are tending to move more in lock-step with the U.S. stock market. Hedge funds may offer fund sponsors a partial solution to this issue.

Hedge Fund Styles

Hedge funds as a group focus on delivering attractive returns with downside loss protection. However, there exist many very different hedge fund investment approaches, or styles, for achieving that objective. Unlike equity investing that breaks down styles into six or nine categories, 20 to 30 different styles are possible when dissecting hedge funds. HRFI, one of the largest hedge fund information providers, divides hedge funds into 25 style categories.

An example of the variety within the hedge fund asset class is the contrast between *equity long/short*, the largest segment of hedge funds, and *convertible arbitrage*, another very popular hedge fund strategy. Equity long/short consists of long holdings in stocks combined with short sales in stocks or stock options. Long positions generally outnumber short positions with a

positive net stock position. Some modest leverage is also generally present. Convertible arbitrage involves holding a portfolio of convertible bonds but hedging out unwanted equity risk by shorting underlying stock. Risk is controlled by shorting stocks in both styles but their return patterns can be very different, as Exhibit 5 shows.

Exhibit 5a: Stock versus Equity Long/Short Return Scatter

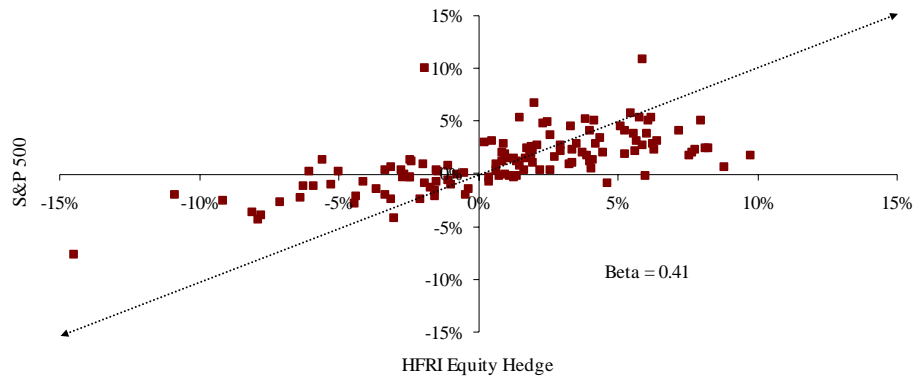
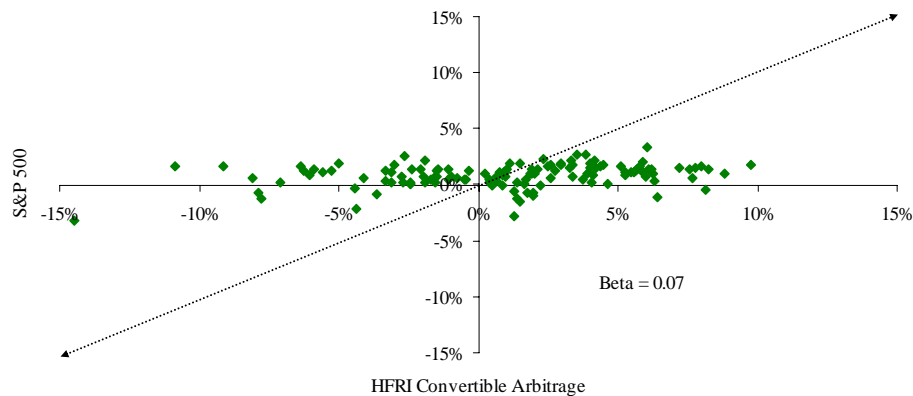


Exhibit 5b: Stock versus Convertible Arbitrage Return Scatter



Equity long/short hedge fund managers have a return pattern that is much more like the S&P 500 index than convertible arbitrage managers. In fact, the left hand (S&P 500 down) and right hand (S&P 500 up) sides of Exhibit 5b are almost mirror images, indicating virtually no stock market influence on convertible arbitrage returns. This visual observation is confirmed by a 0.07 beta measure between convertible arbitrage and S&P 500 Index returns. The HFRI Equity Hedge Index – HFRI’s name for equity long/short managers – has a much higher 0.41 beta with the S&P 500 Index, but even at this higher level Exhibit 5a shows that equity long/short managers provide significant downside return protection when compared to the S&P 500 Index.

The sensitivity of hedge fund returns to the direction of the equity market is an important and common way to differentiate among hedge fund styles and one that Cliffwater uses in Exhibit 6 to group hedge funds into 13 style categories.

