



ASPEN PARTNERS  
ASPEN MANAGED FUTURES BETA INDEX

Managed Futures and the Aspen Managed  
Futures Beta Index  
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# Managed Futures and the Aspen Managed Futures Beta Index

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## Introduction

In the fourth quarter of 2008, a crisis that began in the exotic, seemingly insular world of housing finance spread rapidly to engulf the entire financial system. Investors were stunned as the diversification they had expected from their portfolios disappeared just at the moment it was most needed. Large cap, small cap, and international stocks—as well as other asset classes such as corporate bonds, municipal bonds, mortgages, currencies, and commodities—all became highly correlated to each other, posting historically large losses simultaneously, with little or no diversification benefit from holding a broad portfolio. Even alternative asset classes such as hedge funds, REITs, and private equity offered little protection, at best declining less than equities, but declining substantially nonetheless.

Against that backdrop, the managed futures industry was one of the few categories that provided some relief, posting positive returns through the depths of the financial crisis. Investors were justifiably impressed; record amounts of capital were directed into managed futures funds over the next few years. Yet in the years following the crisis, investors grew increasingly disillusioned with managed futures, as the category generated flat or slightly negative returns over a period that witnessed one of the greatest equity bull markets of all time (albeit arising out of the depressed low equity valuations of the crisis).

The goal of this paper is to provide a brief explanation of the managed futures category, to offer insight into the characteristics of return that we believe should or should not be expected from a managed futures allocation, and to describe how the Aspen Managed Futures Beta Index (Aspen MFBI) has been designed to maximize access to the expected characteristics of managed futures in a liquid, low-cost delivery vehicle.

## Managed Futures: What It Is and Why It's Interesting

The managed futures category (which we reference by the collective singular “managed futures” throughout this paper) is most broadly defined as an assortment of alternative investment funds and asset managers that seek positive investment returns through the trading of futures contracts, forwards, and options. Traditionally, the most common managed futures investment vehicles were limited partnerships managed by Commodity Trading Advisors (CTAs) or Commodity Pool Operators (CPOs). Even though the terms “CTAs” and “managed futures” are sometimes used interchangeably, managed futures exposure has become increasingly available in the form of 40-Act vehicles (i.e., mutual funds and exchange traded funds) as well.

Managed futures funds come in many different varieties, including systematic and discretionary investing; long-term, short-term, and intraday signal generation; trend-following, counter-trend trading, spread trading; as well as other variations. However, the sizable majority of assets in the space pursue some form of medium-to-long-term trend-following. Indicative metrics that seek to present the return of the managed futures asset class (such as the BTOP50 Index, the SG CTA Index, or the Barclay CTA Index) will include CTAs of many different types, but trend-followers make up the lion's share of such indices, and

the indices themselves tend to be highly correlated to the returns of their component trend-following funds, or to a generic trend-following strategy. When an article or paper uses the term “managed futures” as a generic label for an investment style, a return stream consisting primarily of the characteristics derived from trend-following is almost surely the intended meaning.

There are many such papers. The first paper to bring the category to academic prominence was penned by Harvard professor John Lintner in 1983; Lintner noted that the inclusion of managed futures in a portfolio of stocks and bonds could both improve the return and reduce the risk of the overall investment portfolio.<sup>1</sup> Many subsequent papers have reached similar conclusions, and the general characteristics of managed futures relative to traditional investments have remained intact for several decades.<sup>2</sup>

## Characteristics of Managed Futures

Let’s investigate some of the statistical properties of managed futures that make the category interesting as an addition to an investment portfolio. Analyses below will use BarclayHedge’s BTOP50 Index<sup>3</sup> to represent the managed futures space, but as noted above, other indices of managed futures performance will look similar, as they are all strongly dependent on the performance of trend followers. The BTOP50 Index has historical data stretching back to 1987.

### Non-Correlation

Managed futures funds mostly trade contracts tied to the returns of four major asset classes: equities, fixed income, currencies, and physical commodities. But because they are diversified across all four asset classes, and because they can be long or short any futures market with equal ease, managed futures programs tend to be essentially uncorrelated to all four major asset classes over the long run, as shown in Table 1.<sup>4</sup>

**Table 1: Monthly Correlation of Managed Futures to Traditional Asset Classes, 1987-2016**

|                    | Stocks | Bonds | Commodities | Currencies |
|--------------------|--------|-------|-------------|------------|
| <b>Correlation</b> | -0.04  | 0.20  | 0.07        | 0.12       |
| <b>R-Squared</b>   | 0.15%  | 3.95% | 0.47%       | 1.37%      |

Correlations are only mildly positive or negative relative to all four asset classes. The highest correlation, to the bond category, is still so small as to imply that only about 4% of managed futures returns are explained by fixed income returns (i.e., the R-squared of managed futures to bonds is only about 4%).

Low correlation is the key ingredient for effective diversification. Diversification is the only free lunch in investing, since the combination of two assets that are less than perfectly correlated results in a portfolio

<sup>1</sup> John Lintner (Harvard University), “The Potential Role of Managed Commodity-Financial Futures Accounts (and/or Funds) in Portfolios of Stocks and Bonds,” Presentation to the Annual Conference of the Financial Analysts Federation [May 1983].

<sup>2</sup> See, for example, Ryan Abrams, Ranjan Bhaduri, and Elizabeth Flores, “Lintner Revisited: A Quantitative Analysis of Managed Futures in an Institutional Portfolio,” CME Group [May 2012].

<sup>3</sup> The BTOP50 is an equal-weighted index of the largest investible CTA programs that collectively comprise over 50% of the assets in the managed futures space: <http://www.barclayhedge.com/research/indices/btop/>.

<sup>4</sup> Analyses in Tables 1, 2, 3, and 6 use the following data series: Managed futures – BarclayHedge BTOP50 Index; Stocks – S&P 500 Index; Bonds – Barclays Aggregate Bond Index; Commodities – S&P GSCI; Currencies – Inverse monthly US Dollar Index excess returns; Source: Bloomberg.

whose return is the weighted average of the asset returns but whose volatility is less than the weighted average of the asset volatilities. The lower the correlation between the two assets, the lower the resulting portfolio volatility. Because managed futures has such low correlation to traditional long-only asset classes, its volatility is almost entirely idiosyncratic, meaning that its volatility is almost entirely diversified away when it is added to a traditional portfolio. The result is a reduction to the expected volatility of the overall portfolio, and an improvement to the portfolio’s expected risk-return metrics.

### Convexity

The appeal of managed futures as a portfolio diversifier is further strengthened by its positive “convexity” to traditional asset classes, meaning that its correlation and beta to traditional assets is higher in up-periods and lower in down-periods for the traditionals. Table 2 demonstrates.

**Table 2: Correlation/Beta of Managed Futures in Up/Down Months for Traditionals, 1987-2016**

|                         | Stocks | Bonds | Commodities | Currencies |
|-------------------------|--------|-------|-------------|------------|
| <b>Up-Correlation</b>   | 0.11   | 0.19  | 0.21        | 0.39       |
| <b>Down-Correlation</b> | -0.23  | -0.05 | 0.03        | -0.15      |
| <b>Up-Beta</b>          | 0.12   | 0.69  | 0.15        | 0.84       |
| <b>Down-Beta</b>        | -0.20  | -0.22 | 0.02        | -0.22      |

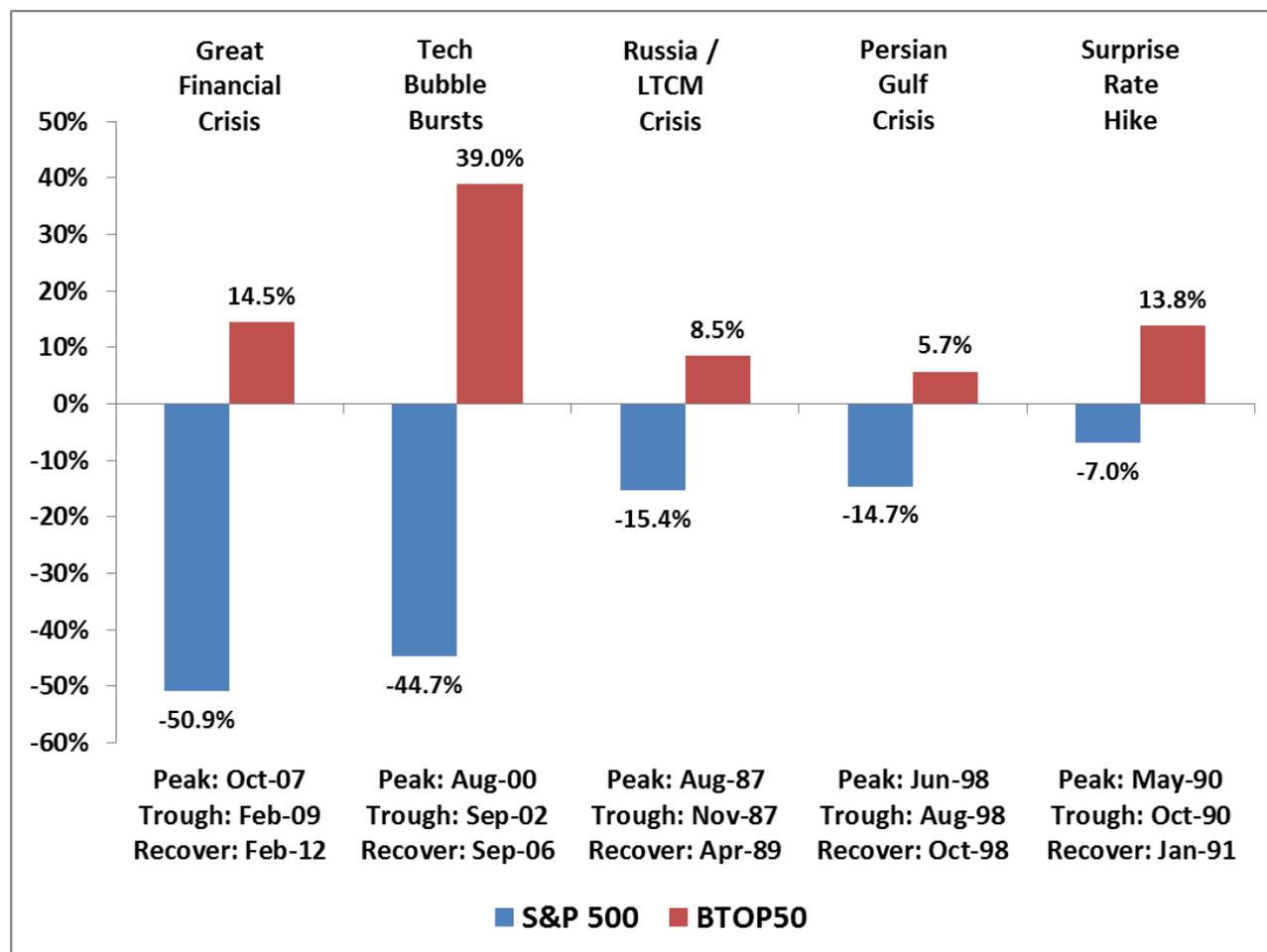
Managed futures has substantially higher correlation and beta during up-periods and lower correlation/beta during down-periods for all four asset classes. This characteristic improves diversification, because up-periods for a portfolio are bolstered and down-periods are attenuated on average. The overall volatility of the resulting portfolio may be the same with or without convexity, but if positive convexity exists then the resulting portfolio volatility will fall more to the upside and less to the downside.

