# Just a One-Trick Pony? An Analysis of CTA Risk and Return

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*In light of the recent popularity of products based on alternative risk premia, the authors examine the ability of these products to capture the returns of the commodity trading advisor (CTA) sector. The empirical analysis indicates that CTAs have heterogeneous return series that cannot be easily replicated through factor investing. Using a novel method, the authors generate the longest bias-free track record for CTAs, running from January 1987 to July 2015 and show consistently positive returns for the industry across the period. Finally, the authors show that CTAs with significant exposure to time series momentum (trend-following) have significantly better returns than those without this exposure.*

## Introduction

One of the fastest growing segments of the asset management industry is alternative risk premia products. It is claimed that these products offer hedge-fund-like returns with higher liquidity, transparency and relatively low fees. Accordingly, the attractiveness of these products depends upon the ability of risk premia to replicate hedge funds returns. The authors test the above claims using Commodity Trading Advisor (CTA) data. CTAs lend themselves as a useful laboratory in this context as they are one of the longest-established hedge fund categories and there is an extensive academic literature discussing their sources of return, including recent advances in the study of alternative risk premia. The paper addresses two core questions. Do CTAs (or sub-groups of CTAs) follow homogenous easily modelled strategies? And do the returns of CTAs within sub-groups stem from exposure to alternative risk premia?

## Why the Paper's Research Questions are Important

The viability of the business model generating hedge-fund-like returns through factor investing is based on two assumptions: i) alternative strategies (hedge funds) have a return profile that is attractive to investors, and ii) it is possible to replicate those returns by factor investing. This paper examines both

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assumptions in the case of CTAs. It finds that while there is strong evidence for long-term positive performance in CTAs, the ability of products to replicate this by investing in risk premia is limited.

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## Data

The analysis is based on the constituents of the BarclayHedge CTA database, which the authors carefully processed to remove well-known biases (see Fung and Hsieh, 2002). The inclusion of live and dead funds eliminates survivorship bias. Backfill bias, the tendency of funds to backfill returns when first reporting, leads to significant over-estimation of performance. The inclusion of a "date added" field post 2002 allows easy removal after this date. Prior to 2002, the authors take a novel approach to eliminating backfill, selecting CTAs based on membership of the BarclayHedge CTA Index. Following the standard approach in the literature, non-U.S. dollar denominated funds, duplicate funds, funds not

reporting net of fees, reporting at quarterly intervals, and failing to report assets-under-management (AUM) were also excluded.

Cleaning the database reduced the sample from 5,199 to 3,419 distinct CTAs to generate CTA return series. The number of live funds varies through time but follows an upward trend. Starting from a low of 54 in 1987, the number rises steadily to range between 200 and 250 from 1993 to 2001. It jumps to 390 in 2002, steadily increasing to a peak of 741 in 2011. It has since fallen back slightly.

The clustering methodology requires that funds have at least twelve months of data. This criterion eliminates a further 950 funds, producing a sample of 2,469 CTAs for style analysis. The large drop off in sample size demonstrates the high attrition rate of newly reporting CTAs. The authors estimate that this step puts an upward bias of 3.5 basis points (bps) per month on the performance of clusters.

**Methodology**

The authors focus on four types of risk premia to analyze performance. They generate three of these from underlying futures data, based on the recent literature: time series momentum (Moskowitz *et al*., 2012), carry (Koijen *et al*., 2018) and value (Asness *et al*., 2012). These risk premia have Sharpe ratios of 0.71, 0.78 and 0.47 respectively. The final risk premium is derived from the well-known option-based factors of Fung and Hsieh (2001).

The authors analyze the performance of CTAs in aggregate and divided into sub-classes. The performance of CTAs (and their sub-classes) is measured as the average return of all relevant live funds in a given month. The authors use both equal-weighted and AUM weighted averages but argue equal-weighted is superior due to unreliable AUM data and very large funds dominating the performance of their clusters. For simplicity, only equal-weighted results are reported here, although both methods produce similar conclusions.

The authors rely on both self-attributed classes of common styles and on classes generated by statistical clustering. The latter approach has been suggested as superior to the self-attributed classes approach in the theoretical literature (Brown and Goetzmann, 1997); the present paper confirms this empirically.

**Results**

Over the period from January 1987 to July 2015, CTAs generated an average annual return of 7.85% per annum with a Sharpe Ratio of 0.38. The earlier 1987-1993 period is characterized by very high returns and volatility. Post January 1994 the returns were lower at 5.40%; however as this corresponded to lower volatility, the Sharpe ratio remains constant at 0.37. The maximum drawdown was 16% in the early volatile period, but since 1992 it has not reached 10%.

Regression analysis shows all four risk premia contribute to performance although the time series momentum and option-factor premia dominate. The four factors altogether can only explain 34% of the CTA returns. The risk-adjusted return (alpha) is 17 bps per month, although this is only marginally significant. A rolling regression shows this is generated consistently over the sample period.

The analysis identifies eight different clusters reflecting a combination of factor exposure and classification: Diversified Trend (8.27% annual return / 0.42 Sharpe ratio), Long Term Trend (7.48% / 0.37), Short Term Trend (6.40% / 0.34), Fundamental Value (3.13% / 0.05), Fundamental Diversified (3.30% / 0.08), Fundamental Carry (5.21% / 0.32), Discretionary (4.64% / 0.31) and Option Strategies (1.33% / -0.11). Apart from the clusters with a significant exposure to trend following, the correlations between the returns series are low, which represents evidence of heterogeneity in CTA return generating processes. There is a notable correlation between exposure to trend following and performance with the trend-following clusters having the highest return and Sharpe ratio.

The explanatory power of the return factors remains moderate, with the adjusted $R^2$ ranging from 14% to 44%. Three of the clusters have statistically significant alpha (Diversified Trend, Shorter Term Trend and Discretionary) while the alpha of the option strategy cluster is significantly negative.

While the risk factors provide moderate explanatory power for the clusters, it is superior to that of the self-attributed classes with an adjusted $R^2$ measure of less than 10% for ten of the sixteen classes. This is consistent with the theory that self-attributed styles are unreliable.

**Conclusions**

CTAs have consistently generated positive performance across the period from January 1987 to July 2015, returning 7.85% on average with a Sharpe ratio of 0.38. Apart from a high volatility-high return period in the early years, this return has been achieved without significant drawdown. A low cost, high liquidity alternative risk premia product replicating this CTA industry performance would be attractive to investors.

However, the return generating strategies of CTAs are highly heterogeneous. Statistical clustering identifies eight sub-strategies with low cross-correlation and different risk exposures. Alternative risk premia do not explain a large proportion of CTA returns with 56% to 86% of returns unexplained across the eight clusters.

From a practitioner's perspective these results suggest that attempts to capture the returns of CTAs face non-trivial challenges. CTAs are not homogenous, so their returns cannot be easily reproduced. A product which seeks to track aggregate CTA performance is likely to have high tracking error. Subdividing the funds does not help with alternative risk premia representing a moderate proportion of the source of returns for sub-strategies. The findings do not support the claim that new products based on alternative risk premia represent a close substitute to CTA investing. The results suggest that while these new products may deliver on liquidity, transparency and fees, investors expecting to replicate CTA returns may be disappointed.

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## Keywords

Performance measurement, commodity trading advisors, CTA, alternative risk premia.