Exhibit 6: Hedge Fund Investment Styles

| Market Neutral | Event Driven | Equity Long/Short | Global Macro | Multi-Strategy |
|---|---|--|--|---|
| Convert Arb | Credit/Distressed | Large Cap | All Markets | Hedge funds combining several arbitrage, credit, and equity strategies, thereby giving flexibility to change strategy weights depending upon market opportunities. Growing in popularity among larger hedge fund firms to leverage operational and client service capabilities. Conv arb firms often add one/two other styles like credit or merger arb; other true multi-strategies combine almost all styles like fund-of-funds, but mostly quant approaches. |
| Convertible bonds portfolio with equity risk hedged by short stock sales with interest rate and credit hedges possible. Credit or volatility trading styles. Leverage=1 to 5:1, Beta<0.1. | High yield or distressed bonds, loans, trade claims, and cap structure plays with high credit risk. Includes non-US & real estate securities. Credit hedges common. Lev=low to none; Beta=0.2 | Long positions of large cap stocks coupled with lower short exposures to reduce risk, add value. Illiquid privates possible. Lev=low/med; Beta=0.2 to 0.5 | Top-down, fundamental investments on global price movements in all markets, countries, and currencies. Lev=low to med; Beta=0.3 to 0.5; high interest rate risk, currency risk | |
| Fixed Inc Arbitrage | Relative Value | Mid-Small Cap | Currency | |
| Includes bond portfolios of various sector, yield curve, US and non-US strategies using derivatives to hedge interest rate and related risks. Lev=high; Beta=none. | Broad category of strategies capitalizing on price differences between similar securities. Includes pipes (Reg D), pairs trades, options, etc. Lev=low/med. | Long positions of mid and small cap stocks coupled with lower short exposures to reduce risk, add value. Illiquid privates possible. Lev=low/med; Beta=0.2 to 0.5. | Currency trading based upon trend-following systems (buy as prices advance & sell as markets decline) and/or fundamental models. Lev=overlay; Beta<0.1. | |
| Equity Arbitrage | Merger Arbitrage | Specialty/Non-US | Managed Futures | |
| Equity market neutral, includes statistical arb, pairs, and fundamental zero beta strategies. Quant strategies often sell rising stocks and buy falling stocks, with hundreds of positions. Lev=low; Beta=none. | Strategy of buying target company and selling short acquiring company to capture return premium after announcement, yet avoid busted deals. Lev=none to medium; Beta=0.1 | Long positions of emerging mkt, real estate, tech, health care, other stocks coupled with lower short exposures to reduce risk, add value. Lev=low/med; Beta=0.5 to 1.0. | Commodity Trading Advisors (CTAs) trading commodity, currency, & financial futures using mostly trend-following systems but sometimes discretionary/fundamental models. Lev=none or overlay. | |

The lower risk, absolute return orientation of hedge funds represents a dramatic departure from the traditional active management orientation of relative performance. Traditional investment styles are defined by the underlying markets they are exposed to (systematic risk). Hedge funds generally try to avoid systematic market risk exposures and, consequently, their performance is most often measured against T-bill or Libor returns instead of stock and bond market indexes. Most endowments and pension funds that do invest in hedge funds have as a performance objective a 4% to 5% return premium over T-bills, net of all fees. They select T-bill returns as a benchmark because they expect very little systematic, market-related return from the hedge fund portfolio and therefore all return is alpha, except for the risk-free T-bill return.

Ten year return and risk statistics for different hedge fund styles are provided in Exhibit 7 that illustrate how hedge funds are generally evaluated. The first three columns show performance relative to 90-day T-bills. For example, over the ten year measurement period the best performing hedge fund style was equity long/short with an 11.24% return over T-bills. However, this hedge fund style also proved to be the most volatile with a tracking error (standard deviation) of 9.89% relative to T-bills. The Sharpe ratio for equity long/short was 1.14, equal to excess return over T-bills divided by tracking error.

Exhibit 7: Hedge Fund Style Performance (July 1994 to July 2004)

| HFRI Index | Excess | | Sharpe Ratio | Weightings to Market Risk (Index) Factors | | | | |
|------------------------|---------------------------|---------------------------|--------------|---|------------------|------------------|-------------------|-----------------|
| | Return to 90-Day T-Bills* | Tracking Error to T-Bills | | Russell 3000 | MSCI World Ex US | Lehman Aggregate | Lehman High Yield | 3-month T-Bills |
| Convertible Arbitrage | 7.15% | 3.77% | 1.90 | 2% | 0% | 1% | 19% | 78% |
| Fixed Income Arbitrage | 1.19% | 4.22% | 0.28 | 0% | 0% | 0% | 12% | 88% |
| Equity Market Neutral | 4.13% | 3.33% | 1.24 | 1% | 3% | 17% | 0% | 79% |
| Merger Arbitrage | 5.88% | 3.94% | 1.49 | 9% | 1% | 0% | 11% | 79% |
| Distressed Securities | 8.16% | 6.13% | 1.33 | 2% | 9% | 0% | 37% | 52% |
| Event Driven | 9.41% | 7.14% | 1.32 | 17% | 6% | 0% | 36% | 41% |
| Equity Long/Short | 11.24% | 9.89% | 1.14 | 33% | 13% | 0% | 8% | 46% |
| Macro | 7.43% | 7.54% | 0.99 | 6% | 14% | 56% | 7% | 17% |
| Hedge Fund Composite | 7.76% | 7.73% | 1.00 | 23% | 11% | 0% | 19% | 47% |
| Hedge Fund-of-Funds | 3.63% | 6.10% | 0.60 | 9% | 12% | 1% | 16% | 62% |
| Russell 3000 | 4.99% | 15.73% | 0.32 | | | | | |
| MSCI World ex US | -0.27% | 14.99% | -0.02 | | | | | |
| Lehman Aggregate | 3.15% | 3.90% | 0.81 | | | | | |
| Lehman High Yield | 3.08% | 7.38% | 0.42 | | | | | |
| Typical Asset Mix** | 3.55% | 9.96% | 0.36 | | | | | |

* T-bills returned 4.28% during this 10 year period.

** 50% Russell 3000, 15% MSCI, 30% Lehman Aggregate, 5% Lehman High Yield.

Seven of the eight hedge fund style groups produced very high Sharpe ratios, near or above 1.0, and the HFRI Fund Composite, combining all hedge fund styles, had a Sharpe ratio of exactly 1.00 for this period. The worst performing style of this group was fixed income arbitrage. Most hedge fund “headline” stories have come from this style group – Long Term Capital being the most notable – when in 1994 and 1998 sharp ramp-ups in interest rates and credit crises caused unexpected losses from many fixed income strategies. Even with these past crises, whose risks managers hopefully better understand, fixed income arbitrage was able to produce a respectable 0.28 Sharpe ratio when compared to the four major asset classes and a typical institutional asset mix shown at the bottom of Exhibit 7. Hedge fund-of-funds, which are discussed in greater detail in a later section, earned a lower 0.60 Sharpe ratio. This result is well below the 1.00 Sharpe ratio for the HFRI Fund Composite and is likely due to additional fees for fund-of-funds pushing returns down and greater survivorship bias in the HFRI Fund Composite pushing returns upward. Still, the fund-of-funds’ 0.60 Sharpe ratio was almost twice the typical asset mix’s 0.36 Sharpe ratio.

