

CTA portfolio diversification: Does it provide value?

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Few institutional investors build broadly diversified CTA portfolios. The more common approach is to build concentrated portfolios using one to three managers. In this article, we consider some of the reasons for the concentrated manager approach and present our research on the value of a diversified allocation to CTAs.

This article is relevant for two kinds of CTA investors: one, which is not convinced that diversification of CTAs adds value. They may have perceptions that little diversification exists between CTAs. The second group, which sees the obstacles and hurdles that make it difficult to have a diversified approach.

Empirical testing for CTA diversification

To test whether CTA investors are better off using concentrated portfolios or diversified portfolios, we did the following study: we imposed a large scale simulation framework on a dataset that contains around 4,700 CTA funds over the period 1994-2013 to quantitatively and objectively evaluate portfolio management approaches using real-life constraints while appropriately accounting for biases in the data. These were both live and “dead” funds from the Barclay CTA database of managers who currently report, and “graveyard” database of managers who stop reporting. We accounted for survivorship, backfill, incubation and liquidation bias in the results.

We sorted the database into three styles of managers based on their correlation to the Barclay CTA index (see table top right).

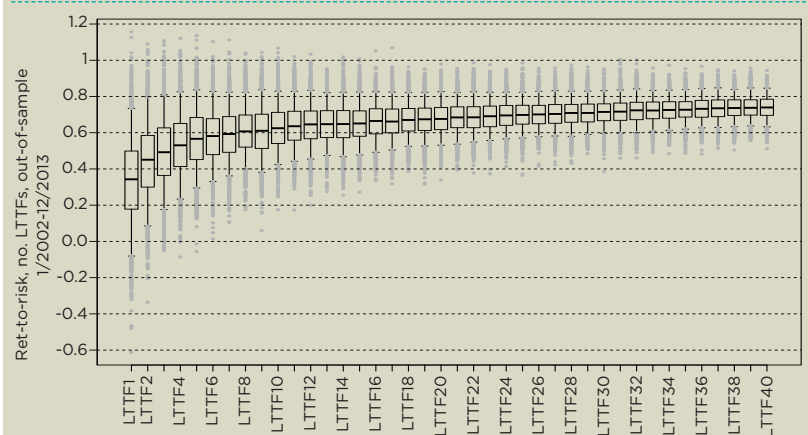
We built portfolios of CTAs, using 1, 2, 3, 4, etc. up to 40 different CTAs to test and see the optimal diversification benefit. We ran 2,000 simulations of different portfolios to test for robust results. The following box plots show the diversification benefit for portfolios of long-term trend-followers, short-term trend-followers, and diversifying managers.

FUND STYLES

Fund styles	Criterion
Long-term trend-followers (LT)	$\rho > 0.6$
Short-term traders (ST)	$0.2 < \rho \leq 0.6$
Diversified traders (DIV)	$\rho \leq 0.2$

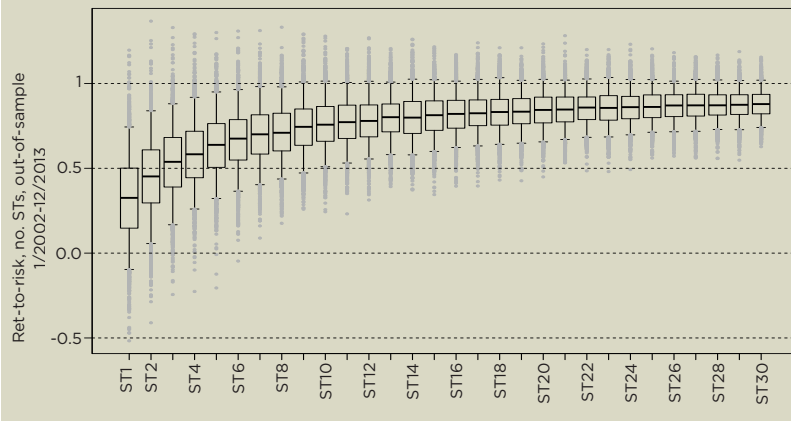
The box plots show the return-to-risk ratios of the CTA portfolios in quartiles. The box contains 50% of the distribution, and the line in the middle is the median. The whiskers show the top and bottom quartiles, and the dots beyond the line are the 5% tail outliers.

