MANAGED FUTURES AND LONG VOLATILITY

By Anders Kulp , Daniel Djupsjöbacka, Martin Estlander, er Capital Management Research

Introduction and background

The buyer of an option straddle pays the implied volatility to get exposure to realized volatility during the lifetime of the option straddle. Fung and Hsieh (1997b) found that the return of trend following strategies show option-like characteristics, because the returns tend to be large and positive during the best and worst performing months of the world equity markets.

Fung and Hsieh used lookback straddles to replicate a trend following strategy. However, the standard way to obtain exposure to volatility is to buy an at-the-money straddle. Here, we will use standard option straddles with a dynamic updating methodology and flexible maturity rollover rules to match the characteristics of a trend follower. The lookback straddle captures only one trend during its maturity, but with an effective systematic updating method the simple option straddle captures more than one trend. It is generally accepted that when implementing an options strategy, it is crucial to minimize trading, because the liquidity in the options markets are far from perfect. Compared to the lookback straddle model, the trading frequency for the simple straddle model is lower.

If it is possible to show that Commodity Trading Advisors (CTAs) and trend followers have a long exposure to volatility, then by analyzing a CTA portfolio in option terms and deriving the option greeks one opens a new dimension to base portfolio optimization decisions on. It would also offer possibilities to use the options markets to reduce or increase exposure.

The purpose of this article is to show that CTAs have a long volatility exposure and to show that, compared to a long option portfolio, CTAs add value. We also want to give insights into and increase the understanding of the relationship between managed futures and volatility.

Insights

As Fung and Hsieh (1997b) state, managed futures and a long straddle portfolio show similar return characteristics. Both tend to have larger returns when we see significant movements in the markets. The majority of managed futures trading strategies are trend followers and the link to long volatility is shown in the following example. In figure 1, a simple trend following strategy is presented.

Figure 1

The figure shows how a typical trend follower's position changes along with a trend in the market. As the market moves up the cumulative position becomes longer and when the market moves down the cumulative position changes to negative. Short/Medium/Long MF means a trend follower signal with short/medium/long time horizon.
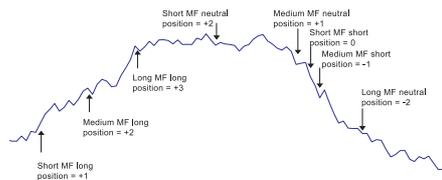
As the market moves up the trend following strategy generates more market exposure. If the market had continued upwards the trend follower would have increased the long exposure. The opposite situation occurs when the market moves sideways and finally downwards in that the long exposure decreases and finally a short exposure is achieved. In figure 2, the exposures of a long option straddle and a trend following strategy are shown. The straddle's market exposure, in the longer term, will be similar to the trend follower's exposure. Option delta changes continuously for each movement in the underlying asset. The delta of the trend follower is more static, because it does not necessarily change until the movement is significant enough to cause a delta update. The frequency of delta updates is dependant on the trend following model deployed.

Figure 2

The figure shows the underlying market exposure for both option straddle delta and a typical trend follower's delta. As can be seen, the two different strategies produce quite similar delta exposures. The figure shows the principles of how a hypothetical option straddle position works, i.e. market exposure increases as the market moves upwards and decreases when the market moves downwards, as the trend following example does.
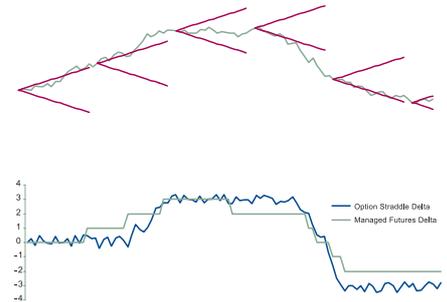
Data and methodology

The relationship between managed futures and a true long volatility exposure are analyzed by comparing the returns from the Standard & Poors Managed Futures Index (SPMFI) with the returns from a portfolio (LV) consisting of long option straddles during the period 1 January 2000 to 31 December 2003.

The LV portfolio consists of long option straddles in 32 instruments. The FX[1] sector has 30% weight[2] in the portfolio, interest rates[3] 25%, equity[4] 15%, commodities[5] 17.5% and energy[6] 12.5%.

Transaction costs are not taken into consideration, and the most liquid maturities have been used. Each straddle is rolled to the next liquid month at the latest 5 days before maturity. If the delta[7] of the call reaches 0.9/0.1 the straddle is rolled to at-the-money. The parameters used are market observations, except for the time to maturity, where a fixed 70 days is used. The fixed time to maturity is needed to get symmetric updates compared to the level of the underlying.

The Return Characteristics of the Standard & Poor Managed Futures Index and a Long Volatility portfolio

The performance measures for the long volatility portfolio (LV) are presented in table 1. The annualized return for the SPMFI is 9.7% and the annualized standard deviation 13.1%. The corresponding LV return is -5.29% with a 13.1% standard deviation. The equity curves presented in figure 3 show that the LV portfolio has a negative slope and that the SPMFI a positive slope. The correlation between the two equity curves is +0.78.

