EDHEC-Risk Institute

393-400 promenade des Anglais
06202 Nice Cedex 3
Tel.: +33 (0)4 93 18 32 53
E-mail: research@edhec-risk.com
Web: www.edhec-risk.com

A Hedge Fund Investor's Guide to Understanding Managed Futures

January 2011

Hilary Till
Research Associate, EDHEC-Risk Institute
and Principal, Premia Capital Management, LLC

Joseph Eagleeye
Principal, Premia Capital Management, LLC

EDHEC BUSINESS SCHOOL

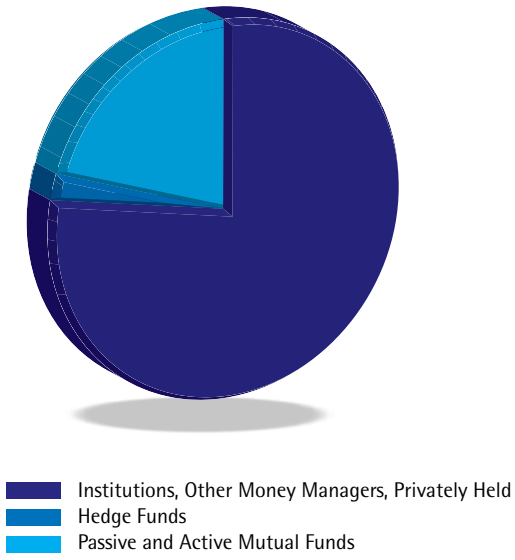
EDHEC is one of the top five business schools in France. Its reputation is built on the high quality of its faculty and the privileged relationship with professionals that the school has cultivated since its establishment in 1906. EDHEC Business School has decided to draw on its extensive knowledge of the professional environment and has therefore focused its research on themes that satisfy the needs of professionals.

EDHEC pursues an active research policy in the field of finance. EDHEC-Risk Institute carries out numerous research programmes in the areas of asset allocation and risk management in both the traditional and alternative investment universes.

The size of the global capital market is estimated to be about $55 trillion, according to Anjilvel et al. (2001). Investments in mutual funds make up about 18% of this total while investments in hedge funds amount to almost 1% of this amount, according to indicative estimates by Morgan Stanley. Jaeger (2002) estimates that managed futures strategies make up about 5% of the hedge fund universe. See Figures 1 and 2.

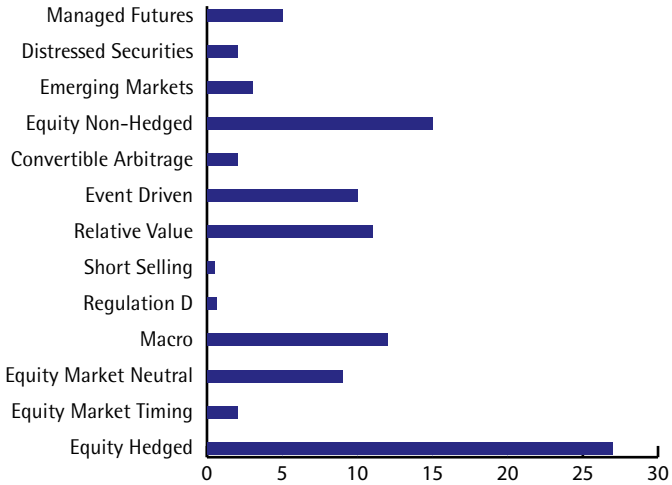
Plainly, managed futures strategies are a niche-within-a-niche in the capital markets. Despite this status, managed futures have become of particular interest to hedge fund investors. This article will discuss why this has become the case by focusing on this strategy's unique diversification properties. We will also briefly cover the main characteristics of this investment category, its underlying sources of return, and alternative statistical measures that are appropriate for comparing managed futures investments with hedge fund investments. We will rely on leading edge academic and practitioner research in covering each of these topics.

Figure 1 - Breakdown of Global Capital Markets by Type of Investment Manager



"Does not include cash equivalents and short-duration fixed income. Estimates for year-end 2000, based on ICI, MSCI, MAR, FRM, (and) Morgan Stanley estimates."
Source: Anjilvel, S., B. Boudreau, B. Johmann, M. Peskin, and M. Urias. (2001, December) "Hedge Funds – Strategy and Portfolio Insights." Morgan Stanley Quantitative Strategies Research, Exhibit 1.

Figure 2 - Breakdown of Hedge Fund Universe by Strategic Sector



Author's Data Source: Hedge Fund Research.
Source: Jaeger, L. (2002) Managing Risk in Alternative Investment Strategies: Successful Investing in Hedge Funds and Managed Futures, London: FT Prentice Hall, Figure 2.2.

I. Performance During Equity Declines

When one examines all the declines in the S&P 500 that were greater than 6% since 1980, one finds that managed futures programs have outperformed the S&P 500 by 17% on average during each period of major equity loss. During each period of equity loss, the average S&P 500 decline was about -12% with the average managed futures return increasing by +5%, according to data from Horwitz (2002). This comparative performance history is shown in Figure 3. The figure also shows that since 1990, hedge funds have generally declined during major equity losses.