Some argue that hedge fund excess returns come at least in part from “hidden beta.”⁶ Exhibit 7 addresses this concern in the five right-hand columns which give each hedge fund style’s exposure to the major market indexes.⁷ Ideally, a hedge fund would have no systematic risk exposures, just alpha, that would result in a 100% weighting to T-bills and a 0% weighting to the other market indexes. That ideal result is not achieved as Exhibit 7 shows, but the first four hedge fund styles come close with weightings of around 80% to T-bills. As expected, given its description, distressed security hedge funds had a high 37% exposure to Lehman High Yield Bond Index risk as it is difficult, except perhaps through credit derivatives, to eliminate all systematic credit risk. Equity long/short managers should also show equity index exposure since they generally have a net long exposure to stocks, unlike their equity market neutral counterparts.

That equity exposure totals 46% when both U.S. (Russell 3000) and non-U.S. (MSCI) weightings are combined. Finally, Exhibit 7 confirms the heavy systematic risk exposures taken by macro hedge funds. Macro funds had a low 9% exposure to T-bills and a particularly high weighting to the Lehman Aggregate Bond index over the time period, likely attributable to portfolio positions in hedged global bonds.

Yes, hidden beta is present in hedge funds, may affect performance, but hasn't been a material factor in explaining high Sharpe ratios for hedge funds over the past 10 years. In Exhibit 8 the hedge fund performance reported in Exhibit 7 is repeated in the three left columns. The three right most columns adjust performance for the market exposures found in hedge fund returns over the past 10 years and reported in Exhibit 7.

Exhibit 8: Hedge Fund Performance Corrected for Index (Beta) Exposures

| | From Exhibit 7 | | | Adjusted for Index Exposures | | |
|------------------------|----------------|-------------|--------|------------------------------|----------|--------|
| | Excess | Tracking | Sharpe | Excess | Tracking | Sharpe |
| | Return to T- | Error to T- | | Return | Error | |
| HFRI Index | Bills | Bills | Ratio | Return | Error | Ratio |
| Convertible Arbitrage | 7.15% | 3.77% | 1.90 | 6.36% | 3.31% | 1.92 |
| Fixed Income Arbitrage | 1.19% | 4.22% | 0.28 | 0.79% | 4.11% | 0.19 |
| Equity Market Neutral | 4.13% | 3.33% | 1.24 | 3.48% | 3.16% | 1.10 |
| Merger Arbitrage | 5.88% | 3.94% | 1.49 | 4.95% | 3.36% | 1.47 |
| Distressed Securities | 8.16% | 6.13% | 1.33 | 6.83% | 4.63% | 1.48 |
| Event Driven | 9.41% | 7.14% | 1.32 | 7.28% | 4.59% | 1.59 |
| Equity Long/Short | 11.24% | 9.89% | 1.14 | 9.16% | 6.57% | 1.39 |
| Macro | 7.43% | 7.54% | 0.99 | 5.06% | 6.19% | 0.82 |
| Hedge Fund Composite | 7.76% | 7.73% | 1.00 | 5.85% | 4.71% | 1.24 |
| Hedge Fund-of-Funds | 3.63% | 6.10% | 0.60 | 2.54% | 4.66% | 0.55 |

Adjusting for market exposures actually *increases* the Sharpe ratio for hedge funds overall, from 1.00 to 1.24. While excess return falls from 7.76% to 5.85% with the adjustment, risk falls by an even greater amount from 7.73% to 4.71%. Most of this change is attributable to equity long/short hedge funds whose Sharpe ratio increases from 1.14 to 1.39. In summary, hidden beta is a concern in evaluating hedge fund performance and must be accounted for, but it has not contributed meaningfully to the strong hedge fund returns over the past 10 years.

It is important to fully understand the unique properties of each hedge fund style to appropriately evaluate performance, measure risk, and understand how best to combine hedge funds into a portfolio.⁸

How Hedge Funds are Used by Fund Sponsors

Hedge funds are now being used by fund sponsors in a variety of ways:

Absolute Return

An “absolute return” asset class, representing a diversified portfolio of hedge funds, is treated just like stocks, bonds, or real estate within the asset allocation decision process and given a target allocation. The hedge fund portfolio generally includes most styles of hedge funds, weighted to provide an equity-like return at a bond-like risk level.

Portable Alpha

A rapidly growing application for hedge funds is as a “portable alpha” portfolio. Portable alpha hedge fund portfolios place greater allocations toward non-directional, low beta hedge fund styles, that perhaps sacrifice some return but, more importantly, have a lower level of risk and lower correlation with stocks. Exhibit 9 offers a comparison of representative style weights for a portable alpha hedge fund portfolio in contrast to an absolute return portfolio.

Exhibit 9: Hedge Fund Style Weights

| <u>Style:</u> | <u>Portable Alpha</u> | <u>Absolute Return</u> |
|-------------------|---------------------------|----------------------------|
| Market Neutral | 50% | 25% |
| Event Driven | 40% | 25% |
| Equity Long/Short | 10% | 40% |
| Tactical | <u>0%</u> | <u>10%</u> |
| | 100% | 100% |

The hedge fund portable alpha portfolio is then combined with index futures and/or swaps in order to “equitize”, “bondize”, or “eafetize” the portfolio. The result is an enhanced index portfolio that can be paired with or replace more traditional enhanced index managers. The different weightings given to portable alpha versus absolute return portfolios are intended to reduce the tracking error of the hedge fund portfolio plus futures combination against the benchmark index.

Other Applications

Some equity long/short hedge managers are replacing long-only managers within a portfolio’s equity allocation. Occurring mostly among endowments and foundations, the belief is that equity long/short managers may produce a return similar to long-only managers but reduce downside risk.