### “Crisis Alpha”

Note that the managed futures stock beta in particular becomes meaningfully negative when equity returns are negative. This behavior hints at the existence of “crisis alpha”—a term coined by Dr. Kathryn Kaminski in an article for the CME Group. Crisis alpha is the tendency of managed futures to offer strong relative performance—indeed often its strongest positive performance overall—during steep drawdowns in the equity markets.<sup>5</sup> Figure 1 illustrates the performance of managed futures during the steepest equity drawdowns over the past several decades (performance shown is for the peak-to-trough period).

<sup>5</sup> Kathryn Kaminski (RPM Risk & Portfolio Management), “In Search of Crisis Alpha,” CME Group [5 April 2009], <http://www.cmegroup.com/education/featured-reports/in-search-of-crisis-alpha.html>.

**Figure 1: Returns of Managed Futures During the Steepest Equity Drawdowns, 1987-2016**



The BTOP50 managed futures index posted positive returns during the peak-to-trough periods of all five of the S&P 500's worst drawdowns since 1987, helping to offset equity losses as part of a balanced portfolio. This ability to consistently reduce portfolio drawdown during the worst stress periods for traditionals is the hallmark of the managed futures crisis alpha characteristic.

Another indicator of crisis alpha is the mathematical concept of "skewness" (or just "skew"), which essentially measures the tendency of a return stream to have outliers either to the high side (abnormally large positive returns) or the low side (abnormally large negative returns). Table 3 shows the skew for managed futures and the four traditional asset classes.

**Table 3: Skewness of Monthly Returns for Managed Futures and Traditionals, 1987-2016**

|             | Managed Futures | Stocks | Bonds | Commodities | Currencies |
|-------------|-----------------|--------|-------|-------------|------------|
| <b>Skew</b> | 1.04            | -0.81  | -0.15 | -0.20       | -0.35      |

Managed futures has strongly positive skew, whereas stocks have strongly negative skew. Intuitively, this means that stocks are very likely to have a few large negative months and more smaller positive months, whereas the managed futures category is likely to have a few large positive months and a larger number of smaller negative months. Combine these offsetting skews with the tendency for managed futures to

be up when stocks are strongly down, and the “crisis alpha” value of managed futures as an equity diversifier is clear. None of the other traditional asset classes have that characteristic, as they all have negative skew as well (albeit not as strongly negative as the skewness of stocks).

### Why Does It Work?

All of the attractive characteristics of managed futures mentioned above are derived from the medium-to-long-term trend-following strategies that dominate the aggregate returns of the managed futures industry. You can also add in the more basic feature of positive absolute returns: For example, since 1987 the BTOP50 index has an annualized return of +7.63%. Its annualized standard deviation is 9.81%, but, as Table 1 indicates, that volatility is altogether idiosyncratic (i.e., it exhibits non-systematic, diversifiable volatility, carrying a minimal effect for a diversified portfolio). Indeed, given the additional characteristics of positive convexity and crisis alpha, the volatility of managed futures is arguably a net positive.

Modern portfolio theory suggests that a return stream consisting entirely of idiosyncratic volatility (let alone convexity and crisis alpha) should have a long-run expected return in the neighborhood of the risk-free rate, but the long-run returns from managed futures have substantially exceeded the risk-free rate. Why do the trend-following strategies that form the backbone of managed futures returns work so well? While there is no conclusive theoretical underpinning for the empirically strong positive returns from managed futures, there are a number of theories that have been proposed as sources of trend-following return:

**Risk Transfer From Hedgers to Speculators:** The idea here is that “hedgers”—market participants for whom assets are inputs to production (e.g., grain prices to a bread company) or outputs from production (e.g., oil prices to Exxon)—are wary of volatility in their cost/revenue structure and prefer to lock in known prices, particularly in the face of changing economic data that increase the risk of future price changes. In this model, trend-followers are speculators who take that risk off the hedgers’ balance sheets, in exchange for capturing a long-run risk premium.<sup>6</sup> Specifically, trends develop because long hedgers are willing to accept a premium in their purchases and short hedgers are willing to accept a discount vs. expected future prices in exchange for the transfer of risk. A temporary preponderance of long (short) hedging activity in the markets thus drives a downward (upward) trend. This theory is particularly applicable to commodities markets, but insofar as currencies affect production/sales prices, interest rates affect financial costs of production, and equity prices affect economic demand (the so-called “wealth effect”), this theory could have some relevance to financial markets as well.

**Non-Market Participants:** For currency and interest rate markets in particular, government and central bank action can provide a rationale for trend-following. For example, it has often been observed that the Fed tends to raise and lower interest rates in a series of steps rather than all at once, thus creating a trend by fiat. Similar arguments apply in the currency markets, where governments and central banks can take steps to move markets in ways that suit political aims. Interest rate policy often has a secondary effect on currencies as well, and in recent years it has also shown a strong effect on equities and some effect on commodities. In these cases, trend-followers are simply the market participants that profit from the non-profit-motivated actions of large non-market participants.

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<sup>6</sup> See, for example, “MLM Index,” Mt Lucas Management, <https://www.mtlucas.com/Content.aspx?content=Index>

**Anchoring Bias:** The prior two theories seek to provide justification for trend-following profits by assuming entirely rational actors, some of whom have motives other than investment profit. This theory and the next two relax the “rational actor” assumption somewhat. This theory states that as new data comes available, prices do not fully react to it immediately because market participants “anchor” their price expectations around the current price.<sup>7</sup> Thus it takes some time for relevant information to be fully absorbed in a security’s price. That time-lapse element creates a trend.

**Herding Behavior and Confirmation Bias:** This is the flip side of anchoring bias; the theory is that herding behavior causes prices to overshoot after a price trend finally reaches the “correct” equilibrium price.<sup>8</sup> The idea is that when market participants see that price trends have developed, especially if the trends confirm their preconceived biases about likely market direction, they will jump on the bandwagon and thus drive the trend further. The trick here is that trend-following models have to react before the majority of the “herd” does; otherwise they’d merely be overpaying along with the herd.

**“Long Straddle” Payout:** It has been noted that trend-following returns resemble payoffs to a “long straddle” options model:<sup>9</sup> i.e., both models are profitable when prices move substantially in either direction and both lose money when prices stick to a narrow channel range. Deeply out-of-the-money options have repeatedly proven to be underpriced (due perhaps to a systematic under-appreciation of the likelihood of large moves, related to the anchoring bias); traders following “black swan” strategies such as straddles have performed particularly well in periods of market panic, such as the dot-com bubble and the credit crisis. This is also precisely when trend-following strategies have performed best, and it offers a theoretical justification for why trend-following has historically performed particularly well in periods of severe market stress and panic.

**Consensus Building:** Market prices are based on a “best guess” expectation of future events. The expectation that a future event will occur is assigned some probability, and markets don’t move all the way to the “correct” price for expected events immediately, since the true correct price is dependent on whether the expected events actually occur. The “consensus building” theory<sup>10</sup> is that market prices move in steps from one equilibrium to a new equilibrium based on new market information, as different market participants assess different probabilities to different possible outcomes. Early adopters of a new thesis start the market’s movement, and if new information or the passage of time confirms the thesis, then a consensus builds around a new level. According to the theory, this process creates a trend. Obviously at any time, new information may serve to disprove the thesis, in which case the early adopters will suffer losses. Thus conceptually, the “consensus building” theory of trend-following returns can also be viewed as a sort of “reversal risk” premium. The idea is analogous to merger arbitrage: When a merger is announced, the target’s stock price generally rises almost to the merger price, but not quite, because

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<sup>7</sup> See, for example, Moskowitz, et al, “Time series momentum,” *Journal of Financial Economics*, Vol. 104 [2012], pp. 228-250, <http://pages.stern.nyu.edu/~lpederse/papers/TimeSeriesMomentum.pdf>: p. 229.

<sup>8</sup> See, for example, Y. Lempérière, et al, “Two Centuries of Trend Following,” *Capital Fund Management* [15 April 2014], <http://xxx.tau.ac.il/pdf/1404.3274.pdf>.

<sup>9</sup> Marc Malek and Sergei Dobrovolsky, “Volatility Exposure of CTA Programs and Other Hedge Fund Strategies,” *The Journal of Alternative Investments* [Spring 2009].

<sup>10</sup> James Meisner, et al, “Understanding the Managed Futures Strategy and its Role in an Institutional Policy Portfolio,” *Commonfund Hedge Funds* [March 2012], [https://www.commonfund.org/InvestorResources/Publications/White%20Papers/11RoleManFuturesWP-ExecSumm\\_102012.pdf](https://www.commonfund.org/InvestorResources/Publications/White%20Papers/11RoleManFuturesWP-ExecSumm_102012.pdf).

there is a nonzero probability that the merger will fall through. At this point, many investors prefer to capture the gains and offload the “reversal risk” that the merger will fail. In taking the other side of the trade, merger arbitrageurs capture a risk premium in exchange for assuming that risk. The “consensus building” theory of trend-following returns essentially asserts that mergers are only a special case of a broader category of new information that is only known to some probability lower than 100%.