Figure 3 - The Myth of Hedge Fund Market Neutrality: Good News for Managed Futures
Declines in the S&P 500 of Greater
Than 6% Since 1980

		S&P 500	Managed Futures a	Hedge Funds b
1	Sep-Nov 1987	-30%	8.5%	
2	Apr-Jul 2002	-20%	10.6%	-4.4%
3	Jun-Sep 2001	-17%	1.9%	-3.8%
4	Jul-Aug 1998	-15%	5.8%	-9.4%
5	Feb-Mar 2001	-15%	4.0%	-3.8%
6	Jun-Oct 1990	-15%	19.4%	-1.9%
7	Sep-Nov 2000	-13%	2.7%	-6.4%
8	Sep 2002	-11%	1.9%	-1.5%
9	Dec 2002 to Feb 2003	-10%	12.1%	0.5%
10	Aug-Sep 1981	-10%	0.1%	
11	Feb-Mar 1980	-10%	10.3%	
12	Dec 1981-Mar 1982	-10%	7.9%	
13	Sep 1986	-8%	-4.2%	
14	Dec 1980-Jan 1981	-7%	9.5%	
15	Feb-Mar 1994	-7%	0.3%	-2.1%
16	Jan-Feb 2000	-7%	0.9%	6.8%
17	Jan 1990	-7%	3.2%	-2.1%
18	May-July 1982	-7%	1.4%	
19	Jul-Sep 1999	-6%	-0.5%	0.7%
	Average	-12%	5%	-2%

a: CISDM (Center for International Securities and Derivatives Markets) Trading Advisor Qualified Index.
b: HFR (Hedge Fund Research) Fund Weighted Composite Index.
Source: Horwitz, R. (2002, December 11) "Constructing a 'Risk-Efficient' Portfolio of Hedge Funds." Kenmar Global Investment, RiskInvest 2002 Conference Presentation, Boston, MA., Slide 8 (with data updated through February 2003).

The returns of 2002 are a striking illustration of managed futures programs outperforming the equity market during large equity declines (See Figure 4). Collectively, managed futures programs produced amongst the highest returns of any investment strategy in the face of a -23.4% drop in the S&P 500 during 2002.

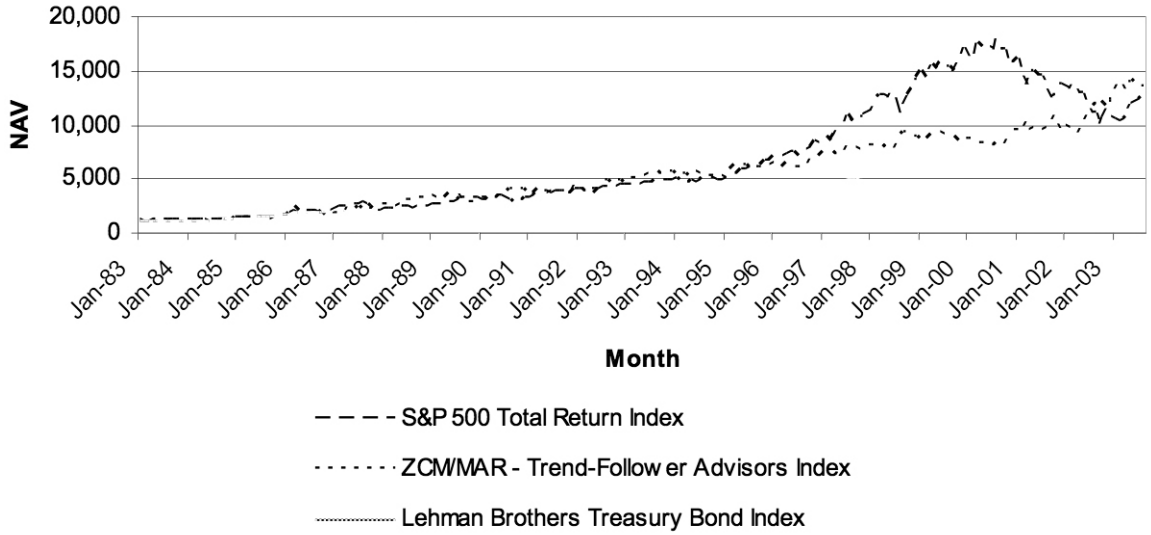
Figure 4 - Index Returns 12 Months to December 2002

Long Only Indices	Return
S&P 500	-23.37%
Nasdaq Composite	-31.53%
MSCI EAFE	-17.06%
Hedge Fund Indices	
Hennessee Hedge Fund	-3.43%
CSFB Tremont	3.04%
MSCI Hedge Fund Composite	3.90%
Managed Futures Indices	
Barclays CTA Index	11.81%
Carr CTA Index	13.28%

Source: Phillips, M. K. (2003, February) "New Fans For Managed Futures." Global Investor, p. 45.

Managed futures programs are also referred to as Commodity Trading Advisors (CTAs). The 2000-2003 equity bear market coincided with such good performance on the part of CTAs that over the time period, January 1983 to August 2003, CTAs outperformed equities, as illustrated in Figure 5. The CTA proxy index shown in this figure is based on an index of trend-followers, which, as will be discussed later, is the dominant investment style of CTAs.

Figure 5 - Net Asset Value Chart
January 1983 through Agust 2003



The ZCM/MAR indices became the CISDM indices, as of the writing of this article.
ZCM: Zurich Capital Markets;
MAR: Managed Account Reports; and
CISDM: Center for International Securities and Derivatives Markets.
Source: Rulle, M. (2003) "Trend-Following: Performance, Risk and Correlation Characteristics." Working Paper, Graham Capital Management, Exhibit 1 (with data updated through August 2003).

II. Characteristics of Managed Futures Participants

A. Low Barriers to Entry, but Assets are Concentrated in the Hands of the Few

The managed futures landscape is notable for the large number of managers within it, and yet the vast majority of assets are managed by a select few. Aleks Kins of Access Asset Management notes in Collins (2003) that "CTAs with less than $50 million under management account for 75% of the CTA universe." On the other hand, according to Phillips (2003), 90% of the assets are "concentrated in the hands of a few large players who have been in the market for 20 years or more."