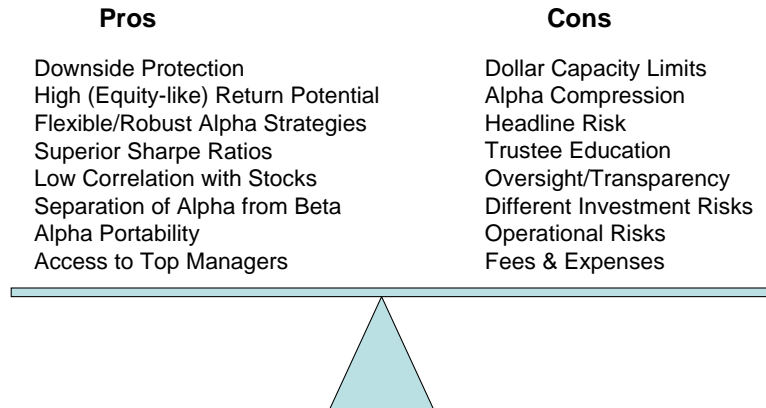
A very different application used by larger institutions is to use a hedge fund portfolio as a liquidity pool to fund private equity and other illiquid alternative investments. Fund sponsors have difficulty maintaining targeted allocations to illiquid alternatives because they have no control over cash drawdowns and distributions. Actual allocations to alternatives end up being very different quarter-to-quarter from targets, which in turn causes actual performance to sometimes differ significantly from benchmark performance for reasons beyond the fund sponsor’s control. A hedge fund portfolio can act as a vehicle to keep actual and targeted alternative allocations more in line.

Certain styles of hedge funds are finding their own individual applications within fund sponsors’ portfolios. “Managed futures” advisors⁹ offer unique return and risk characteristics that some sponsors find attractive and in some circumstances, because trading is done with derivatives, these managed futures programs are being implemented in an overlay form with little or no invested capital. Another example are currency overlay programs that focus entirely on alpha generation – currency as an asset class – rather than hedging an underlying long-only international equity portfolio. Active currency managers have performed very well over the past decade.

Hedge Fund Pros and Cons

Exhibit 10 summarizes many of the key considerations that investors need to evaluate before committing to hedge funds.

Exhibit 10: Hedge Fund Considerations



Exhibits 3 and 4 demonstrated the significant return potential and risk protection offered by hedge funds in the past and their low correlation with common stocks. Hedge funds can also be customized to produce a variety of return and risk levels, or combined with index futures and swaps so that fund sponsors can select their overall market risk (beta) exposures separate from their manager risk (alpha) exposures. Another important reason to consider hedge funds is to follow the “brain drain” that has developed from traditional long-only money management firms to hedge funds.

However, hedge funds don’t come without some challenging issues that need to be carefully managed. Firstly are issues of capacity, as many of the most successful hedge funds are either closed to new business or near capacity. However, our experience is that the most hedge funds are still accessible to large institutional pension and endowment funds. These hedge funds are slowly transitioning their investor clientele from foreign fund-of-funds investors to more patient and sophisticated capital represented by U.S. pension funds and endowments.

Concern is mounting that too many investors are now putting money into hedge funds, thereby reducing alpha opportunities as strategies are copied and markets become more efficient. Convertible arbitrage is a commonly cited example of this where hedge funds are believed to comprise 70% of convertible trading.¹⁰ Others believe that markets are deep enough and anomalies are sufficiently present to allow superior hedge fund managers to earn excess returns. This concern is ultimately an empirical issue. Hedge fund returns have been low thus far this year but not outside what is expected in a flat and low volatility year.

Trustees and fiduciaries are generally reluctant to invest in newer investment opportunities no matter how great they appear from a fear that there may be unfair scrutiny if the investment does not perform well. Hedge funds currently fall in this category for many public pension plans. One reason endowments have been more accepting of hedge funds is that they are not generally seen as susceptible to public recrimination.¹¹ The bankruptcy of Long-Term Capital in 1998 continues to cast a shadow on hedge funds. Part of this is related to the level of understanding the average trustee has about hedge funds. The complexity and heterogeneity among hedge funds imposes a

higher burden on fiduciaries to educate themselves about these investments. Trustee education will generally slow the movement of capital into any new asset class.

Portfolio transparency is something taken for granted by most fiduciaries, but it is often difficult to fully attain when investing in hedge funds. Many hedge fund managers short stocks or are invested in securities where public disclosure might give valuable information to competitors that would undermine the hedge fund manager's objective. As a result, it is often necessary to reach compromises with hedge fund managers to balance the need to monitor and the risks from disclosure. One approach has been to use an analytics vendor.¹² Through a confidentiality agreement, the analytics vendor gets security positions from the hedge fund manager and prepares a report detailing the portfolio risk exposures but not the underlying securities. A more common but less satisfying approach is for the manager to give investors largest holdings or to review the portfolio only at the manager's office. Investors should expect disclosure issues from one out of every five hedge fund managers.

The risks underlying equity and bond investing are familiar to institutional investors. However, depending upon investment strategy, hedge funds can face risks that may surprise investors. Short-selling, leverage, and option strategies can create fat-tail or skewed return patterns that are not captured by the simple standard deviation calculation.

The high number and complexity of securities used by hedge fund managers places additional burdens upon all aspects of operations: trading, clearing, accounting, and compliance. Many hedge fund management teams are not experienced with back-office requirements or do not staff those functions adequately. Hedge fund manager due diligence needs to include special attention to operational matters that are generally taken for granted with more familiar master trustee bank relationships.

Finally, first-time hedge fund investors will be struck by fee schedules that mirror levels and structure found in private equity rather than traditional asset classes. A typical fee is 1% of assets plus a 20% performance fee on profits. A "high water mark" clause prevents managers from getting paid twice on the same profits just as a "claw back" protects private equity investors.