## **The Changing Landscape of Managed Futures**

Regardless of what factors drive the performance of trend-following, it is clear that the characteristics of that performance—low correlation and positive convexity to traditionals, crisis alpha, etc.—have been beneficial contributors to a diversified investment portfolio over the long run. Those characteristics rose to particular prominence during the 2008 stock market crash at the apex of the financial crisis. The positive performance of managed futures, at a time when seemingly all other risk asset classes’ returns became highly correlated and strongly negative, created positive press and record capital inflows for managed futures. The newfound demand, in addition to clarification of SEC rules enabling access to futures returns, also fueled the launch of numerous managed futures mutual funds and ETFs, allowing access to the category for retail investors who lacked the ability or the inclination to invest in limited partnership structures such as CTAs.

Unfortunately, most investors who allocated to the category following the crisis have experienced a prolonged lull in managed futures returns. In the five years following the banner year that was 2008, the BTOP50 Index, for example, returned a grand total of -4.1%. Annualizing to about -0.8%/year, that return stream hardly constitutes a crash, but it isn’t what investors had in mind when they allocated to the space, and it looks particularly poor in comparison to the historic equity bull market that has run virtually non-stop since the nadir of the financial crisis. Investor disillusionment has caused asset flows to reverse, and the space has suffered net outflows for the past several quarters.

## **Assessing Post-2008 Underperformance**

To evaluate the ongoing value proposition of managed futures, it is important to assess the possible sources of underperformance for the asset class after the 2008 financial crisis. A number of different market factors are likely contributors.

### **No Crises, So No Crisis Alpha**

While it may be frustrating to compare the returns of managed futures to the returns of equities since the crash, it must be borne in mind that they are uncorrelated strategies, so a direct comparison of their returns is not sensible in general. Moreover, as the Kaminsky “Crisis Alpha” piece points out, managed futures returns tend to be lumpy, with trend-following models producing modest returns most of the time, punctuated by large gains during market crises. As the huge run up in equities indicates, there have been no true crisis periods since the market bottomed in early 2009, so it should be expected that there would be no periods of strong performance for trend following in that time frame. Still, even the “treading water” periods between crises have typically consisted of mildly positive rather than mildly negative performance, and we must look elsewhere to explain the remaining discrepancy.

### **Disappearance of Short-Term Interest**

A number of observers have noted that a substantial portion of the returns from managed futures funds has come from the accrual of interest on cash deposits. Since cash interest rates have been driven

essentially to zero, this is no longer a meaningful source of return for managed futures. This factor has been proposed as a major culprit for the category's recent underperformance.

While there is likely some validity to this claim, the reality is more complicated and more nuanced than this simplistic analysis would indicate. To understand why, we need to review some of the basics of futures-based investing.<sup>11</sup>

A futures contract is not a financial security as are stocks and bonds; rather, it is an agreement to buy or sell an underlying asset for a fixed price (the "futures price") at a fixed time in the future. Because the agreement is made with respect to a future date, no cash changes hands between the buyer and the seller of the futures contract when the position is entered, in contrast to paying cash up front to buy a stock or bond. Instead, the cash used to fund a futures strategy is held in one or more cash accounts; some portion of the cash is held as futures margin, which is simply a good-faith deposit, ensuring that payments can be made in the event of adverse price moves in the futures contracts. Cash only changes hands as the price of futures contracts fluctuate from day to day.

As a consequence of this structure, the total return for a futures investor (aside from fees and expenses) consists of two components: 1) the positive or negative return on the futures contracts themselves, and 2) the interest earned on the cash. The argument, then, is that the recent underperformance for managed futures is explained by the second component being driven essentially to zero by the reduction of short-term interest rates to a level virtually indistinguishable from 0%.

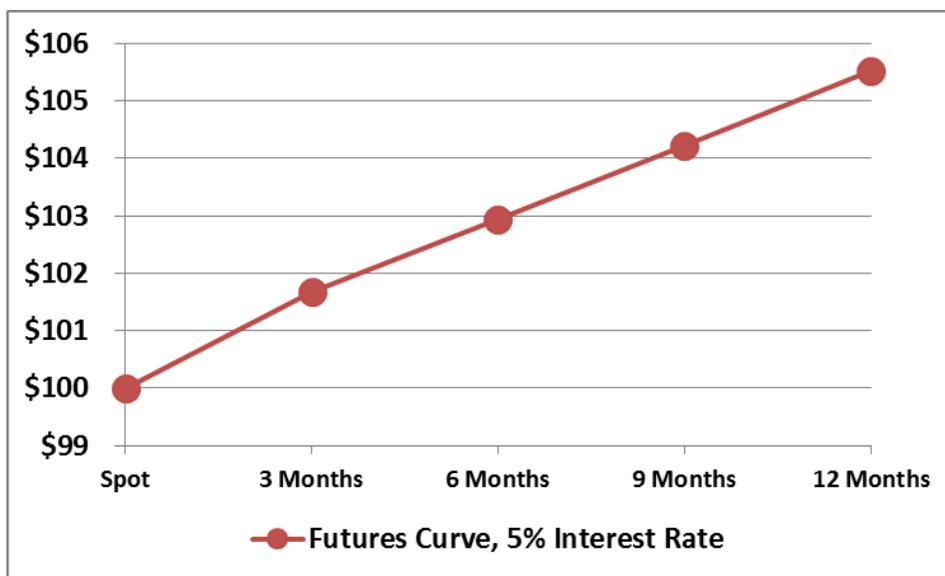
While this argument is correct regarding the direct effect of low interest rates on the second component *per se*, it ignores the effect of changing cash rates on the first component, the futures return. However, that effect is non-negligible. To understand why, let us consider a fully-funded (i.e., the cash deposit is equal to the notional futures investment amount) long position in a futures contract on a theoretical underlying that pays no yield or dividend and has no carrying costs.<sup>12</sup> Suppose the prevailing interest rate is 5%, and the current spot price of the asset is \$100. Figure 2 shows the resulting shape of the futures curve. (The first data point is the spot price, and the next four data points are the prices for futures contracts 3, 6, 9, and 12 months out.)

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<sup>11</sup> For a more in-depth discussion about the mechanics of futures trading than is offered here, see the Aspen Partners note, "Futures Contracts and Investment Exposure."

<sup>12</sup> Aside perhaps from a couple of relatively obscure total return stock index futures markets, such a market does not really exist. Commodity underlyings all have carrying costs (a.k.a., "convenience yields"), fixed income and currency markets have interest yields, and equity markets have dividend yields. The analysis presented in this section applies in exactly the same manner to all markets, but the existence of a yield or carrying cost obscures the matter by further altering the shape of the futures curve.

Figure 2: Idealized Futures Curve, \$100 Spot Price and 5% Interest Rate



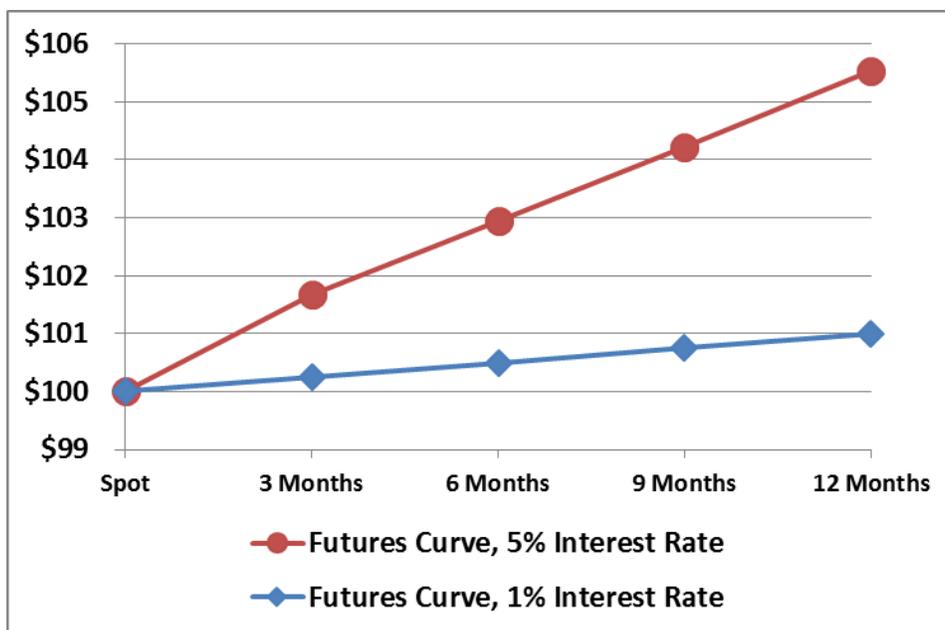
Note that the futures curve is upwardly sloping. This is not because the market is assuming that the price will be higher in the future than it is today. All information about the market's collective assumptions regarding the future price path of the asset is contained in the spot price.<sup>13</sup> To understand why the futures curve is upwardly sloped, we must invoke the Law of One Price (LOOP), which asserts that (ignoring frictions such as fees, expenses, and liquidity) an investor should be indifferent between investing in the spot asset or investing in an equivalent notional amount of futures contracts on the asset. Were one investment preferable to the other, arbitrageurs would quickly step in and close the gap.

So why the upwardly sloping curve? Whereas the return to buying the asset directly consists of one component (the return of the asset itself), the return to holding a futures position on the asset consists of two components, the return of the futures and the interest earned on the cash. This means that the return to the futures should be equal to the return of the asset minus the return on the cash. This slightly lower return for the futures contracts relative to the underlying asset is attained by virtue of the futures contracts having a higher price than the spot asset. The further out the futures contract, the more interest will be accrued before it expires, and the more expensive the contract.

Now suppose that the interest rate is 1% instead of 5%. Figure 3 shows the resulting change in the futures curve.