The large number of small CTAs is likely due to the low cost of entry. According to McGuinness (2003), a start-up hedge fund generally requires at least $20 million in trading capital to effectively cover operating costs. In contrast, CTAs trade in exchange-traded options and futures with relatively low margin requirements. It is not unusual for a start-up CTA to trade an account as small as $250,000, which would only require about $25,000 in margin. A start-up securities hedge fund, on the other hand, requires lines of credit with prime brokers and all manner of over-the-counter derivatives documentation. McGuinness notes that the start-up costs of a securities hedge fund are about $275,000. In contrast, using the experience of the authors of this article, the start-up costs of a managed futures business are a small fraction of this figure.

B. Trend-Following is the Predominant Style

Although there are two basic types of CTAs-discretionary and trend-following-the investment category is dominated by trend-followers. Trend-followers are also known as systematic traders. The operative word here is systematic. Automated programs screen the markets using various

technical factors to determine the beginning or end of a trend across different timeframes. Lungarella (2002) States:
"The trading is based on the systematic application of quantitative models that use moving averages, break-outs of price ranges, or other technical rules to generate the 'buy' and 'sell' signals for a set of markets."

In this investment process, automation is key and discretionary overrides of the investment process tend to be taboo.

Discretionary traders occupy the other end of this bifurcated CTA spectrum. As Lungarella explains, for discretionary traders:
"Personal experience and judgment are the basis of trading decisions. They tend to trade more concentrated portfolios and use fundamental data to assess the markets, as well as technical analysis to improve the timing."

While it is easier to make generalisations regarding trend-followers, discretionary traders are not readily compartmentalised. Their trading styles run the gamut from opportunistic niche strategies to thematic, global macro trading opportunities.

Schneeweis and Spurgin (1998) confirm that systematic, trend-following is the dominant style among CTAs. The authors draw their conclusion from the fact that the correlations between a general CTA index and systematic CTA subindices are about 90%, while the correlations between a general CTA index and discretionary CTA indices are approximately 50%. Citing some of their previous research, Fung and Hsieh (2001) note that when they apply principal component analysis on CTA funds, they find a single dominant style, which they interpret as the trend-following style.

Schneeweis and Spurgin further clarify that:
"CTAs who follow discretionary (e.g. mixed markets and strategies) or unique markets (e.g. energy, currency, and agriculture) (may require) separate explanatory return variables (from the ones used for systematic traders)."

That is, there are different drivers behind systematic trend-following strategies and discretionary trading strategies. As the managed futures investment category is dominated by trend-followers and because academic research correspondingly centers around them, the focus of this article will be on trend-following.

III. Trend-Following Approach

A. Description

The basic idea underlying trend-following strategies is that all markets trend at one time or another. Rulle (2003) notes that:
"A trend-following program may trade as many as 80 different markets globally on a 24-hour basis. Trend-followers try to capture long-term trends, typically between 1 and 6 months in duration when they occur."

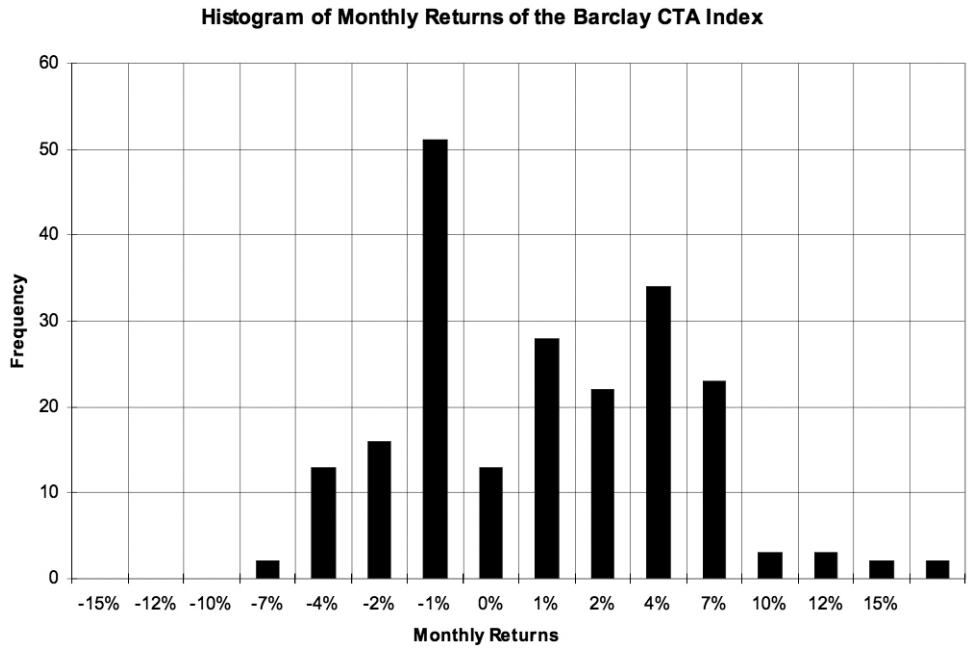
Trend-followers will scan the markets with quantitative screens designed to detect a trend. Once the model signals a trend, a trade will be implemented. A successful trend-follower will curb losses on losing trades and let the winners ride. In other words, false trends are quickly exited and real trends are levered into. In a sense this is the distinguishing feature amongst trend-following CTAs. The good managers will quickly cut losses and increase their exposure to winning trades.

In a sense, the alpha may come from this dynamic leverage. As Fung and Hsieh (2003) note: "trend-following alpha will reflect the skill in leveraging the right bets and deleveraging the bad ones as well as using superior entry/exit strategies. Negative alphas will be accorded to those managers that failed to lever the right bets and showed no ability in avoiding losing bets irrespective of the level of overall portfolio return – luck should not be rewarded."