Hedge Fund-of-Funds

Instead of investing directly in hedge funds, fund sponsors can invest in a hedge fund-of-funds which commingles assets into a diversified portfolio of hedge funds. The hedge fund-of-funds manager performs all selection, allocation, monitoring, and reporting duties, thus greatly simplifying hedge fund investing for the investor. Hedge fund-of-funds can also act as a fiduciary screen and thereby shield fund sponsors from potential headline risk should something happen with one of the individual hedge funds. These benefits have proven to be meaningful to some investors. Estimates are that one-half of all institutional capital going to hedge funds is presently through hedge fund-of-funds vehicles.¹³

The benefits of hedge fund of funds must be weighed against their costs. Hedge fund-of-funds generally charge a 1% asset fee, plus a small performance fee, over and above fees paid to the underlying hedge fund managers. Possibly offsetting these additional fees is better investment performance if the fund of funds managers can select superior hedge funds or give greater weighting to better performing hedge fund styles.

There are 985 hedge fund-of-funds in the HFR database. Exhibit 11 provides performance statistics on a 589 subset that have a track record of at least three years. This hedge fund-of-funds group should be less vulnerable to the potential performance biases found generally in hedge fund index returns because (1) hedge fund-of-funds do not drop out as rapidly as hedge funds, (2) hedge fund-of-funds are truly investable, unlike most hedge fund indexes, and (3) excluding hedge fund-of-funds with track records less than three years limits an upward “reporting bias” when strong performers report returns and poor performers do not.

Instead of reporting only average performance statistics, the 25th – 75th percentile range is shown in Exhibit 11 to demonstrate that hedge fund-of-funds selection, and therefore hedge fund portfolio construction, can be very important. The median (50th percentile) excess return over T-bills for this group is 4.66% which is consistent with the frequently used T-bill plus 4% to 5% performance objective for hedge funds. Risk, measured as tracking error relative to T-bills, had a median value of 5.64% for the group and a 0.86 Sharpe Ratio. And, as expected, hedge fund-of-funds performance had a low 0.28 median correlation with the S&P 500 Index, reflecting strong diversification benefits when added to a typical equity oriented portfolio.

Exhibit 11: Hedge FoFs Performance Statistics*

| Quartile | Excess Return over T-Bills | Tracking Error (Risk) | Sharpe Ratio | Correlation with S&P500 |
|----------|-------------------------------|--------------------------|-----------------|----------------------------|
| 25th | 7.22% | 9.24% | 1.37 | 0.45 |
| 50th | 4.66% | 5.64% | 0.86 | 0.28 |
| 75th | 2.68% | 3.62% | 0.49 | 0.14 |

* 589 fund-of-funds with greater than three year history.

The upper and lower quartile performance statistics shows that experience can vary considerably due to fund-of-funds selection or time period but the return, risk, and diversification benefits do not go away. A 2.68% excess return, a 9.24% tracking error, a 0.49 Sharpe Ratio, or a 0.14 equity correlation – each lower quartile outcomes in Exhibit 11 – are values that nonetheless will provide material benefit when added to a diversified portfolio.

Exhibit 12: Historical Style Allocations for Hedge Fund-of-Funds

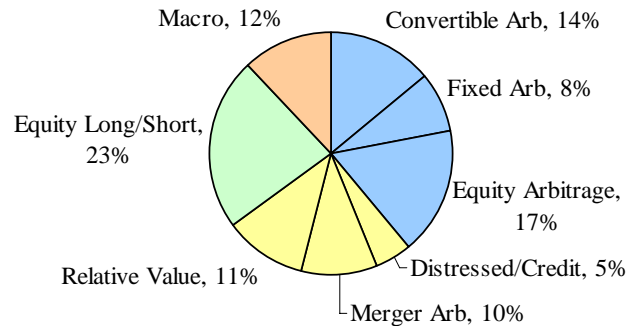


Exhibit 12 shows average style allocations for the 589 hedge fund-of-funds in the study.¹⁴ Hedge fund-of-funds show broad diversification across hedge fund styles. However, unlike the hedge fund universe which has closer to 50% in equity long/short, hedge fund-of-funds, on average, tend to adopt a more conservative, lower risk portfolio profile with 23% allocated to the higher beta, higher risk equity long/short hedge fund style.

Exhibit 11 shows the performance benefits of hedge fund-of-funds but does not answer the question as to whether an investor could do better bypassing the fund-of-funds intermediary and investing directly into hedge funds. The answer to this question is elusive since the hedge fund indexes, which traditionally would serve as performance yardsticks – have not been investable until recently and therefore a reliable apples-to-apples performance comparison is not possible.

With that note of caution, we conducted a performance attribution study on 448 hedge fund-of-funds in the HFRI database for the period beginning January 1994 through July 2004. The 1994 start date was chosen because of the higher reliability – lower survivorship bias – of hedge fund index returns after that date. Fund-of-funds that began after our start date were analyzed for the period they were in existence and each fund-of-funds had to have at least a three year record to qualify.¹⁵ Value-added (alpha) was measured by how well fund-of-funds select their underlying hedge funds, and because fund-of-funds have different styles, we corrected for this by regressing returns against 10 HFRI hedge fund style indexes. Our findings are consistent with what might be expected. The median (average) value-added from fund-of-funds is -1.1% (-1.0%) annualized, roughly equal to the average fees charged by fund-of-funds. However, there is considerable variability in value-added among individual fund-of-funds. The 25th-75th percentile range is +0.99% to -3.04%. This is good news to investors who can identify top quartile fund-of-funds, their fees are more than covered by their hedge fund selection skills. Still, this begs the question whether an investor who can identify top quartile fund-of-funds, shouldn't also be able to identify top quartile hedge funds and therefore save the 1% intermediary fee.

