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## MANAGED FUTURES AND VARYING CORRELATIONS

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Managed futures (or CTAs) is an alternative investment strategy characterised by its ability to take either long or short positions efficiently in a wide variety of global markets; by historically low correlations to both traditional and other alternative investment strategies; and by the potential to provide portfolio diversification.

In a fully diversified portfolio, any allocation to managed futures is determined by their potential for enhancing returns, reducing volatility and reducing downside risk.

In this paper, we discuss one aspect of managed futures returns: time-varying and market-varying correlations. We argue that one way of conceptualising managed futures is as an imperfect straddle on the equity markets—one with a higher average return but imperfect hedging.

### Managed futures expressed as excess returns to cash

Because managed futures are an active asset management strategy with only a limited correlation to other asset classes, we believe their historical returns and potential future returns can be meaningfully expressed as excess returns to cash.

To demonstrate this, we first break down managed futures<sup>2</sup> exposures into a market component and skill component. Beginning with a universe of 33 possible market exposures from 1990 to 2004 that include currency markets, correlations, volatilities, long market exposures, yields and spreads, we use forward stepwise regression to identify the most relevant market exposures in managed futures.

Our analysis shows that the index had a negative exposure to movements in the dollar relative to a broad basket of global currencies. Consistent with the basic managed futures strategy of trend following, the data also indicate a positive relationship to momentum factors—in other words, the managers tend to buy securities which have recently risen in value and sell those that have recently lost value. There is a negative exposure to convertible bonds, which results from a combination of exposure to equity markets, bond markets and the optionality implied in convertible bonds. Finally, there is also positive exposure to US investment grade bond markets, with their characteristically inverse relationship to interest rates.

Figure 1: Historical Market Exposures



Source: CISDM, HFR

Data Period: 1990 to 2004

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<sup>2</sup> As indicated by the CISDM Managed Futures Index.

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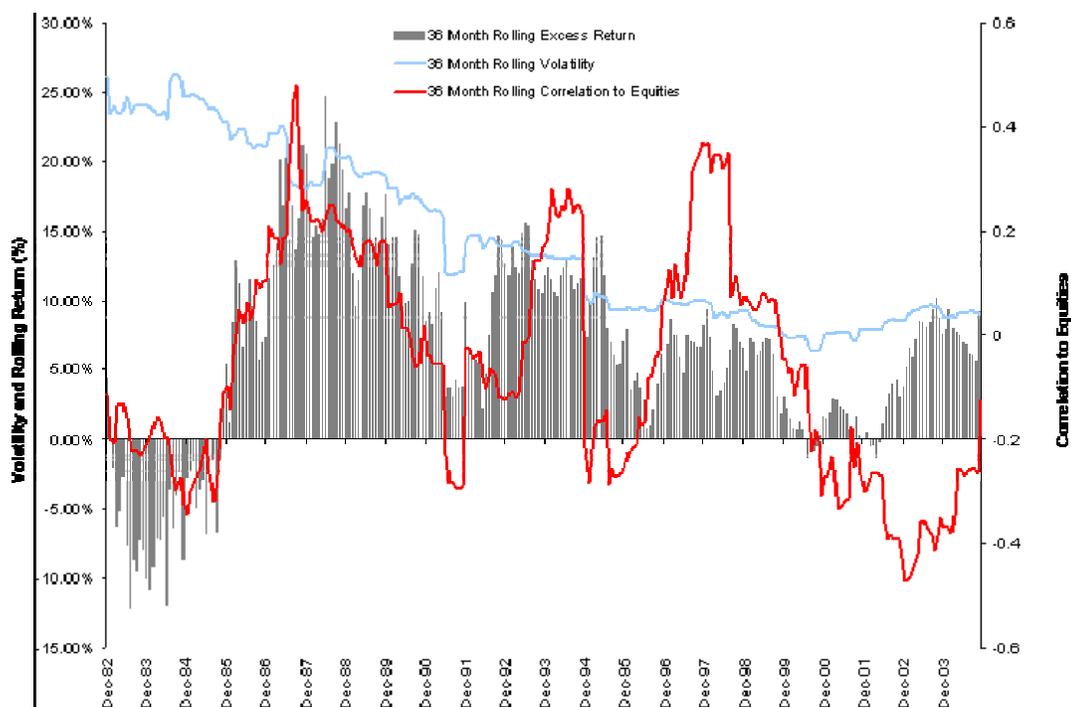
Perhaps most importantly, our model explains only 19% of the variation in managed futures returns. The remaining variations in performance cannot be attributed to measurable factors and, as is customary in financial economics, are attributed to the skill or choices that active managed futures managers apply in their trading strategies. What this means, in general, is that managed futures have largely been independent of market factors, a result that implies that broadly, managed futures returns are probably best expressed as a spread to cash.