B. Option-Like Payoff Profile

A trend-following strategy aims for a payout profile similar to that of a long option strategy. See Figure 6.

Figure 6 - January 1985 to August 2002
Histogram of Monthly Returns of the Barclay CTA Index



Author's Data Source: Barclay Trading Group Ltd.
Source: Lungarella, G. (2002, Fourth Quarter) "Managed Futures: A Real Alternative." swissHEDGE, Harcourt Investment Consulting, Figure 1.

The figure also shows that CTA returns are positively skewed. Lungarella (2002) notes that:
"Almost like a call option, the downside risk is to a certain extent limited, and the upside potential rather open. ... (This is because the dominant strategy, trend-following,) will generate strong returns in times when the markets are trending, and during sideways markets the risk management guidelines will try to limit the losses."

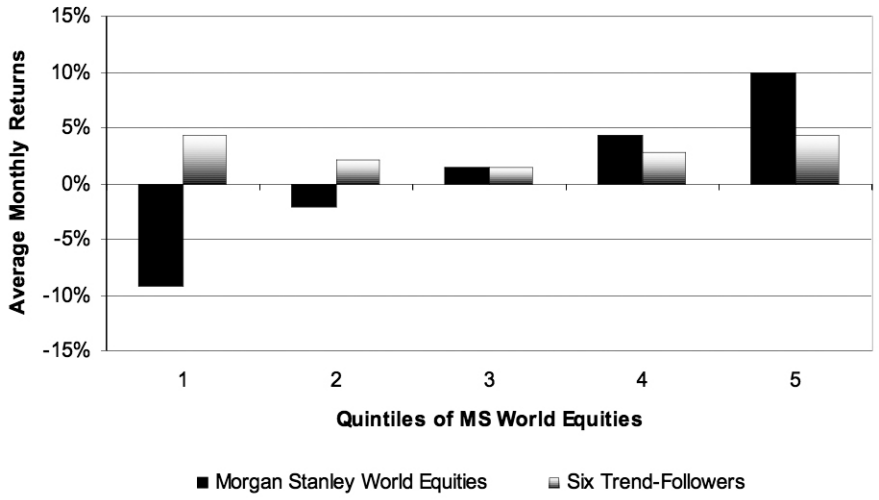
Due to this call-option-like return profile, trend-followers are sometimes classified as a "long option" strategy. This is in contrast to "short option" strategies where one earns steady, small returns but is exposed to infrequent, but large draw-downs. Return profile some hedge fund arbitrage strategies appear to provide. The portfolio implications of these observations will be covered in a later section of this article.

While there seems to be little dissension on categorising trend-following as a "long option" strategy, it is somewhat controversial to refer to trend-following as a "long volatility" strategy. Schneeweis and Spurgin (1998) note:
"(The) return (of CTAs) is not strictly related to volatile markets, but (instead is due) to markets which are trending or offer large intramonth moves."

In explaining the returns of CTAs, the authors further clarify that:
"... standard deviation is often less significant in the presence of intramonth 'draw-downs' or 'draw-ups.'"

Fung and Hsieh (1997) highlight another option-like aspect of trend-following returns. Figure 7 shows the returns of the six largest trend-following funds across five different world equity market environments. State 1 maps into the average returns of world equities and CTA's during the worst equity months while State 5 consists of the average returns of world equities and CTA's during the best equity months. The authors note that trend-following CTA returns are similar to the payoff profile of out-of-the-money call and put options (or a straddle) on equities.

Figure 7 - Average Monthly Returns of Six Large Trend-Tollowing Funds Five Different MS World Equity Market States (April 1983 to March 1997)



MS: Morgan Stanley
Source: Fung, W. and D. Hsieh. (1997) "Survivorship Bias and Investment Style in the Returns of CTA's: The Information Content of Performance Track Records." Journal of Portfolio Management, Vol. 24, No. 1, Exhibit 2.

Figures 3 and 7 suggest that trend-followers may have a negative beta with equities when the equity market is doing poorly. Rulle (2003) provides an intuitive rationale for why this has been the case historically:
"(Trend-following) ... has a high negative correlation to equity markets during periods of perceived crisis in those markets. We believe this occurs because a global consensus emerges about macroeconomic conditions, which causes various markets, particularly currencies, interest rates and equities to move in tandem. When this consensus is further confronted by an 'event,' such as a major country default, the 'event' will reinforce the crisis mentality already in place and drive those trends toward their final conclusion."

Another way of characterising Rulle's argument is that CTAs have historically benefited from "event risk."

C. Return Replication of Trend-Following Systems

There have been at least two attempts at modeling the returns of trend-following CTAs. Spurgin *et al.* (2001) create a benchmarking algorithm centered around a set of mechanical momentum strategies. In contrast, Fung and Hsieh (2001) replicate the returns of trend-followers with a basket of straddles on interest rates, currencies and physical commodities.

1. A Combination of Momentum Strategies

Spurgin *et al.* (2001) create a passive benchmark that tracks trend-following returns with a tracking error "similar to what is encountered between a typical equity mutual fund and the S&P 500 index."

The authors create passive momentum strategies based upon three different crossover points: 15, 27 and 55 days. That is, if a futures price is greater than its price *t* days ago, one takes a

long position in a particular market; otherwise, one takes a short position, where t=15, 27, and 55. This process is done for futures contracts in each of the following futures market sectors: currencies, interest rates, physical commodities and equity indices. These momentum strategies are the building blocks for their passive CTA style benchmarks.