Building a Portfolio of Hedge Funds

Constructing a multi-manager portfolio is fairly straightforward when dealing with traditional long-only asset classes focused on relative performance. Managers are selected for their alpha potential and weighted to minimize style risk relative to the asset class or benchmark. While alpha potential is a factor in manager weighting, it is secondary to matching managers' style risk with benchmark style risk. For example, a great small cap value manager is generally going to get a small allocation compared to a large cap manager because of the proportional representation of small cap stocks in the Russell 3000 or similar index.

Constructing a portfolio of hedge funds is more challenging. The objective is to limit, if not eliminate, style exposures but they are often complex and difficult to estimate. There are also many more types of hedge fund style risk compared to long-only portfolios that need to be managed. Manager diversification is also much more meaningful in a portfolio of hedge funds. The average correlation between any two long-only equity managers or bond managers is approximately 0.95 or higher due to their high beta content. Hedge fund managers have much lower correlations as illustrated in Exhibit 13.

Exhibit 13: Hedge Fund Inter- and Intra-Style Correlations*

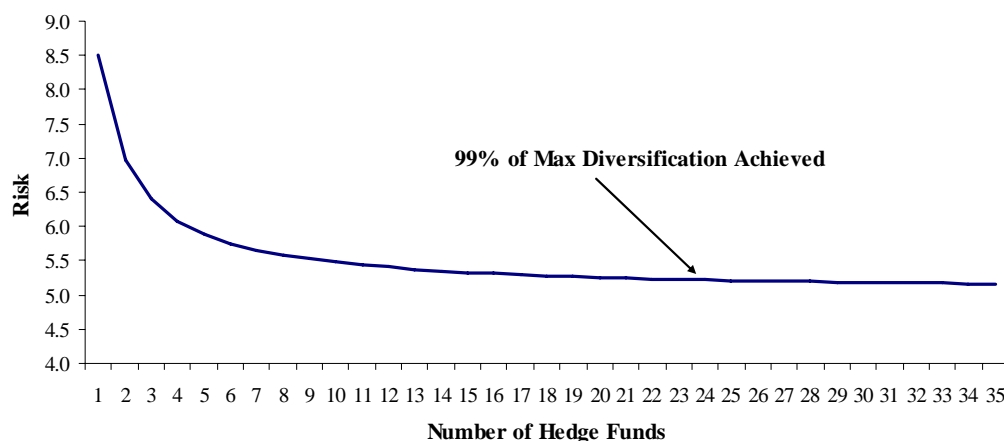
| | Convertible Arb | Fixed Income Arb | Equity Market Neutral | Merger Arb | Distressed | Relative Value | Equity Long Short | Macro |
|-------------------------|--------------------|------------------------|-----------------------------|---------------|------------|-------------------|-------------------------|-------|
| Convertible Arb | | | | | | | | |
| Fixed Income Arb | 0.12 | | | | | | | |
| Equity Mkt Neutral | 0.17 | 0.07 | | | | | | |
| Merger Arb | 0.45 | -0.01 | 0.21 | | | | | |
| Distressed | 0.56 | 0.35 | 0.17 | 0.50 | | | | |
| Relative Value | 0.57 | 0.30 | 0.24 | 0.44 | 0.67 | | | |
| Equity Long/Short | 0.44 | 0.07 | 0.35 | 0.48 | 0.58 | 0.52 | | |
| Macro | 0.39 | 0.14 | 0.24 | 0.30 | 0.46 | 0.38 | 0.58 | |
| Intra-style Correlation | 0.53 | 0.08 | 0.08 | 0.53 | 0.42 | 0.30 | 0.28 | 0.11 |

* Ten years ending July 2004.

Overall, correlations between hedge fund styles are low, averaging 0.35. Equally important, correlations between hedge funds within the same style, called intra-style correlation, are even lower, averaging 0.29. This means that it is equally important to diversify within the hedge fund styles as it is to diversify across hedge fund styles. For example, the median Sharpe ratio for equity long/short managers is 0.59. However, adding a second equity long/short manager with the same 0.59 individual Sharpe ratio will increase the combined Sharpe ratio to 0.74, assuming a 0.28 correlation (from Exhibit 13) between them.

The magnitude of risk reduction from adding hedge funds is significant at a 0.35 correlation level. Exhibit 14 shows what happens to risk as hedge funds are combined. We assume that individual hedge funds have an 8.5% tracking error (risk) versus T-bills – the median risk level for all hedge funds – and a 0.35 correlation. Hedge fund portfolio risk falls quickly from 8.5% to levels approaching 5.0%. At 20 hedge funds, 98% of the possible risk reduction is achieved at a risk level of 5.26%, which is similar to the average risk found in hedge fund-of-funds.

Exhibit 14: The Optimal Number of Hedge Funds



Hedge Fund Return, Risk, and Correlation Assumptions

The variety of hedge fund styles and differences in how hedge funds are weighted within a portfolio makes determining a single set of hedge fund asset allocation assumptions very challenging. Exhibit 15 details how we derive our expected return and risk assumptions for two hedge fund applications: portable alpha and absolute return.