<sup>13</sup> There is some debate about whether this assertion is always true in practice, but information about future prices contained in the futures price and not the spot price is almost certainly minimal, and generally zero (ignoring certain seasonal effects in some of the deliverable physical commodity futures markets). And even if the futures price did contain information about future price expectations, that effect would be independent of, and would not alter, the interest rate effect discussed here.

**Figure 3: Idealized Futures Curve, \$100 Spot Price and 5% or 1% Interest Rate**



Because the interest to be earned on the cash is lower, the required reduction in the long futures position’s return is smaller, so the positive slope in the futures curve is shallower. Of course, in the current environment, the cash interest rate is close to zero, so the idealized futures curve would be essentially flat.

For a fully-funded long futures investor, assuming the expected return of the asset itself is independent of the interest rate, the reduction in the cash rate reduces the amount of money made on the cash (the direct observation that has led to the notion that reduced interest rates have produced lower returns for managed futures), but it also increases the futures return by an offsetting amount (the indirect observation that is missing from a simplistic analysis of the effect of lower cash returns).

So does this mean that the reduction in interest rates has had no effect whatsoever on managed futures returns? Unfortunately, it is decidedly not that simple either. One reason for this is leverage. Whereas the accrued cash interest is relevant only to the actual amount deposited, the futures discount applies to whatever notional amount is traded. If an investor traded a 2x long position in the futures described above, a lower interest rate would actually provide a net benefit, since the reduction in cash accruals would be offset by twice the improvement in the shape of the futures curve. Counteracting this effect, though, is the fact that managed futures funds can go short as well as long. A short investment is actually doubly punished by decreasing interest rates, since the deposited cash interest goes down and the futures curve becomes less favorable for the short investor. (This relationship also satisfies the LOOP relative to a short seller’s profits, since the short seller’s deposited margin and the cash proceeds of the short sale both accrue less interest when rates decline.)

Since a long futures position benefits indirectly from lower interest rates, a short position is indirectly hurt and deposited cash is directly hurt by such lower rates, it follows that if managed futures funds’ exposures were on average equally balanced between long and short notional positions, a reduction in interest rates would actually result in exactly the result naively asserted at the beginning of this section: I.e., managed

futures returns would be reduced by the magnitude of the reduction in the interest rate. However, in general, managed futures funds positions are net long the majority of the time, which attenuates this outcome, but most likely does not eliminate it altogether. In other words, reduced cash interest rates in all probability are hurting managed futures returns on average, but not by as much as a naïve analysis would imply.

There may be other, subtler and harder to analyze reasons why reduced interest rates would lower the expected return of managed futures, such as the argument that the return to a risky asset class can be regarded as the return to the risk-free asset (which is declining by definition) plus a risk premium (which may or may not be changing)—in which case a risky asset class should see its total expected return decline, but not necessarily its return premium relative to a risk-free investment. Regardless, though, the interest rate observation constitutes an argument for why managed futures returns should perhaps be lower, not why they should have disappeared altogether for a five-year period. Other culprits must be at work as well.

### **Prevailing High Correlations**

Another culprit that deserves its share of blame for poor managed futures results is a pattern of persistently elevated correlations across markets and across asset classes, which substantially reduces opportunities for trend-following profitability. However, this too requires further exploration. After all, cross-asset correlations were even higher in the fourth quarter of 2008, when many managed futures funds posted record profits. Why should persistently high correlation suddenly be problematic for managed futures after the crisis ended? Some basics about the nature of trend-following returns are required to answer this question.

Under normal conditions, the majority of markets are not trending most of the time. Successful trend-following programs will invariably have a common attribution pattern that shows a large number of trades producing small losses, offset by a smaller number of trades producing much larger average gains. One of the reasons for diversifying across a broad range of markets and the full complement of asset classes is that it increases the odds of finding the one or two markets that are trending, so as to offset the non-trending markets at any given time. However, when all markets are highly correlated, the diversification is less effective, since there are fewer independent patterns to trade.

In the fourth quarter of 2008, this lack of individual market independence was actually beneficial, because the pattern to which almost all markets became highly correlated was a strongly (negatively) trending pattern. As a result, instead of having a few winners to overcome a bevy of losers (per normal market conditions), trend-followers found winners everywhere they looked. In the years that followed, the correlation remained but the trends disappeared. The so-called “risk-on/risk-off” trade that would send nearly every risk asset in the same direction on a given day—but generally not for multiple consecutive days—meant that there were few or no markets independently trending. The result is choppy, slow-drip losses across a trend-following portfolio.

### **Prevailing Low Volatility**

Over large portions of the years following the financial crisis, much of the volatility normally seen in the markets has been driven from the system. In general, trend-following is considered a “long volatility” strategy, in the sense that it tends to perform best in high volatility regimes and it tends to record small

losses in periods of minimal volatility.<sup>14</sup> Even when trends do appear against a low-vol backdrop, the lack of large price movements implied by the low volatility means that those trends are not likely to produce much profit unless trend-followers are willing to take on dangerously high amounts of leverage to capture those profits. (More about that concept below.)

### The Primary Culprit: Intervention

In the subsections above, we have seen that the lack of crisis opportunities, the lack of cash interest, the lack of independent price movement, and the lack of volatility in the markets are likely all contributors to some degree to the unimpressive performance of managed futures following the financial crisis. All of those factors are proximate causes for poor performance, but they do not explain why market conditions shifted against trend following for such an extended period of time, nor do they offer insight on whether or not the changes are permanent.

While there are likely many underlying explanatory factors, we concur with the common consensus that the primary culprit creating market conditions unfavorable to managed futures performance has been repeated intervention by the world's governments, and especially by the world's central banks.<sup>15</sup> Interventions have been explicitly designed to calm the markets and forestall crises (resulting in no crisis alpha for managed futures). The repeated application of monetary sedatives has driven volatility out of the markets. The predominance of central bank activity over other market drivers has caused most of the world's markets to move in harmony with monetary expectations, resulting in the high correlations of the risk-on/risk-off trade. And, of course, low interest rates are also a direct and intended effect of central bank cash infusions.

More directly, the timing of central bank intervention has been problematic for trend-following, because most interventions, and certainly the most strongly felt interventions, have stepped in to calm market fears at times when incipient crisis concerns had just begun to form strongly negative trend patterns. Luke Ellis at Man Group, which runs AHL, the world's second-largest CTA, said it well: "When I started out in

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<sup>14</sup> Strictly speaking, "long volatility" would refer to a strategy that does well when volatility rises and poorly when it falls, regardless of the absolute magnitude of volatility. Managed futures, on the other hand, has more of a colloquial "long vol" nature, in that it tends to perform better when broad market volatility is high and worse when it is low, regardless of the direction in which volatility itself is moving. Also, the form of volatility that is important is technically *price* volatility rather than *return* volatility (though the two often occur at the same time). Consider a market that declines by 1% in value for five consecutive days. Such a market is ideal for a trend-follower, and it has high price volatility but zero return volatility. For more information, see Malek and Dobrovsky, "Volatility Exposure."

<sup>15</sup> Here is a sampling of a very large number of articles that make the case for central bank and government intervention as the primary cause of managed futures underperformance:  
Emma Cusworth, "CTA trend followers suffer in market dominated by intervention," Risk.net [10 October 2013], <http://www.risk.net/hedge-funds-review/feature/2299487/cta-trend-followers-suffer-in-market-dominated-by-intervention> (login required).  
Daisy Maxey, "Managed-Futures Funds Still Popular," *The Wall Street Journal* [21 May 2014], <http://online.wsj.com/news/articles/SB10001424052702303480304579575763556085636>.  
Vineer Bansali, et al, "Managed Futures: Positive Trends Ahead," PIMCO [May 2014], <http://www.pimco.com/en/insights/pages/managed-futures-positive-trends-ahead.aspx>.  
Matt Osborne, "Three Reasons for Managed Futures and Macro...Now," Altegris [July 2014], <http://www.altegris.com/~media/Files/White%20Paper/ACA3ReasonsMFMacro073114FINAL.pdf>: p. 2.

asset management I was told two rules: the trend is your friend and don't fight the Fed. For the first time we now have the Fed fighting the trend."<sup>16</sup>

Having identified central bank intervention as a prime culprit for managed futures underperformance, the next question is, how permanent will the new regime be? Essentially, there are three different possibilities:

1. Whether because of or despite the stimulus, economic growth will take hold, allowing governments and central banks to return to a less active role in moving markets, returning volatility levels and market activity to more normal conditions.
2. At some point, intervention will stop working, in the sense that another crisis will occur despite governments' and central banks' best efforts to prevent it.
3. Self-sustaining recovery will not occur, but stimulus will continue to prevent market crises and dampen market volatility virtually in perpetuity.

If outcome #1 occurs, then managed futures should be able to return to its historical pattern of moderate but meaningfully positive returns during "normal" market conditions. If outcome #2 occurs, then the "crisis alpha" characteristic of managed futures makes it likely that the category will be one of very few places to look for positive returns during the resulting crisis. Only if outcome #3 occurs will the underperformance of managed futures likely persist.

To believe that current central bank-dominated market regime can persist in perpetuity, one must effectively believe that central bank intervention has driven the actual, underlying risks out of the market economy, and not just the *ex post* volatility. As pointed out in an excellent article by Harold de Boer of European CTA Transtrend, if fundamental risks to the economic system remain despite interventions, then that means that a large measure of the total risk in the markets has been moved out of *volatility* and into *kurtosis*.<sup>17</sup> A pattern of returns with high kurtosis is marked by two characteristics. The first is a "high peak"—a preponderance of very small periodic returns that, in isolation, give the appearance of a very low volatility regime. The second is "fat tails"—an increased probability of outsized, "outlier" events, including, most importantly, outlier events in the left tail—a.k.a., crises.

As de Boer observes, as long as market behavior remains in the "high peak" region, managed futures returns are likely to remain attenuated, especially insofar as the small directional returns in the high peak region at, say, monthly polling frequency, are created by anti-trend interventions at lower frequencies. But if and when a "tail event" occurs, causing large moves at approximately monthly frequency, such an event will likely be marked by self-reinforcing market moves at shorter frequency, which is precisely the set of market conditions under which trend-following models thrive.