The passive CTA style benchmarks are created by figuring out the combined weightings of the passive momentum strategies that would best fit various Managed Account Reports (MAR)[1] indices. The MAR indices represent the performance of CTAs who categorise themselves as belonging in one or more the following categories: currency, discretionary, diversified, financial, systematic and trend-following.

The time period of the authors' dataset is January 1988 through December 2000. Their procedure uses four years of monthly data to calculate the weightings on the passive strategies. For example, the authors use 1988 to 1992 data to model the 1993 performance of MAR indices out-of-sample. To the extent that the returns of the in-sample models are systematically under or over the actual returns, an adjustment is made to the next period's out-of-sample prediction. Figure 8a shows the average composition of the style benchmarks versus the MAR indices from 1993 to 1999.

Columns 1 through 4 of Figure 8a show the average weight for each of the momentum strategies (or subindices.) The interest rates and currency subindices receive the largest weightings.

Figure 8a - Composition of Passive CTA Style Benchmarks

	Average Annual Sub-Index Weights (%) of Style Benchmarks				**Average Annual Results**	
Columns	C 1	C 2	C 3	C 4	C 5	C 6
MAR Index	Interest Rates	Currencies	Physical Commodities	Equities	In-sample R-squared	Implied Leverage
Dollar Weight	99.6	100.6	48.5	1.6	0.68	2.5
Equal Weight	82.5	104.4	42.0	11.6	0.71	2.4
Currency	60.3	146.8	-	-	0.64	1.6
Discretionary	36.8	30.4	24.2	-	0.17	0.9
Diversified	107.3	93.0	60.8	13.4	0.60	2.7
Financial	142.2	120.6	45.6	-	0.66	3.1
Systematic	128.8	109.3	68.9	13.8	0.61	3.2
Trend-following	154.3	167.5	77.7	19.2	0.72	4.2

Source: Excerpt from Spurgin, R., T. Schneeweis, and G. Georgiev. (2001) "Benchmarking Commodity Trading Advisory Performance with a Passive Futures-Based Index." CISDM Working Paper, Isenberg School of Management, University of Massachusetts, Amherst, MA., Exhibit 2.

Figure 8b compares the average R-squared of the in-sample models with the average R-squared of out-of-sample models.

Figure 8b - In-Sample Versus Out-of-Sample Performance of Passive CTA Style Benchmarks

	Average Annual Results	
MAR Index	In-Sample R-squared	Out-of-Sample R-squared
Dollar Weight	0.68	0.54
Equal Weight	0.71	0.60
Currency	0.64	0.62
Discretionary	0.17	0.04
Diversified	0.60	0.50
Financial	0.66	0.62
Systematic	0.61	0.58
Trend-following	0.72	0.62

Source: Excerpt from Spurgin, R., T. Schneeweis, and G. Georgiev. (2001) "Benchmarking Commodity Trading Advisory Performance with a Passive Futures-Based Index." CISDM Working Paper, Isenberg School of Management, University of Massachusetts, Amherst, MA., Exhibit 2.

1 - The MAR indices became the Center for International Securities and Derivatives Markets (CISDM) indices, as of the writing of this article.

Figure 8c compares the average out-of-sample difference between each MAR index and its corresponding passive style benchmark.

Figure 8c

MAR Index	Average Monthly Out-of-Sample Difference Between MAR Index and Passive Style Benchmark in Basis Points
Dollar Weight	14
Equal Weight	37
Currency	23
Discretionary	-13
Diversified	60
Financial	30
Systematic	14
Trend-following	44

A Positive Number means the Passive Style Benchmark underperformed the corresponding MAR Index.

Source: Excerpt from Spurgin, R., T. Schneeweis, and G. Georgiev. (2001) "Benchmarking Commodity Trading Advisory Performance with a Passive Futures-Based Index." CISDM Working Paper, Isenberg School of Management, University of Massachusetts, Amherst, MA., Exhibit 2.

Several notable aspects of Figures 8a, 8b, and 8c are as follows:
1.) The momentum subindices explain very little of the Discretionary CTA returns. Only 17% of the price variation is explained with the momentum subindices. Out-of-sample, the R-squared drops down to 4%. This is additional evidence that there are different fundamental factors driving trend-following versus discretionary strategies.

2.) As would be expected, the predictive power of the passive benchmarks drops somewhat when using out-of-sample data.

3.) With the exception of the Discretionary MAR Index, the passive benchmarks underestimate the returns. This is most notable with the MAR Trend-following Index. The passive benchmark underestimates the MAR Trend-following Index by about 44 basis points per month. This finding is consistent with the idea that the core strength of a good trend-follower is the manager's ability to lever-up a winning trade. This is not a criticism of the authors' benchmarking approach, though: one would hope that active managers could indeed outperform passive style benchmarks.

2. Lookback Straddles

In Fung and Hsieh (2001), the authors formalise the notion of trend-followers as being "long options" by likening the strategy to a portfolio of lookback straddles. Under a "straddle" strategy, one simultaneously owns a put and call. Under an option strategy with a lookback feature, the owner is allowed to exercise their option at the underlying asset's extreme price over the life of the option. The owner of a lookback put would have the benefit of selling the underlying asset at highest price over the option's horizon while the owner of the lookback call would have the benefit of buying at the lowest price. The owner of a lookback straddle would have the benefit of the difference of the maximum and minimum price of the underlying asset over the straddle's time horizon.

When only examining times of extreme equity moves, Fung and Hsieh are able to explain about 61% of the variation in trend-following returns. The time period of this study was from January 1989 through December 1997. The key variables in explaining trend-following returns are lookback straddles on U.S. bonds, Dollar/Mark, wheat and silver. Lookback straddles on short rates (Eurodollar and Short Sterling) and Dollar/Yen are also noted as contributing factors. On a stand-alone basis, lookback straddles on currencies have the highest explanatory power, followed by commodities, short-rates and bonds.