Exhibit 15: Derivation of Hedge Fund Return & Risk Assumptions

| | Market (Systematic) Risk Exposures | | | | Expected Returns, Expected Risks, and their Components | | | | | | |
|--------------------|------------------------------------|------------|-------------|--------|--|-------------|----------------|------------|------------|--------------|------------|
| | Equity Market | High Yield | Lehman Aggr | T-Bill | Market Return | Market Risk | Expected Alpha | Alpha Risk | Info Ratio | Total Return | Total Risk |
| Market Neutral: | | | | | | | | | | | |
| Convertible Arb | 0% | 15% | 5% | 80% | 3.38% | 1.79% | 2.35% | 4.70% | 0.50 | 5.73% | 5.03% |
| Fixed Income Arb | 0% | 15% | 15% | 70% | 3.58% | 1.98% | 3.25% | 6.50% | 0.50 | 6.83% | 6.79% |
| Equity Arb | 0% | 0% | 10% | 90% | 2.95% | 1.02% | 3.50% | 7.00% | 0.50 | 6.45% | 7.07% |
| Event Driven: | | | | | | | | | | | |
| Distressed/Credit | 0% | 25% | 0% | 75% | 3.63% | 2.61% | 3.63% | 7.25% | 0.50 | 7.25% | 7.71% |
| Relative Value | 0% | 10% | 0% | 90% | 3.10% | 1.35% | 2.88% | 5.75% | 0.50 | 5.98% | 5.91% |
| Merger Arb | 5% | 5% | 0% | 90% | 3.18% | 1.94% | 2.25% | 4.50% | 0.50 | 5.43% | 4.90% |
| Equity Long/Short: | | | | | | | | | | | |
| Large/Small Cap | 40% | 5% | -5% | 60% | 4.83% | 7.81% | 3.13% | 12.50% | 0.25 | 7.95% | 14.74% |
| Emerging Market | 50% | 35% | -20% | 35% | 6.08% | 10.56% | 4.25% | 17.00% | 0.25 | 10.33% | 20.01% |
| Global Macro: | | | | | | | | | | | |
| Macro | 15% | 0% | 35% | 50% | 4.20% | 3.40% | 2.88% | 11.50% | 0.25 | 7.08% | 11.99% |
| Currency | 0% | 0% | 15% | 85% | 3.05% | 1.09% | 2.25% | 9.00% | 0.25 | 5.30% | 9.07% |
| "Portable Alpha" | 5% | 12% | 4% | 80% | 3.46% | 2.08% | 3.00% | 4.22% | 0.71 | 6.46% | 4.70% |
| "Absolute Return" | 18% | 10% | 3% | 69% | 4.07% | 3.87% | 3.10% | 6.51% | 0.48 | 7.17% | 7.57% |

Return and risk is divided into market (systematic) sources and alpha. We first identify market exposures for each hedge fund style in the first four columns. Market return and market risk for each style is then calculated. For example, the absolute return portfolio is expected to have a 4.07% return and 3.87% risk from market risk exposures.¹⁶ Next expected alpha, alpha risk, and information ratios are given for each hedge fund style. Alpha risk comes from a Cliffwater study of hedge funds with at least a three year track record and risk levels are rounded to the nearest

one-quarter percentage point. The expected information ratio is Cliffwater's best estimate given historical values and our experience. Expected alpha is simply expected alpha risk multiplied by the expected information ratio. The final two columns report total expected return and risk by style group and for the portable alpha and absolute return portfolios.¹⁷

The assumed weightings for style groups within the portable alpha and absolute return portfolios are displayed in Exhibit 16.

Exhibit 16: Portfolio Weights

| | Portable Alpha | Absolute Return |
|--------------------|-------------------|--------------------|
| Market Neutral: | | |
| Convertible Arb | 20% | 10% |
| Fixed Income Arb | 15% | 8% |
| Equity Arb | 15% | 8% |
| Event Driven: | | |
| Distressed/Credit | 15% | 10% |
| Relative Value | 15% | 10% |
| Merger Arb | 10% | 5% |
| Equity Long/Short: | | |
| Large/Small Cap | 10% | 35% |
| Emerging Market | 0% | 5% |
| Global Macro: | | |
| Macro | 0% | 10% |
| Currency | 0% | 0% |
| | 100% | 100% |

Exhibit 17 contains Cliffwater asset allocation assumptions for portable alpha, absolute return, and selected other major asset classes. The hedge fund assumptions differ slightly from Exhibit 15 since it is our practice to round return assumptions to the nearest one-quarter percentage point.

Exhibit 17: Abridged Cliffwater 2004 Recommended Covariance Matrix*

| | Equity | | Fixed Income | | | | Alternatives | | | Absolute Return |
|----------------------|------------|----------------|--------------|------------|------|------------|--------------|----------------|------------|-----------------|
| | U.S. Stock | Non-U.S. Stock | Leh Aggr | Cash Equiv | TIPS | High Yield | REITs | Private Equity | Port Alpha | Absolute Return |
| Return (%) | 7.75 | 7.75 | 4.75 | 2.75 | 4.50 | 6.25 | 7.75 | 10.75 | 6.50 | 7.25 |
| Risk (%) | 17.00 | 18.00 | 4.00 | 1.00 | 6.00 | 10.00 | 16.00 | 25.00 | 5.00 | 8.00 |
| Correlations: | | | | | | | | | | |
| U.S. Stock | 1 | 0.70 | 0.35 | 0.10 | 0.00 | 0.55 | 0.65 | 0.75 | 0.25 | 0.40 |
| Non-U.S. Stocks | 0.70 | 1 | 0.10 | -0.10 | 0.00 | 0.40 | 0.40 | 0.50 | 0.20 | 0.30 |
| Lehman Aggregate | 0.35 | 0.10 | 1 | 0.10 | 0.00 | 0.40 | 0.15 | 0.30 | 0.10 | 0.10 |
| Cash Equivalent | 0.10 | -0.10 | 0.10 | 1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.65 | 0.55 |
| TIPS | 0.00 | 0.00 | 0.00 | 0.00 | 1 | 0.00 | 0.00 | 0.00 | 0.30 | 0.25 |
| High Yield | 0.55 | 0.40 | 0.40 | 0.00 | 0.00 | 1 | 0.30 | 0.35 | 0.40 | 0.35 |
| REITs | 0.65 | 0.40 | 0.15 | 0.00 | 0.00 | 0.30 | 1 | 0.30 | 0.20 | 0.35 |
| Private Equity | 0.75 | 0.50 | 0.30 | 0.00 | 0.00 | 0.35 | 0.30 | 1 | 0.25 | 0.35 |
| Portable Alpha | 0.25 | 0.20 | 0.10 | 0.65 | 0.30 | 0.40 | 0.20 | 0.25 | 1 | 0.75 |
| Absolute Return | 0.40 | 0.30 | 0.10 | 0.55 | 0.25 | 0.35 | 0.35 | 0.35 | 0.75 | 1 |

* See Cliffwater's "2004 Asset Allocation Assumptions Report" for complete asset class coverage.