If it is the case that risk remains despite the reduction of volatility—and despite the resulting poor managed futures performance in the high peak while waiting for the crisis to happen—then managed futures may be more needed than ever as a crisis hedge, because the fat tails imply an increased

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<sup>16</sup> Sam Jones, "Hedge Fund Sceptics Warn on 'QE Infinity,'" Financial Times [25 September 2012], <http://www.ft.com/cms/s/0/4c91870a-066a-11e2-bd29-00144feabdc0.html#ixzz3Ffc7xZC6> (login required).

<sup>17</sup> Harold de Boer (Transtrend), "Trend Following: Riding the Kurtosis," *CTA Intelligence* [August 2013].

probability of a crisis event. Because the timing of such events are very hard to predict, we would recommend against trying to time an allocation to managed futures. I.e., we recommend against attempting to avoid the weak performance during the high peak, as it reduces the likelihood of allocating in time to benefit during the unpredictably timed fat tail. Indeed, if investors could time the next crisis, then they would have no need for managed futures crisis alpha anyway.

Given that “poor performance” for managed futures constitutes flat to mildly negative returns, the cost to hold a managed futures allocation during the low volatility interlude is not tremendously high. Investors who are sanguine about near-term equity returns and who lament the opportunity cost of their managed futures investments can actually increase the size of their risk portfolios (at the expense of cash, bonds, or other low-risk investments), since the presence of managed futures essentially increases the portfolio’s risk budget by providing crisis alpha in the event their sanguine views prove overly optimistic.

Even if the fat tail does exist, it may not manifest itself in practice, since it is a probabilistic construct that need not necessarily occur. The most likely way for a tail event not to transpire is for the economy to recover before the event can strike, such that interventions can be reduced and markets can be returned to more normal (both colloquially and statistically) behavior (outcome #2)—in which case managed futures should return to moderate profitability anyhow.

Even if investors believe that scenario #3 (a perpetual low-volatility environment brought about by unending intervention) is possible, they shouldn’t eliminate managed futures from their portfolios unless they are certain that the probability of #3 is high enough that the risk of scenario #2 (an eventual market crash that cannot be forestalled by intervention) can be safely ignored. For logical consistency, such investors should also be willing to place their entire investment portfolios in high-beta equity portfolios, since this view implies that a market crash will never again occur. If an investor is uncomfortable with the latter conclusion, then we would argue that the investor should also be uncomfortable with the conclusion that recent underperformance implies that managed futures should no longer have a place in a diversified portfolio.

## **Managed Futures Style Drift: An Unwelcome Response to Poor Performance**

Of course, in arguing in the prior section for the ongoing importance of a managed futures allocation, we are referring to an allocation to a source of return that retains the historical characteristics of the managed futures category. Unfortunately, largely due to pressures created by the post-2008 market backdrop, many managed futures funds have enacted changes in their trading styles that lean away from those historically prevalent sources of return. While we are sympathetic to the predicament of these managers and thus understand the rationale that is driving this “style drift” phenomenon, we do not believe that these style drifts are beneficial modifications, given the expected role of managed futures in a diversified investor’s overall portfolio. Some of the observed categories of style drift are outlined below:

### **Long Bond and Long Equity Biases**

In the years following the financial crisis, both equities and fixed income rocketed up almost monotonically. Longer-term trends that were long fixed income and (once the crisis itself was removed from the lookback) long equities were virtually the only trends that contributed positively to trend-following returns on a consistent basis. Given that backdrop, perhaps it is unsurprising that industry

participant and observer Quest Partners found an increasing tendency for managed futures funds to demonstrate long equity and long fixed income biases in their returns.<sup>18</sup> This evidence is supported anecdotally by periods such as the “taper tantrum” in May and June of 2013, when managed futures funds on average performed very poorly as interest rates rose and equities sank following the Fed’s signaling its willingness to taper its quantitative easing policies. (Note that the “taper tantrum” occurred after the publication of Quest’s paper, providing strong out-of-sample evidence that Quest’s conclusions were well-founded.) In many cases, such changes have likely come about not so much because of explicit decisions to adopt long biases, but rather because of research into past performance leading managers to adopt seemingly sophisticated adaptations to their programs that include long equity and long bond biases as side effects or partial consequences.

For CTAs facing pressure to generate positive performance to justify fees and retain assets, the temptation is strong to bias their models toward positions that seem to be working in a seemingly endless bull market. Moreover, to whatever extent fund returns are measured and evaluated on a stand-alone basis, such biases may actually be helpful in terms of long-run return expectation, since equities and fixed income both have positive return expectations. However, from a portfolio construction process, such biases are unhelpful, because they emphasize positions (long bonds and long equities) that investors probably already have in their portfolios. Insofar as investors are including managed futures in their portfolios to capture the historical diversification characteristics outlined in the first section of this paper, the inclusion of long biases in managed futures models will run counter to those goals, even if they improve the stand-alone return expectations of the models.

To be clear, the existence of long equity and long fixed income biases does not mean that a managed futures fund can never be short those asset classes. However, the presence of such biases in a managed futures program does imply that the program will generally take more time to get short in a bear market; the maximum net short exposure may also be less strong than would be the case in the absence of such biases. Both tendencies will blunt the ability of a managed futures program to provide strong positive convexity and crisis alpha during traditional asset class drawdowns.

### **Volatility Targeting**

Another change that has become increasingly prevalent is volatility targeting by managed futures funds.<sup>19</sup> Vol targeting is a technique wherein a managed futures model is levered up or down in order to maintain a pre-selected volatility target. The goal of volatility targeting is to reduce the “heteroscedasticity” of the model—i.e., reduce the tendency for volatility to evolve over time—thus smoothing the model’s volatility profile.

Once again, this is a goal that may improve the stand-alone statistical characteristics of the model (though it is unclear the extent to which that is true) at the expense of reducing the model’s benefits in a diversified portfolio. During crisis periods in particular, market volatility is almost certain to be elevated. Because underlying market volatility is high, a volatility targeting strategy will be designed to reduce exposures in

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<sup>18</sup> Nigol Koulajian and Paul Czkwianianc, “Quantitative Trend Following Strategies and Equity Risk: From Diversifier to Hedge,” Quest Partners LLC [April 2013].

<sup>19</sup> For a more in-depth discussion of volatility targeting, see Aspen’s research note, “Volatility Targeting Compromises the ‘Crisis Alpha’ Benefits of Managed Futures” [March 2014], <http://www.aspenpartners.com/content/Docs/Aspen-VolatilityTargeting-2014-03.pdf>.

such periods, relative to the non-vol-targeted base exposures. As a consequence, whatever “crisis alpha” may be offered by the underlying program will necessarily be muted by the imposition of the volatility target.

There are several reasons why funds are tempted to adopt volatility targets. One reason is that they do not wish to have sub-periods of substantially elevated volatility in their stand-alone return profiles, but as the previous paragraph notes, this reduces the “crisis alpha” potential of their models. Another reason may relate to recent performance: Since market volatility has mostly been very low in the years following the financial crisis, a vol targeting strategy allows funds to generate more interesting-looking return series than would be the case without the vol target. Combining the vol target with the aforementioned long equity and long fixed income biases might even make back-tested versions of strategies look much more attractive than the returns otherwise obtained by trend-followers over the course of those years. Ironically, though, because managed futures funds must adopt substantial leverage to achieve their volatility targets against a low-volatility backdrop, they actually take on significant “cliff risk” or “tail risk” in seemingly benign periods. A “blue sky” market shock in an otherwise low-volatility period for the markets could create massive losses if such a program is highly levered under the assumption that recent volatility and return patterns will hold. As an example of these sorts of leverage excesses, one managed futures mutual fund’s gross notional-to-capital ratio reached more than 19-to-1 in 2013—a leverage level that we consider to be exceedingly dangerous for any managed futures program, let alone for a mutual fund.

Another likely reason why some managed futures funds have adopted volatility targets is that it may make their programs seem more palatable for certain investors. For example, if an institution such as a pension fund has policy rules requiring an alternative investment program to remain below a certain stand-alone risk threshold, the use of a volatility target can allow a fund to be in compliance with those rules. While this certainly creates an incentive for fund managers to adopt vol targets, we believe that such rules are short-sighted on the part of the institutions. First, such rules ignore the “crisis alpha” characteristic of managed futures, likely resulting in reduced stand-alone managed futures program volatility during crisis periods at the expense of higher overall investment portfolio volatility. This may allow the managed futures fund manager to report more attractive stand-alone risk characteristics, but it can cause the investor’s portfolio’s risk characteristics to look worse. Second, although such policies are undoubtedly put in place by investors in an effort to reduce risk, the employment of volatility targets can actually increase the risk of catastrophic losses, as noted in the previous paragraph.

### **Financials Overload**

One more style drift that is particularly prevalent among the largest managed futures funds is that an increasingly large percentage of the portfolio is allocated to financials (equities, bonds, and currencies), with less going to commodities. Some of this may be due to recent performance, as commodity trend-following has been particularly unprofitable following the financial crisis. But it is also due to liquidity in the futures markets. Other than the most liquid energy markets, commodity futures markets have far lower trading volume and open interest (a measure of the total number of futures contracts outstanding)

than do equity and fixed income futures markets or currency futures and forward<sup>20</sup> markets.<sup>21</sup> There simply isn't enough liquidity available in commodity markets for a very large managed futures program to grant the commodity sector an equal portion of its overall risk budget. While most large CTAs will list a substantial number of commodity markets as traded instruments, this is largely just for show, as many of those markets can't possibly absorb a large enough allocation to move the needle in fund performance.

### Why Are These Changes Even Possible?

Given that most managed futures programs—and nearly all trend-following programs—are systematic, it may be surprising that such style shifts are possible. However, even though most programs are indeed “systematic” in the sense that trading is performed by following programmed rules, they are nonetheless subject to change, as ongoing research leads to modifications in the rules themselves. CTAs often proclaim the prowess of their research teams, emphasizing the time and money they spend on ongoing research to continually improve their models. While these proclamations seem sensible enough in isolation, the downside is that ongoing research and system modification means that the savvy investor can be less dependent on the historical characteristics of model returns to forecast the likely statistical characteristics of future returns. In other words, for a managed futures fund that is heavily focused on ongoing model research, maintaining an investment is less an exercise in being comfortable with the fund's return characteristics and more about having faith in the fund team's research capabilities. In that sense, it is more like investing in an actively managed stock fund and less like investing in an index fund, even if the managed futures program is “systematic.”