When one performs this same set of regressions over the full sample (rather than just during extreme equity moves), CTA returns are linked once again to lookback straddles on commodities, currencies and bonds; however, these variables now only explain about 47% of the variation in trend-following returns.

In Figure 9, Fung and Hsieh (2003) provide out-of-sample results of their model; the out-of-sample results are asterisked. Their model accurately predicts that trend-followers would do well during three of the four large equity declines since the beginning of 1998. But like the momentum indices approach, the lookback straddle methodology cannot capture the magnitude of returns (again likely due to the dynamic nature of leverage used by trend-followers).

Figure 9 - Returns During Extreme Declines in the Stock Market

Periods of Large Decline	S&P 500	Zurich Trend-Followers	Fung and Hsieh Trend-Follower Model
Sep-Nov 1987	-29.6%	11.7%	12.9%
Jun-Oct 1990	-14.7%	23.5%	28.5%
Jul-Aug 1998*	-15.4%	9.4%	5.6%
Sep-Nov 2000*	-13.1%	6.5%	-5.0%
Feb-Mar 2001*	-14.9%	9.3%	3.6%
Aug-Sep 2001*	-13.8%	9.2%	3.9%

The Zurich indices became the CISDM indices, as of the writing of this article.
Source: Based on Fung, W. and D. Hsieh. (2003) "The Risk in Hedge Fund Strategies: Alternative Alphas and Alternative Betas." In L. Jaeger, ed. The New Generation of Risk Management for Hedge Funds and Private Equity Investments. London: Euromoney Books, Exhibit 5.8.

IV. Appropriate Metrics for Comparing Managed Futures Strategies with Hedge Fund Investments

As noted earlier, successful trend-followers have tended to do well in the face of extreme equity market returns and generally have had a low correlation to the equity market. As such, one might expect that trend-followers should compete with other hedge fund strategies as a diversifying investment in a traditional stock/bond portfolio. Yet, as noted before, CTAs represent only about 5% of the overall hedge fund market. One may wonder why this number is so low.

A key metric for comparing strategies is the Sharpe Ratio, the excess return divided by the standard deviation. And on this risk-adjusted return metric, trend-followers do not look as attractive as other hedge fund strategies. However, one might consider exploring the following two frameworks that paint trend-followers in a more favourable light.

A. Portfolio Skewness

This section will briefly explain how taking into consideration the higher moments of an investment's return distribution will put CTA's in a more favourable light. But before doing so, we will build an economic argument of why the higher moments of an investment's return distribution matter.

The first thing to understand is how a strategy earns its returns. As noted in Till (2001), the latest stream of thought by financial economists is that there are actually multiple sources of risk besides the market risk factor, which can produce high average returns. If an investor passively bears any of these risks, that investor will earn a return, which is not conditioned upon superior information. Frequently, there may be large losses from bearing one of these risk factors, resulting in a short-option-like return distribution, but the returns over time are sufficient to make the activity profitable. These returns are called "risk premia".

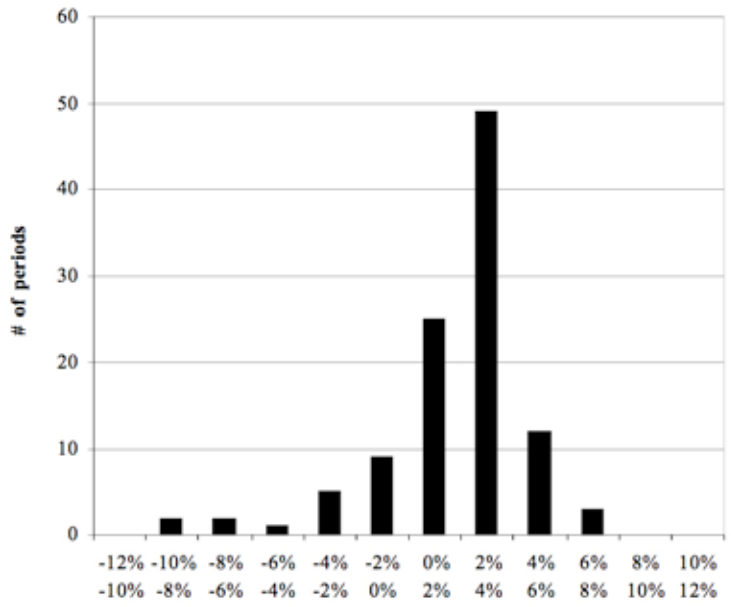
A number of hedge fund strategies appear to be earning risk premia. In other words, they earn returns because they are performing an economic function, which involves some form of risk transfer.

For example, one could argue that a relative-value bond fund earns its returns by taking on the illiquid assets that international banks desire to lay off when in need of reducing risk. The fund hedges this risk by shorting liquid assets. A relative-value bond fund thereby provides a reinsurance function for financial institutions, but it also exposures the fund to liquidity crises. As a result, an examination of empirical data shows that relative-value bond funds have *short-option-like returns*. An investor in such funds assumes the risk of systemic financial distress and provides other investors with the flexibility of being able to readily liquidate their investments. A relative-value bond fund is, in essence, providing real options to other investors.

One issue with the Sharpe Ratio is that it can inadvertently favour "short option" strategies. One may be earning premia in compensation for taking on the risk of rare events. In other words, by undertaking a maximum Sharpe ratio strategy, an investor may be accepting negatively skewed returns in exchange for improving the mean or variance of the investment.