The absolute return hedge fund portfolio offers an expected 7.25% return that is 0.5% below the expected return for publicly traded stocks but at a much lower 8.0% risk level and a low 0.4 correlation with U.S. stocks. The portable alpha hedge fund portfolio has a 6.50% expected return, above the 6.25% return for high yield bonds, but a 5.0% risk level that is one-half the 10.0% risk for high yield. Correlations with stocks are even lower for portable alpha.

The asset allocation “efficient frontier” will have sizable allocations to hedge funds given these return and risk characteristics. However, investors must be cautious in placing too much weight on these hedge fund forecasts since they are alpha-based, unlike the other assumptions in Exhibit 17 that only factor in beta return and risk. Returns and risks for the non-hedge fund asset classes will transpire with no help from the investor. The hedge fund returns and risks assume that the investor can successfully seek out hedge fund managers that can replicate successful track records of the past.

Our risk analysis looks at hedge funds in a very traditional way using standard deviation of return as the primary risk measure. Those experienced with hedge funds know that is not sufficient because certain strategies will produce unusual risks that won’t be fully captured by standard deviation. These unusual risks include “fat tails”, captured by kurtosis, and return distributions that have higher probability of large negative returns compared to positive returns, called negative “skew.” These unusual risk characteristics should be factored into allocation decisions and hedge fund portfolio construction.

Conclusion

The investment landscape is far different than it was 10 years ago. Expected returns from traditional asset classes have shrunk to levels that at best offer returns in the six to seven percent range. This new reality forces fund sponsors to: (1) change benefit or spending obligations, (2) increase fund contributions or gifting, or (3) seek higher returns through alternative investments like hedge funds. Hedge funds can assist fund sponsors to earn higher returns. With their low risk qualities, they can be combined with traditional asset classes – called “portable alpha” – to add significant value added over the index where traditional active money managers have had difficulty. Alternatively, a separate hedge fund portfolio – called “absolute return” – can be included as an asset class with equity-like returns but lower risk. Risk-reduction from hedge funds is important in that it allows the fund sponsor to take more risk with other parts of the portfolio.

Unlike stocks and bonds, hedge fund performance will vary materially from investor to investor. Like private equity and real estate, hedge fund selection is an important factor in achieving the higher returns and lower risk shown in past performance statistics. Events such as the closing of high quality hedge fund managers weighs against replicating past success, but the migration of talented managers to hedge funds and the creation of financial instruments to more finely control risks offers potentially more opportunity for higher returns ahead to those able to identify superior management teams and investment strategies.

Cliffwater is a service mark of Cliffwater LLC.

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- ¹ HFR Industry Reports © HFR, Inc. June 30, 2004 www.hedgefundresearch.com.
- ² Casey, Quirk & Acito, “Institutional Demand for Hedge Funds”, September 2004.
- ³ The HFRI Fund Weighted Composite Index (“HFRI Composite”) is an equal weighted index of returns of over 1,650 hedge funds, net of all fees and expenses. Funds that liquidate or close remain in the return series as of the last month-end.
- ⁴ While the HFRI Index goes back to 1990, the 1994 starting point was selected because several studies have questioned the reliability of earlier data due to survivorship and selection biases.
- ⁵ See Liang, “Hedge Fund Performance: 1990-1999,” *Financial Analysts Journal*, Jan-Feb 2001, and Fung and Hsieh, “Performance Characteristics of Hedge Funds and Commodity Funds: Natural vs. Spurious Biases,” *Journal of Financial and Quantitative Analysis*, Vol. 35, No. 5.
- ⁶ See, for example, Asness, Kraib, and Liew, “Do Hedge Funds Hedge?” *The Journal of Portfolio Management*, 2001.
- ⁷ Weightings were calculated using Bill Sharpe’s optimized regression methodology.
- ⁸ Clifford Asness identifies three sources of hedge fund return: market beta, hedge fund beta, and pure alpha. Hedge fund beta represents returns earned from a simple “rules-based replication” of the underlying hedge fund strategy that may or may not offer a long-term return premium. For example, a merger arbitrage beta return can be captured by portfolio replicating a strategy of buying all announced merger targets and selling acquirers. True manager alpha would be measured against this hedge fund beta return. See Clifford Asness, “An Alternative Future: Part I,” (30th Anniversary Issue) and “An Alternative Future: Part II,” (Fall 2004) *The Journal of Portfolio Management*.
- ⁹ These are also called commodity trading advisors or “CTAs.”
- ¹⁰ See “Have Hedge Funds Eroded Market Opportunities?” (JP Morgan Market Strategy Report, October 1, 2004) for a thorough analysis of the performance of commonly used hedge fund strategies over time.
- ¹¹ This is not always true. Student outcry over investments in environmentally sensitive sectors by the hedge fund manager Farallon Capital attracted widespread campus protests. However, long-only managers can be equally vulnerable as was demonstrated by the mutual fund market timing fiasco.
- ¹² Measurisk and RiskMetrics are two firms that offer hedge fund analytical services.
- ¹³ Casey, Quirk & Acito, “Institutional Demand for Hedge Funds”, September 2004.
- ¹⁴ Style weights were calculated using optimized regression where dependent variable is hedge fund-of-funds return and independent variable are HFRI hedge fund component index returns.
- ¹⁵ This ensures at least 36 monthly return data points for the optimized style regression.
- ¹⁶ Market return and risk are calculated using asset class assumptions found in Cliffwater’s “2004 Asset Allocation Assumptions Report” (unpublished research report).
- ¹⁷ The hedge fund style groups are assumed to have an alpha return correlation of 0.3.