The world's largest CTA, Winton Capital Management, is a great example. Winton's founder David Harding recently labeled central bank intervention (the primary culprit identified above for recent managed futures underperformance) a “convenient excuse,” and said that CTAs ought to view it instead as a “spur to innovate further.”<sup>22</sup> Such quotes perfectly capture the viewpoint that ongoing model innovation (optimistic terminology for what we've been calling “style drift”) should be part of a managed futures program manager's mandate. Winton is also unusually explicit about their adoption of a volatility target (which is now only 10%<sup>23</sup>) and long equity biases (the flagship Winton program now allocates about 25% of fund capital to a long-only cash equity program<sup>24</sup>). Harding has even gone so far as to say that Winton shouldn't be called a CTA, and that their expertise is far wider than implied by that label.<sup>25</sup> Such attitudes

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<sup>20</sup> Although liquidity in currency futures is large and rising, for historical reasons the majority of the liquidity in currency derivatives is in the over-the-counter forwards markets. Consequently, most large managed futures funds trade OTC currency forwards in place of, or in addition to, currency futures contracts.

<sup>21</sup> For comparison, West Texas Intermediate Crude Oil, the most liquid of all commodity futures contracts, generally has daily futures trading volume under \$50 billion. The most liquid equity futures contract, the S&P 500 e-Mini, often has daily trading volume in excess of \$250 billion, and many other financial contracts also have volume in excess of that of WTI Crude. Other commodity markets are far more modest. For example, the most liquid industrial metal, Copper, generally has trading volume below \$5 billion. The most liquid contract in the “softs” complex, Sugar #11, has trading volume that is typically less than half that of Copper. Data source: CSI.

<sup>22</sup> Matt Smith, “Winton founder calls QE an ‘excuse’ for poor CTA returns,” *CTA Intelligence* [April 2014].

<sup>23</sup> Laurence Fletcher, “Winton escalates computer-driven hedge fund arms race,” Reuters [7 August 2013], <http://www.reuters.com/article/2013/08/07/us-winton-hedgefund-idUSBRE9760L420130807>.

<sup>24</sup> Stephen Taub, “The Morning Brief: David Harding's Winton Capital Plots Big Expansion,” *Institutional Investor's Alpha* [4 March 2014], <http://www.institutionalinvestorsalpha.com/Article/3315307/The-Morning-Brief-David-Hardings-Winton-Capital-Plots-Big-Expansion.html>.

<sup>25</sup> “Some Words From Winton Capital's David Harding,” Attain Capital [17 June 2014],

perfectly demonstrate that if an investment is made in Winton (and funds of its ilk), it should be because of confidence in the brilliance of the fund manager, not because of confidence that future fund returns will have strongly similar statistical characteristics to past returns. Consider again David Harding’s own words: “If there is a giant stock market crash...I can tell you one thing for sure...We’ll either be short or long.”<sup>26</sup>

For investors looking to hire good managers with good track records, this tradeoff might be just fine. For investors who would rather be certain of capturing the historical characteristics of managed futures (e.g., non-correlation, convexity, and crisis alpha relative to traditional asset classes), a program that promises to avoid style drift by holding tightly to a robust, transparent, unchanging system may be in order. It may even be sensible to allocate capital to programs in both categories, the former being more of an “alpha-seeking” strategy, and the latter being more of an “alternative beta.” Indeed, given that the aforementioned historical characteristics of managed futures can be captured with a relatively simple, rules-based, intermediate-to-long-term trend-following system, investors nowadays should probably only be willing to pay “alternative beta” prices for such characteristics anyway.

## Introducing the Aspen Managed Futures Beta Index

The Aspen Managed Futures Beta Index (Aspen MFBI) is designed for investors seeking returns of the latter type. As its name implies, the index seeks to capture the historical alternative beta characteristics of managed futures.<sup>27</sup> A description of Aspen MFBI is provided below, followed by a comparison to a well-known managed futures category index, the BTOP50.

### Index Description

The Aspen Managed Futures Beta Index combines a broadly diversified intermediate-to-long-term trend-following strategy with a “counter-trend” overlay, capturing the favorable statistical characteristics of the managed futures category in a simple, robust, liquid, low-cost model.

The trend-following module is the core strategy, from which are derived the favorable characteristics expected of a managed futures program, such as long-run low correlation, convexity, and “crisis alpha” relative to traditional asset classes. The trend-following strategy trades liquid futures markets across the equity, sovereign fixed income, currency, and physical commodity asset classes. The three financial asset classes are globally diversified, while the commodity asset class is diversified across multiple commodity sectors (energies, precious metals, grains, industrial metals, and softs).

The trend-following module is designed to capture the “beta” of trend-following without overweight or bias. Weightings to each of the four major asset classes are determined on an inverse volatility-weighted basis. In other words, less volatile asset classes such as fixed income receive higher *a priori* weights than more volatile asset classes such as commodities, such that the expected contribution to overall model volatility from each asset class is equalized, prior to the calculation of trend signals. The trend signals are

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<http://www.valuwalk.com/2014/06/winton-capital-david-harding>.

<sup>26</sup> “CNBC didn’t screw up their interview with Winton’s David Harding,” Attain Capital [30 July 2014],

<http://managed-futures-blog.attaincapital.com/2014/07/30/cnbc-interview-wintons-david-harding>.

<sup>27</sup> For a more detailed treatise on the existence and duplicability of managed futures beta, see Aspen’s research paper, “Managed Futures & Alternative Beta” [December 2013],

computed across a spectrum of intermediate-to-long-term lookbacks, ranging from one month to one year. Trends are unbiased long-vs.-short. Depending on how many of the trend signals agree for a given market, futures positions in that market can be de-levered, unlevered, or levered up, long or short (i.e., the more the various trend signals agree, the more strongly weighted is the resulting trend position).

The “counter-trend” module simulates the role that non-trend strategies play in the portfolios of diversified CTAs whose models are primarily, but not entirely, trend-following. Given that trend-following returns tend to be most interesting in periods of elevated risk or stress in the global markets and are relatively quiet in low-volatility market periods (especially if they do not employ a volatility target), many CTAs add “short volatility” overlays to their models, with the goal of increasing returns in the latter periods without sacrificing their ability to provide crisis alpha in the former periods. (Recall that trend-following is a “long volatility” strategy.) Aspen MFBI’s counter-trend overlay simulates this behavior.

Trend-following positions are always a substantial majority of overall Aspen MFBI portfolio weightings. Counter-trend can represent, at most, 25% of the integrated portfolio, or as little as 0%. The size of the counter-trend overlay is determined by a proprietary Broad Risk Indicator, which adds counter-trend exposure when global exogenous stress levels are low, and removes counter-trend (adds to trend) when broad economic and financial risk levels are elevated.

To improve the capital efficiency of the Aspen MFBI program, the model’s portfolio produces a long-run volatility level that is approximately 1.5 times that of the BTOP50 index. One way of viewing this mildly higher volatility program is that it allows the investor to get \$1.5 worth of managed futures exposure for every \$1 invested. This allows the index to provide the same portfolio benefit while requiring a smaller percentage of portfolio dollars, which enables investors to defray the fixed costs of investment (e.g., mutual fund overhead, for investors who access the index via a mutual fund structure) over more units of index exposure.

Importantly, Aspen MFBI does not have a volatility target, but allows volatility to rise and fall with underlying market volatility and trend favorability. In highly volatile market backdrops, this allows Aspen MFBI to preserve the “crisis alpha” characteristics that enable a trend-following strategy to protect against large drawdowns in traditional risk assets, whereas the imposition of a volatility target would reduce exposures and thus reduce the effectiveness of the protection in such periods, as discussed above. In fact, when the Broad Risk Indicator is strongly elevated, the model actually increases overall exposures to a limited degree, in order to maximize the potential crisis hedge provided in a portfolio context. In low volatility environments, the lack of a vol target prevents Aspen MFBI from taking on the dangerous levels of leverage that can be necessary to maintain a vol target.

The maximum leverage ratio ever experienced by the Aspen MFBI program was 2.6-to-1; compare that to the more than 19-to-1 leverage ratio in the mutual fund mentioned above. Aspen MFBI’s unwillingness to increase leverage in potentially misleadingly low volatility environments reduces cliff/tail risk in such periods. The program may increase exposures slightly in such periods, in order to capture expected positive returns from the counter-trend module, but such increases are fractional rather than multiplicative. When the Broad Risk Indicator perceives middling exogenous risk, the model slightly de-levers the overall portfolio, since it is unclear whether the trend or counter-trend modules will be particularly beneficial in such environments.

## Comparing Aspen MFBI and BTOP50

In the analysis of managed futures at the beginning of this paper, the BarclayHedge BTOP50 Index was employed to represent the managed futures category. BTOP50 is one of several indices employed as gauges for overall industry performance. All such indices tend to be strongly correlated to each other, and they all have similar short- and long-run returns; consequently, it is reasonable to select just one such index for analysis purposes, as we do with BTOP50 here. To support the case for Aspen MFBI as an investible tool for capturing managed futures beta in an efficient, inexpensive manner, we now present a comparison of Aspen MFBI to BTOP50.

### Risk/Return

Summary statistics are shown in Table 4 below. Whereas earlier managed futures data was presented for the years since 1987, the inception of Aspen MFBI is in January, 2003, so the calculations shown in this section are for the period since 2003.