To the extent that a portfolio of hedge funds contains strategies that have "short-option-like profiles," one might wonder whether allocations to CTAs with their "long-option-like profiles" would provide helpful diversification benefits. This question particularly comes to mind when viewing Figures 10a and 10b.

Figure 10a - Stop Losses and Return Distributions
Histogram of Monthly Returns of the CSFB Convertible Arbitrage Index (2X)

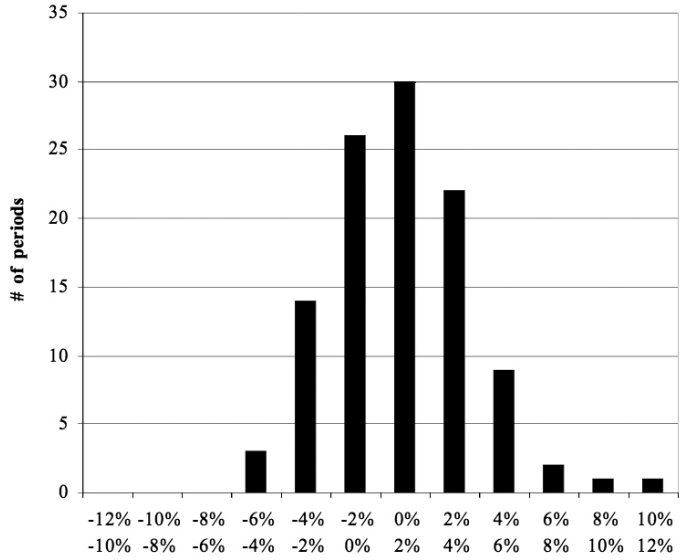


"Arbitrage strategies exhibit return distributions with left tails. Arbitrage strategies have frequent small gains (capturing the arbitrage spread) and rare but sometimes sizeable losing trades."
==> SHORT-OPTION DISTRIBUTION TYPE
CSFB: Credit Suisse First Boston;
2X: two-times leveraged.
Source: Molinero, R. (2003, April 10) "Rotella Capital Management." Professional Risk Managers' International Association (PRMIA) Seminar Presentation, Chicago, IL, Slide 10.

Framing the matter in a concise statistical fashion, the issue for hedge fund investors, as noted by Feldman (2002), is that "most hedge fund 'styles' achieve high Sharpe ratios at the expense of high levels of kurtosis and negative skew."

For those readers who desire a brief statistical primer, skewness and kurtosis are the "higher moments" of a statistical distribution. The mean is the first moment of a distribution, standard deviation the second, with skewness and kurtosis being the third and fourth respectively.

Figure 10b - Stop Losses and Return Distributions
Histogram of Monthly Returns of the Carr Barclay CTA Index



"On the other hand, CTAs exhibit return distributions with right tails. Although CTAs incur more frequent small losses (due to stops), winning trades tend to be significant."
==> LONG-OPTION DISTRIBUTION TYPE
Source: Molinero, R. (2003, April 10) "Rotella Capital Management." Professional Risk Managers' International Association (PRMIA) Seminar Presentation, Chicago, IL, Slide 10.

Bacmann and Scholz (2003) write that skewness "mainly describes how asymmetric the distribution is. In other words, a positive skewness indicates that more observations are found to the right tail of the distribution." The authors further explain that kurtosis "is linked to the existence of extreme returns. The higher the kurtosis is, the more likely extreme observations are. In this context (for given levels of average returns and their variance), risk averse investors like positive skewness and dislike high kurtosis."

Upon inspection of Figures 10a and 10b, we would note that the arbitrage strategy has negative skewness while the CTA strategy has positive skewness.

Kat and Amin (2003) find evidence that when one uses mean-variance optimisation to construct portfolios that include a sufficiently large number of hedge funds, one ends up with portfolios that have lower skewness as well as higher kurtosis in the overall portfolio's return distribution. In other words, they find that there is a trade-off between improving a portfolio's mean-variance characteristics and taking on more risk of rare, but large losses.

Could the addition of CTAs with their positive skewness help in portfolio optimization? Kat (2004) formally examines the role of CTA's within both a traditional stock and bond portfolio, which may also include hedge funds. He pays particular attention to the impact that hedge funds and CTAs have on a portfolio's higher moments.

Kat (2004) finds that:
"Adding managed futures to a portfolio of stocks and bonds will reduce that portfolio's standard deviation more and quicker than hedge funds will, and without the undesirable side-effects on skewness and kurtosis. Overall portfolio standard deviation can be reduced further by combining both hedge funds and managed futures with stocks and bonds."

It appears that in order to view CTAs in a more favorable light, their diversifying properties during infrequent, crisis events may need to be valued more highly than has been the case thus far.

B. A Beta-Adjusted Return Metric

Besides understanding the "tail risk" of strategies, another key attribute to understand in evaluating strategies is the quality of the data that one is relying on in making decisions.

As noted in Till (2004), the principals of AQR Capital Management have built a convincing argument in Asness et al. (2001) that the lack of relationship of hedge fund indices to the S&P 500 is largely due to the reporting of stale prices for hedge fund positions. The researchers use the CSFB/Tremont hedge fund indices in their research.

When the researchers regress the CSFB/Tremont Aggregate Hedge Fund Index's returns versus lagged returns of the equity market, they find a strong relationship between the hedge fund index and the S&P using data from January 1994 to September 2000. Because there is such a strong relationship once they compare the hedge fund index's returns to dated returns in the stock market, they infer that hedge funds making up the index may have been using stale pricing in evaluating their holdings.