### Managed futures' historical correlations

One potentially attractive aspect of managed futures is a relatively low level of historical correlation to traditional and alternative asset classes. For example, from 1980 to 2004, the correlation between the CISDM dollar-weighted managed futures index and the Russell 3000 was -0.03; the correlation between the CISDM and the Lehman Aggregate Bond Index was 0.07; the MSCI EAFE index -0.05; and the Goldman Sachs Commodity Index -0.01.

Another important characteristic of managed futures is that the characteristics of returns are not constant. In Figure 2, we show the 36 month rolling returns over cash, the 36-month rolling correlation to equity, and the 36-month rolling volatility for managed futures. Notably, both returns and volatilities appeared to be dropping over this period, although both have begun trending upward again. In addition, the correlations, while generally low and negative 60% of the time, exhibit substantial variation, ranging between -0.4 and 0.4 over the period.

Figure 2: Rolling Risk, Return and Correlations of Managed Futures



Source: HFR data, CAI Analysis

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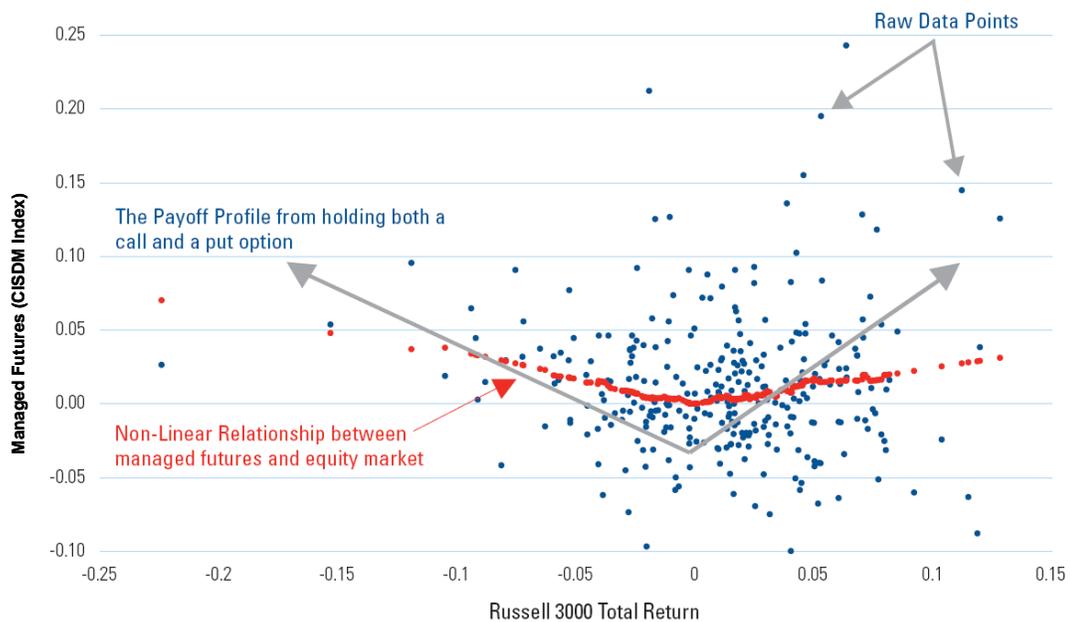
## Resemblance to Equity Straddle

While the correlations are clearly time-varying, are these movements in the correlation dependent on identifiable factors? From a portfolio perspective, in other words, do managed futures correlations change in different market situations?