**Table 4: Summary Statistics, BTOP50 and Aspen MFBI, 2003-2016**

|                           | BTOP50 | Aspen MFBI |
|---------------------------|--------|------------|
| <b>Annualized Return</b>  | 3.27%  | 7.29%      |
| <b>Standard Deviation</b> | 7.08%  | 9.59%      |
| <b>Sharpe(1.42%)</b>      | 0.26   | 0.61       |
| <b>Correlation</b>        | 0.75   |            |

Note first that the similarity in the sources of return between BTOP50 and Aspen MFBI are demonstrated by the 0.75 correlation of monthly returns between the two indices. Importantly, correlation holds between two return series regardless of the relative amounts of leverage in the two series. The reason that is important here is because of the obvious risk/return differences between the two indices. Aspen MFBI is intentionally run at an average leverage ratio that yields approximately 1.5 times the long-run volatility of the BTOP50 index. As noted above, this allows investors to achieve a given exposure level to a managed futures return stream in a more capital efficient manner. The long-run standard deviation of BTOP50 is low enough that a larger-than-desirable allocation might be required to move the needle in a diversified portfolio, whereas an allocation to Aspen MFBI gives an investor more managed futures “bang” per invested “buck.” (Not that a direct allocation to BTOP50 is possible anyway; to get BTOP50 returns, an investor would have to go through the onerous and due diligence-intensive process of allocating to each of the individual CTAs tracked by the index.) Conversely, if an investor is wary of Aspen MFBI’s higher volatility, an easy fix is to simply “over-capitalize” it, setting aside extra cash in the managed futures allocation so as to dampen the price swings.

To be clear, although Aspen MFBI’s long-run volatility is expected to be about 1.5 times that of BTOP50, that doesn’t necessarily mean that Aspen MFBI employs 1.5 times as much leverage as the typical CTA. In fact, given the use by CTAs of futures on a number of very low-volatility markets (particularly short-term interest rates) that are not employed in Aspen MFBI, it is entirely possible that the average CTA uses more leverage than Aspen MFBI at any given time. As elucidated above, this will especially be the case for volatility-targeting CTAs in periods of low underlying market volatility.

Note that despite having somewhat less than 1.5 times the long-run volatility of BTOP50, Aspen MFBI actually has more than twice the annualized total return, resulting in a substantially superior stand-alone

Sharpe ratio. Thus, despite being a “beta” index, Aspen MFBI appears to generate meaningfully positive alpha relative to the category index. In a sense this is true, but the alpha primarily comes not from manager skill, but from lower fees. A typical CTA will generally charge a management fee of 2%/year (which would be more like 3%/year for the required 1.5x allocation to match Aspen MFBI exposures) and an incentive fee of 20% of returns above a high water mark. Aspen MFBI, on the other hand, charges only a 1.5%/year management fee and no incentive fee. The “fee alpha” resulting from this cost differential means that a substantial amount of CTA skill-based alpha would be required just to break even with the Aspen index, and the statistics above suggest that there just isn’t enough of it among the largest CTAs to overcome Aspen MFBI’s fee advantage over the long run.

There is an additional factor at play here as well. Because Aspen MFBI trades a relatively simple model that requires rebalancing once per week, it executes far fewer trades per dollar than does the typical CTA, which will generally execute far more frequent—often intraday—trading. This means that Aspen MFBI also enjoys a healthy advantage in trading costs and slippage—“slippage” being the small per-trade losses accrued due to bid/ask spreads benefitting market makers on average at the expense of most managed future programs.

### Upside vs. Downside

While fee and trading cost differentials explain much of the long-run outperformance of Aspen MFBI vs. BTOP50, the 0.75 correlation, while high, still implies meaningfully imperfect correlation, such that there clearly are certain things that the two series are doing differently. Some of the difference is due to the random noise inevitably arising from various methods of applying substantially but not entirely similar strategies. The existence of a few non-trend-following CTAs and a number of non-trend sub-strategies pursued by primarily trend-following CTAs but not captured by Aspen MFBI explains some of the difference as well.

However, we believe that the difference is also partly explained by the aforementioned emergence of various biases, which we will argue has actually resulted in Aspen MFBI being a purer vehicle for capturing the beneficial historical return characteristics of the managed futures category than is the modern incarnation of the category itself.

Consider the upside-vs.-downside characteristics listed in Table 5, beginning with the upside deviation vs. the downside deviation of the two series’ monthly returns (i.e., the standard deviation of returns in positive vs. negative months). Both series have larger upside than downside deviation, per the expected idiom of managed futures. But the ratio of positive to negative deviation is substantially more favorable for Aspen MFBI.

**Table 5: Upside vs. Downside Statistics Using BTOP50 and Aspen MFBI Monthly Returns, 2003-2016**

|                           | BTOP50  | Aspen MFBI |
|---------------------------|---------|------------|
| <b>Upside Deviation</b>   | 4.67%   | 7.75%      |
| <b>Downside Deviation</b> | 3.59%   | 4.29%      |
| <b>Skew</b>               | 0.21    | 1.83       |
| <b>Max Drawdown</b>       | -10.93% | -12.97%    |
| <b>Max Runup</b>          | 74.72%  | 193.72%    |

We noted above that managed futures is rare among asset classes in that it has positive rather than negative skew. This is true for both BTOP50 and Aspen MFBI, but the skewness is more positive for the latter (and smaller in recent years for the former than it was historically), indicating that Aspen MFBI is even more likely than BTOP50 to produce more outsized positive return surprises than negative outliers.

As a final indicator of upside vs. downside potential, despite having just under 1.5 times the volatility of BTOP50, Aspen MFBI's maximum drawdown of monthly returns is only about 20% worse than that for BTOP50<sup>28</sup>—a seemingly small price to pay for a max runup that is more than twice as good.

### Correlation and Convexity

We considered above the long-run low correlation and positive convexity (i.e., higher correlation/beta<sup>29</sup> in up-periods for traditional and lower correlation/beta in down-periods) of managed futures vs. four major long-only asset classes: equities, fixed income, commodities, and currencies. Table 6 looks at those same characteristics for BTOP50 and Aspen MFBI since 2003.

As expected of managed futures, both BTOP50 and Aspen MFBI demonstrate very low long-run correlation to all four asset classes, and both managed futures indices have positive convexity. But again the differences favor Aspen MFBI's unbiased trend-following approach. Aspen MFBI has lower overall correlation and beta to all four asset classes; in fact, whereas BTOP50's correlation to each asset class is slightly positive, Aspen MFBI's is slightly negative, which is preferable from a portfolio building perspective. Moreover, the differential between Aspen MFBI's up-month correlation and (always negative) down-month correlation is substantially greater across all four asset classes than is the differential between BTOP50's up-month correlation and (not always negative) down-month correlation. In the down-periods in particular, when negative correlations can provide a hedge benefit as well as a diversification benefit, Aspen MFBI's correlation figures are substantially better than those of BTOP50.

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<sup>28</sup> Given the lognormal nature of investment returns, two ways of measuring the severity of a drawdown should be considered. The first is the depth of the drawdown itself; by that measure Aspen MFBI's worst drawdown is about 19% worse than that of BTOP50. The other is the magnitude of return required to recover from the drawdown; by that measure Aspen MFBI's worst drawdown (14.90% return required for recovery) is about 21% worse than that of BTOP50 (12.27% return required for recovery).

<sup>29</sup> Regarding partial betas in particular, the following academic research paper demonstrates that statistically significantly higher up-beta and lower down-beta is a mathematical indicator of successful market timing:

Henriksson, Roy D. and Robert C. Merton, "On Market Timing and Investment Performance. II. Statistical Procedures for Evaluating Forecasting Skills," *The Journal of Business*, Vol. 54, No. 4, (October 1981), pp. 513-533: <http://www.people.hbs.edu/rmerton/onmarkettimingpart2.pdf>.

**Table 6: Overall, Up-, and Down-Correlations/Betas of BTOP50 and Aspen MFBI to Traditionals, 2003-2016**

|                                   | <b>BTOP50</b> | <b>Aspen MFBI</b> |  | <b>BTOP50</b>                    | <b>Aspen MFBI</b> |       |
|-----------------------------------|---------------|-------------------|--|----------------------------------|-------------------|-------|
| <b>Stock Correlation</b>          | 0.01          | -0.16             |  | <b>Bond Correlation</b>          | 0.19              | -0.01 |
| <b>Stock Up-Correlation</b>       | 0.10          | -0.03             |  | <b>Bond Up-Correlation</b>       | 0.18              | 0.20  |
| <b>Stock Down-Correlation</b>     | -0.26         | -0.54             |  | <b>Bond Down-Correlation</b>     | 0.03              | -0.25 |
| <b>Stock Beta</b>                 | 0.00          | -0.11             |  | <b>Bond Beta</b>                 | 0.39              | -0.04 |
| <b>Stock Up-Beta</b>              | 0.08          | -0.03             |  | <b>Bond Up-Beta</b>              | 0.54              | 0.70  |
| <b>Stock Down-Beta</b>            | -0.19         | -0.62             |  | <b>Bond Down-Beta</b>            | 0.09              | -1.22 |
|                                   |               |                   |  |                                  |                   |       |
|                                   |               |                   |  |                                  |                   |       |
|                                   | <b>BTOP50</b> | <b>Aspen MFBI</b> |  | <b>BTOP50</b>                    | <b>Aspen MFBI</b> |       |
| <b>Commodity Correlation</b>      | 0.03          | -0.10             |  | <b>Currency Correlation</b>      | 0.08              | -0.07 |
| <b>Commodity Up-Correlation</b>   | 0.31          | 0.22              |  | <b>Currency Up-Correlation</b>   | 0.19              | 0.15  |
| <b>Commodity Down-Correlation</b> | -0.15         | -0.43             |  | <b>Currency Down-Correlation</b> | -0.03             | -0.31 |
| <b>Commodity Beta</b>             | 0.01          | -0.05             |  | <b>Currency Beta</b>             | 0.06              | -0.08 |
| <b>Commodity Up-Beta</b>          | 0.17          | 0.14              |  | <b>Currency Up-Beta</b>          | 0.28              | 0.25  |
| <b>Commodity Down-Beta</b>        | -0.06         | -0.28             |  | <b>Currency Down-Beta</b>        | -0.04             | -0.58 |