Investors might consider hedge funds for their portfolios because they would like to diversify away some of their equity market exposure. Given that investment rationale, the AQR researchers recalculate the Sharpe ratio of a number of hedge fund styles if one hedged out their true equity market exposure, taking into consideration the stale-pricing effect.

Figure 11 shows the authors' results. "Monthly Unhedged Sharpe Ratio" is the unadjusted Sharpe ratio of the hedge fund style. "Monthly Beta Hedged Sharpe Ratio" is the Sharpe ratio of the hedge fund style if it were hedged according to its relationship with the stock market based on regressing contemporaneous returns. "Summed Beta Hedged Sharpe Ratio" is the Sharpe ratio of the hedge fund style if it were hedged according to its relationship with the stock market, which includes the stale-pricing effect.

Figure 11 - Annual Sharpe Ratios of Unhedged and Hedged Hedge-Fund Returns
January 1984 to September 2000

Portfolio	Monthly Unhedged Sharpe Ratio	Monthly Beta Hedged Sharpe Ratio	Summed Beta Hedged Sharpe Ratio
Aggregate Hedge Fund Index	0.80	0.31	-0.40
Convertible Arbitrage	1.07	0.95	-0.11
Event Driven	1.05	0.55	-0.27
Equity Market Neutral	1.85	1.55	1.06
Fixed Income Arbitrage	0.35	0.28	-0.56
Long/Short Equity	0.94	0.39	-0.23
Emerging Markets	0.11	-0.47	-0.82
Global Macro	0.54	0.18	-0.40
Managed Futures	-0.10	-0.12	0.14
Dedicated Short Bias	-0.38	0.61	0.89

Source: Asness, C., J. Liew, and R. Krail. (2001) "Do Hedge Funds Hedge?" Journal of Portfolio Management, Vol.1, No. 28, Table 6.

V. Conclusion

Despite the small size of managed futures relative to other alternative investment strategies, this investment strategy has risen in prominence mainly because of its positive performance during the March 2000 to March 2003 equity market decline. Even with an improving equity market, one may expect investments in managed futures to grow as hedge fund investors' understanding of this strategy's unique diversification benefits becomes more widespread.

References

• Anjilvel, S., B. Boudreau, B. Johmann, M. Peskin and M. Urias. 2001. Hedge Funds – Strategy and Portfolio Insights. *Morgan Stanley Quantitative Strategies Research*. (December)

• Asness, C., J. Liew and R. Krail. 2001. Do Hedge Funds Hedge? *Journal of Portfolio Management* 1 (28): 6–19.

• Bacmann, J.F. and S. Scholz. 2003. Alternative Performance Measures for Hedge Funds. *AIMA Journal*. (June)

• Collins, D. 2003. Turning Asset Allocation On Its Head. *Futures Magazine* (August): 64-66.

• Feldman, B. 2002. Portfolio Construction with Alternative Investments. Ibbotson Associates, QWAFAFEW Seminar Presentation, Chicago, IL. (August)

• Fung, W. and D. Hsieh. 1997. Survivorship Bias and Investment Style in the Returns of CTA's: The Information Content of Performance Track Records. *Journal of Portfolio Management* 24 (1): 30-41.

• Horwitz, R. 2002. Constructing a 'Risk-Efficient' Portfolio of Hedge Funds. Kenmar Global Investment, RiskInvest 2002 Conference Presentation, Boston, MA. (December)

• Jaeger, L. 2002. *Managing Risk in Alternative Investment Strategies: Successful Investing in Hedge Funds and Managed Futures.* London: FT Prentice Hall: 23.

• Jaeger, L. 2003. The Risk in Hedge Fund Strategies: Alternative Alphas and Alternative Betas. *The New Generation of Risk Management for Hedge Funds and Private Equity Investments.* London: Euromoney Books: 72-87.

• Kat, H, and G. Amin. 2003. Stocks, Bonds and Hedge Funds: Not a Free Lunch! *Journal of Portfolio Management* 29 (4): 113-120.

• Kat, H. 2004. Managed Futures and Hedge Funds: A Match Made in Heaven. *Journal of Investment Management* 2 (1): 32-40.

• Lungarella, G. 2002. Managed Futures: A Real Alternative. swissHEDGE. Harcourt Investment Consulting: 9 –13. (Fourth Quarter)

• McGuinness, S. 2003. Counting The Costs. *Hedge Funds Review*: 32-33. (August)

• Molinero, R. 2003. Rotella Capital Management. Professional Risk Managers' International Association PRMIA Seminar Presentation, Chicago, IL. (April)

• Phillips, M. K. 2003. New Fans For Managed Futures. *Global Investor* 45-46. (February)

• Review of Financial Studies. 2001. The Risk in Hedge Fund Strategies: Theory and Evidence from Trend Followers. *Review of Financial Studies* 14 (2): 313-341.

• Rulle, M. 2003. Trend-Following: Performance, Risk and Correlation Characteristics. Working Paper, Graham Capital Management.

• Schneeweis, T. and R. Spurgin. 1998. MultiFactor Analysis of Hedge Funds, Managed Futures, and Mutual Fund Return and Risk Characteristics. *Journal of Alternative Investments* 1 (1): 1-24.

• Singapore Economic Review. 2004. Risk Measurement of Investments in the Satellite Ring of a Core-Satellite Portfolio: Traditional versus Alternative Approaches. *Singapore Economic Review* 49 (1): 105-130.

• Spurgin, R., T. Schneeweis and G. Georgiev. 2001. Benchmarking Commodity Trading Advisory Performance with a Passive Futures-Based Index. CISDM Working Paper, Isenberg School of Management, University of Massachusetts, Amherst, MA.

• Till, H. 2001. Life at Sharpe's End. *Risk & Reward*: 39-43. (September)