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1 AUDUSD, USDCAD, USDCHF, CHFJPY, EURUSD, EURGBP, EURJPY, GBPUSD, GBPCHF, GBPJPY, USDJPY and NZDUSD.
2 Weight compared to invested time premium.
3 Eurodollar, Euribor, GER Bund, GER Bobl, German 2 Yr Schatz , US 5 Yr T-Note, US 10 Yr T-Note and US 30 Yr T-Bond.
4 The S&P 500 Index and the German DAX Index.
5 Soybean Oil, Corn, Cotton, Gold, Coffee, Soybeans, Sugar and Wheat.
6 Crude Oil and Natural Gas
7 The delta is derived by Black-76

Table 1 Performance measures for the period 1.1.2000 – 31.12.2003.

	SPMFI	LV
Ann. Return	9.66%	-5.29%
Ann. Std	13.10%	13.10%
Correlation to SPMFI	1	0.78
Skewness	-0.11	0.76
Excess kurtosis	-0.14	1.84
% Positive month	58%	42%

Figure 3
The figure shows the equity curves from 1.1.2000 to 31.12.2003 for the S&P Managed Futures Index, the long straddle portfolio (LV) and for an alternative with adjusted implied volatilities. In LV -9.5% implied volatilities are adjusted down by 9.5 percent to get a return that is equal to the S&P Managed Futures return. 9.5 % can be viewed as the value added by the SPMFI compared to the long straddle portfolio (LV).

Equity curves , SPMFI and Long Straddle Portfolios
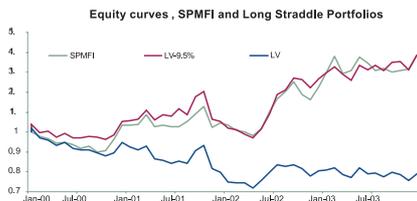
The added value of Managed Futures

The high correlation (+0.78) indicates that the characteristics of the market exposures of the two portfolios are very similar even if SPMFI performs 14.95% better than LV on an annual basis. This means that the SPMFI obtains a similar market exposure with a larger alpha.

If we decrease the implied volatility, options become more sensitive to changes in the underlying asset, i.e. they have more gamma compared to theta. Accordingly, the LV strategy becomes more profitable. To analyze how large the difference is in terms of implied volatility we construct a new portfolio with the same components and updating rules, i.e. we keep the theta exposure but increase the gamma exposure. The implied volatility is decreased by 9.5% to generate annual returns equal to the return of the SPMFI. This means that by investing in managed futures we buy the same market exposure as having a long volatility portfolio but, in terms of implied volatility, the exposure is 9.5% cheaper than if it were obtained through the options market.

As stated in sector 4 the SPMFI returns and the LV returns are similar. To further analyse how overpriced option straddles are compared to the SPMFI, we analyse the differences. The monthly SPMFI returns are regressed against the monthly LV returns. The results are presented in table 2 and they show that SPMFI returns have a significant positive alpha, 1.08%. This means that the SPMFI returns 1.08% more on a monthly basis and 12.96%[8] more on an annual basis than LV. Here, alpha can be considered to represent the cheaper volatility exposure achieved through SPMFI.

Table 2 The table presents statistics from regression model
$Spmfi_{ret} = \alpha + \beta\ LV_{ret} + \varepsilon.$ **. The α can be seen as the added value in the SPMFI. The alpha and the beta are significant at the 5% level.**

Dependent: SPMFI, explainable: LV	
α	1.08%
β	0.78
R^2	0.61
F-value	70.80
Prob-value	0.00%
Correlation to SPMFI	0.78

Summary and Conclusions

The results imply that the returns of the S&P Managed Futures Index (SPMFI) and the long volatility portfolio, constructed using option straddles, are similar with a correlation of +0.78. The SPMFI returns show a significant positive monthly alpha, 1.08%, i.e. 12.96% on a yearly basis, compared to the long volatility portfolio. A return equal to the SPMFI was received by decreasing the implied volatilities in the long volatility portfolio by 9.5%. Thus, managed futures replicate a long volatility exposure 9.5% cheaper than it can be bought from the option markets.

Despite the fact that the volatility exposure can be bought cheaper through managed futures, than through a long volatility portfolio, there are situations when implied volatility is cheaper than the implied managed futures volatility, i.e. the dynamics in the trend follower fail to replicate the long volatility exposure. This can for instance happen when implied volatility changes unexpectedly.

The link between managed futures and long volatility also gives possibilities to use well-developed risk management tools for option portfolios, i.e. derive the managed futures portfolio exposure to volatility. If we know the exposure we can use the option markets to offset undesirable risks.

From these findings we conclude that a managed futures manager can make best use of all available opportunities by using both the options and futures markets.

References
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8 Calculated as alpha (1.08) times number of months (12).

KEY FACTS ABOUT AIMA

- Founded in 1990
- Covers hedge funds, managed futures and managed currency funds
- Members include management companies, investors, prime brokers, lawyers, administrators, accountants and more
- Over 800 corporate members (2700+ individuals) across 43 countries
- Governed by elected Council
- Specialist committees implement strategy across research, sound practices, conferences/events, tax and marketing & PR.
- Serves its members, regulators and institutional investors

Enhancing understanding, sound practices and industry growth