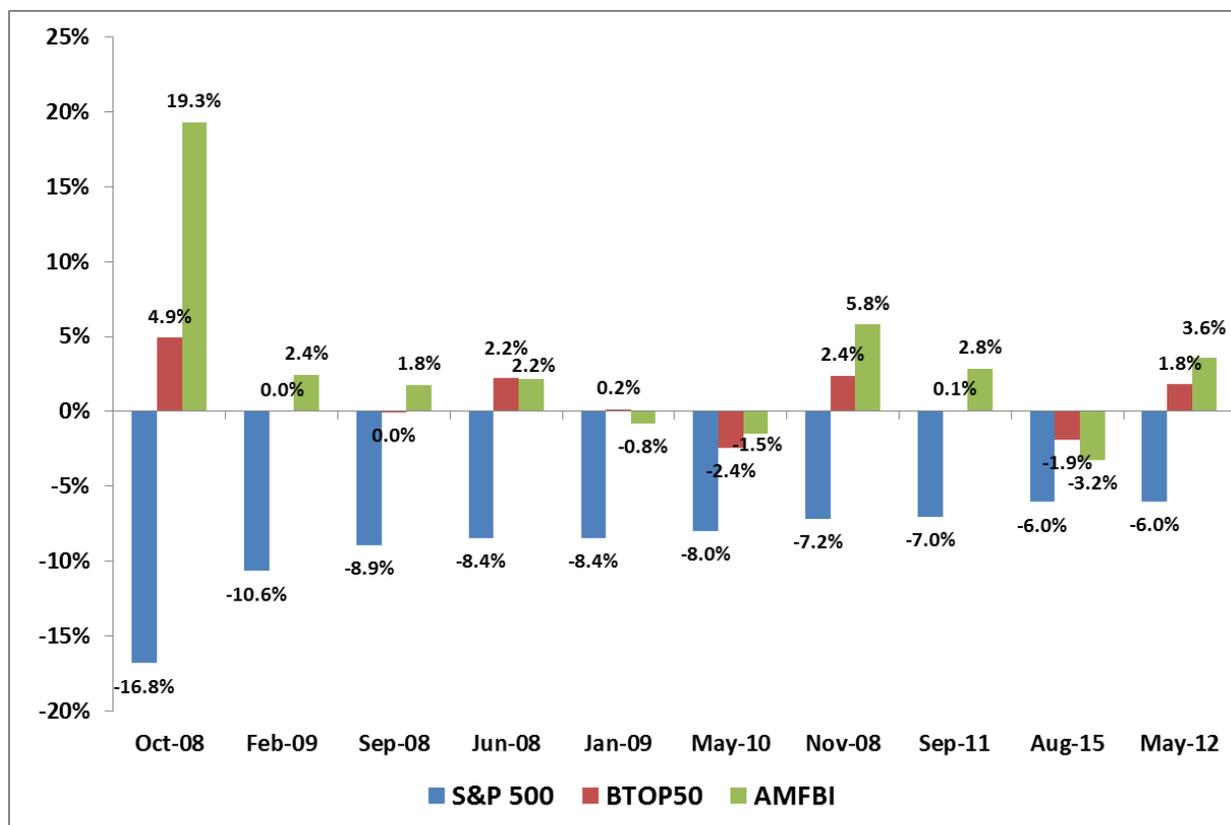
### Crisis Alpha

Given Aspen MFBI’s superior down-period correlations to stocks in particular, one might expect that Aspen MFBI would have greater “crisis alpha” potential as well, and indeed this appears to be the case historically, though there has only been one substantial crisis period since 2003. We’ve already seen that during the -50.9% S&P 500 drawdown from 2007 to 2009, BTOP50 aided investors with a +14.5% return. During that same period, Aspen MFBI’s return was +41.4%—a positive return of similar magnitude to the negative return experienced by the S&P 500 over the same period.

Breaking S&P 500 returns down into smaller, one-month “mini crises” yields Figure 4, which shows the returns of the two managed futures series over the ten worst months for the S&P 500 since the inception of Aspen MFBI.

As expected, both managed futures series demonstrate significant crisis alpha. Both BTOP50 and Aspen MFBI generated positive returns in seven of the ten worst equity months since 2003. Hedging an average loss of 8.7% for S&P 500, BTOP50’s average return in those months was +0.7%; for Aspen MFBI, the average return was a much more favorable +3.2%. In fact, Aspen MFBI outperformed BTOP50 in eight of those ten months. Even if you divide the Aspen MFBI return by 1.5 to yield approximately equivalent notional managed futures program exposure, Aspen MFBI returns would still be superior to BTOP50 returns in six of the ten “mini crisis” months. This is partly due to the fact that Aspen MFBI does not adopt the long-equity and financials-heavy biases that have infiltrated a number of managed futures programs; it is also partly due to the fact that Aspen MFBI does not have a volatility target, whereas many CTAs in the BTOP50 index do.

Figure 4: BTOP50 and Aspen MFBI Returns in the Ten Worst Months for Stocks, 2003-2016



## Conclusion

In this paper, we have examined the historical characteristics of managed futures. Though the “managed futures” label can encompass a broad range of strategies, in aggregate the industry has long been dominated by intermediate-to-long-term trend-following. Trend-following produces a stream of returns that is uncorrelated to traditional asset classes. It is “convex” in the sense that correlations are higher in up-periods and lower in down-periods for traditionals. In periods of severe market stress, correlations can be strongly negative, enabling trend-based managed futures programs to provide “crisis alpha” in the form of strongly positive returns at such times.

The crisis alpha provided by managed futures in the financial crisis of 2008-2009 brought new recognition to the industry, but the years following the crisis have witnessed disappointing performance from the category. In response, a number of biases (long equities and fixed income, volatility targeting, etc.) that were historically absent from the category have become increasingly prevalent in managed futures returns. We looked at a number of reasons why performance has been relatively poor in the years following the crisis, and presented the case that the biases that have been entering managed futures programs are not beneficial for the overall portfolios of investors for whom a managed futures program is intended as a complement to traditional stock and bond allocations.

The Aspen Managed Futures Beta Index (Aspen MFBI) is designed to offer pure, unbiased exposure to the traditional drivers of managed futures returns in a robust, transparent, low-cost wrapper. Aspen MFBI

captures the statistical characteristics that make managed futures an attractive portfolio diversifier. In addition to capturing the “alternative beta” of managed futures returns, the strategy offers “fee alpha,” charging a low annual management fee, with no incentive fee. The index charges only a 1.5%/year fee for approximately 1.5 times the total style exposure offered by CTA indices, which themselves are comprised of funds that typically charge a 2% management/20% incentive fee structure.

For institutions looking to invest with fund managers whom they believe capable of generating alpha through ongoing research and model refinement (similar to an investment in an actively managed stock-picking program), there are many such CTAs upon which to perform due diligence. But for investors looking to capture the positive characteristics of managed futures in a strictly systematic, predictable, transparent, and robust manner (similar to an investment in an equity index fund), the low-cost Aspen MFBI program is an ideal choice.

## **Important Disclosures**

**PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.** *There is no assurance that the investment process will consistently lead to successful investing. There is no guarantee that stated objectives will be met.*

*All Aspen MFBI monthly returns shown do not include transaction cost, but are net of 1.50% for estimated fees and other expenses. An investor cannot invest directly in an index.*

*This document does not constitute an offer to sell or solicitation of an offer to buy any security. The information contained herein is provided for educational purposes only and is not intended to solicit interest in any investment opportunity.*

*Data has been obtained from reliable sources. Aspen Partners believes the information herein to be reliable; yet no warranty or guarantee is made as to its accuracy or completeness.*

## **Benchmarks & Indices**

*Aspen Managed Futures Beta Index (Aspen MFBI) is constructed using a quantitative, rules-based model designed to replicate the trend-following and counter-trend exposure of futures markets by allocating assets to liquid futures contracts of certain financial and commodities futures markets. The Index therefore seeks to reflect the performance of strategies and exposures common to a broad universe of futures markets, i.e., managed futures beta.*

*“BTOP50 Index” represents the Barclay BTOP50 Index, an index of the largest investable CTA programs, as measured by assets under management.*

*“Barclay CTA Index” represents the Barclay CTA Index, a leading benchmark of representative performance of CTAs.*

*“Bonds” represents the Barclays Capital Aggregate Bond Index, a market capitalization-weighted index, meaning the securities in the index are weighted according to the market size of each bond type.*

*“Commodities” represents S&P GSCI (formerly the Goldman Sachs Commodity Index), a composite index of commodity sector returns which represents a broadly diversified, unleveraged, long-only position in commodity futures.*

*“Currencies” represents an inverse monthly US Dollar Index excess returns. US Dollar Index is a measure of the value of the U.S. dollar relative to majority of its most significant trading partners.*

*“Newedge CTA Index” represents the Newedge CTA Index, a leading benchmark of major commodity trading advisors (CTAs).*

*“S&P 500” and “Stocks” represents the S&P 500 Total Return Index, a widely recognized, unmanaged index of common stock prices*

*The Barclays Capital Aggregate Bond Index, Barclay CTA Index, Barclay BTOP50, Newedge CTA Index, S&P 500 Total Return Index, US Dollar Index, and S&P GSCI are unmanaged and do not represent the attempt of any manager to generate returns on an investment. These benchmark indices do not include transaction costs and other expenses.*

## **Definitions**

*Annualized Return: The average amount of money earned by an investment each year over a given time period.*

*Beta: A measure of an investment's sensitivity to market movements.*

*Correlation: A statistical measure of how an index moves in relation to another index or model portfolio.*

*Compound Annual Growth Rate: The year-over-year growth rate of an investment over a specified period of time.*

*Long Straddle: A strategy of purchasing a long call and a long put with the same underlying asset, expiration date and strike price. The strike price will usually be at the money or near the current market price of the underlying security.*

*Maximum Drawdown: The greatest peak-to-trough decline during a specific period of an investment.*

*Maximum Runup: The greatest trough-peak increase during a specific period of an investment.*

*R-Squared: A measurement of the relationship between a portfolio and its benchmark.*

*Sharpe Ratio: A measurement of risk-adjusted performance which subtracts the "risk-free" rate of return from an investment's performance.*

*Skewness, or "Skew": An asymmetry distribution, in which the curve appears distorted or skewed either to the left or to the right. Skewness can be quantified to define the extent to which a distribution differs from a normal distribution.*

*Standard Deviation: A measurement of the annual rate of return's dispersion from its mean, indicating an investment's volatility.*