To analyse this question, we discard traditional regression methods that would relate managed futures to market factors via a linear relationship; that would imply that their correlation is constant.

Figure 3 shows the monthly returns of the Russell 3000 index versus the monthly returns of the CISDM managed futures index. To study varying correlations, we use a method called local regression. Unlike traditional ordinary least squares regression, this method emphasises those points that best help determine the relationship between managed futures and equity markets *conditional on the level of equity returns*; in other words, it does not force the correlation to be the same over the entire set of cases, but allows it to vary if such a relationship exists in the data. This regression is indicated by the small red dots in Figure 3.

Figure 3: Managed Futures and the Equity Market



*Note: The local regression is calculated assuming a span of 30% and the distance function is Euclidean distance, The RMSE of the regression is 4.61%. Returns are total returns. The straddle includes buying one call and one put options of equal exercise and expiry.*  
*Source: CISDM, CAI, January 1980 to November 2004*

Figure 3 indicates that managed futures have historically possessed the rather attractive feature of positive correlation during rising equity markets and negative correlation during falling equity markets. As a result, managed futures have given investors positive benefits during periods of market declines. These benefits have been felt most when they are needed most and may serve to reduce possible downside risk. To put it another way, on average, the correlation of managed futures to the equity market has tended, over time, to

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be slightly negative. When equity markets have been in decline, however, the relationship has decreased even further, thus offering additional diversification when it is needed most.

The straight gray lines in Figure 3 indicate the payoff associated with holding a straddle (equivalent to holding both a long put and a long call option) on the equity market. Interestingly, the managed futures' historical payoffs, as indicated by the red dots, are very similar in shape to such a straddle. The difference is that whereas managed futures returns are on average positive (even when there is no movement in the equity market), for a straddle the investor pays an option premium indicated by a negative payoff when the equity markets do not move.

This result raises two questions. First, why does such a relationship exist in the data? And, second, from a portfolio perspective, what are the implications?

With respect to the first question, one possible explanation has to do with the nature of the managed futures strategy. Because managed futures managers are generally trend followers, they need the markets to move in order to generate returns (in other words they are long volatility). If the markets are totally flat, there will be no trends. By contrast, if the markets are moving in a consistent manner, managed futures managers may capture value. Since managed futures managers can go both long and short, then, the *direction* of the moves is not as important as the fact that trends exist. Thus, consistent with our analysis, managed futures have tended to perform better given sustained moves in either direction, with larger volatility leading to larger returns.

From a portfolio perspective—the second issue we raise above—the question for investors thus becomes<sup>3</sup>: which has been better as a potential hedge against downside risk: buying a straddle directly or investing in managed futures? The answer to this depends on the tradeoffs between risks and rewards.

On the one hand, managed futures may generate a positive expected excess return, as we discussed above.<sup>4</sup> This can be compared to a straddle on the equity market, which requires investors to *pay* an option premium. Conversely, even a cursory inspection of Figure 3 indicates that, whereas a straddle is a *precise* hedge—in other words, it has exactly the property of increasing returns in both down and up markets, managed futures are not. Instead, while managed futures has generated *on average* straddle-like payoffs and a positive expected value, in some cases of either down or up markets, this relationship will be inexact because moves in managed futures do not exactly match those in the equity market. The choice of which, if either, will depend on the specific objectives of the investor.

In sum, a main way in which managed futures may add value to a portfolio is potential downside protection produced when markets are not performing well because, in contrast to traditional markets, managed futures have in the past performed well in unstable and uncertain times.

Author's note: this paper draws heavily on a longer Citigroup Alternative Investments whitepaper: "Managed Futures and Asset Allocation," 2005. Author order is alphabetical and does not reflect contribution to the paper.

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<sup>3</sup> Past performance is no guarantee of future results

<sup>4</sup> We use the excess return of managed futures here because unlike a straddle, managed futures investments require cash investments (or borrowings). This means that if we compare the two, we must account for this difference to account for any opportunity cost in investing capital.