DIVERSIFICATION AMONG LONG-TERM TREND-FOLLOWING CTAs

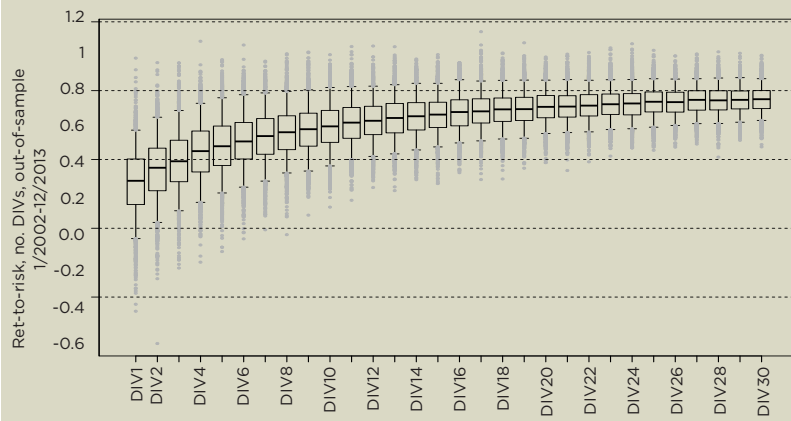


These boxplots show the number of managers needed to achieve the optimal portfolio diversification benefits. As one can clearly see, diversified portfolios have higher return-to-risk ratios on average, and more predictable results than concentrated portfolios. The question of how many managers gives optimal diversification can be a matter of interpretation. Depending on if one is looking for the “efficient frontier” point of the curve, reducing downside risk, or something else like “capturing 60-70% of the diversification”,

DIVERSIFICATION AMONG SHORT-TERM TREND-FOLLOWING CTAS



DIVERSIFICATION AMONG DIVERSIFYING CTAS



one could say between three and seven long-term trend-followers would give optimal diversification. Short-term managers are in the range of four to 10 managers. Diversifiers, due to the lowest average correlations between managers, range five to 12.

Diversification among styles

Now let's turn to the question of building a CTA portfolio of complementary styles. We also tested the benefits of having portfolios of one manager of each style, two of each, three of each, etc. up to 15 of each style. We ran 2,000 simulations with the results (right).

Here again we see diversification continuously adds value, and the optimal diversification benefit is somewhere in the two to five CTAs of each strategy. Not only is there a diversification benefit among CTAs of the same general category as we saw before, but when constructing CTA portfolios of complementary styles, having multiple CTAs of each category is also beneficial.

Watch the tails

One important observation about these box plots is the length of the tails. The risk of concen-

trated portfolios of one to three CTA managers is that one could pick a top performer or two and get much better results than the diversified portfolios, or one could be unlucky and pick a manager that dramatically underperforms the diversified portfolios. This seems obvious, but it also begs the question of how skilled one is in manager selection, and the statistical probability of peak performance persisting. If one is trying to strategically pick the portfolio approach with the highest average risk adjusted return and the most predictable results, then one is better off with diversification.

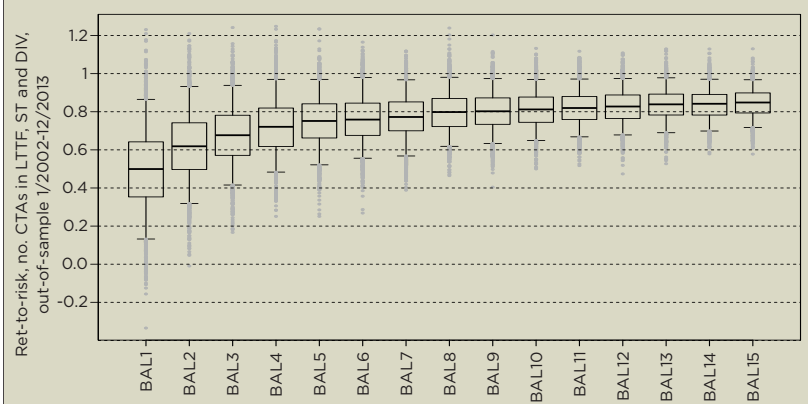
The problem of performance persistence

Are top-performing CTAs persistently top performers over time? The question is important, of course, because if CTAs tend to have persistent top performers, then there should be quantitative methods that can be used to find them, and then allocators can build portfolios of only the best. The challenge of CTA allocation would be in finding the right quantitative allocation algorithm. Unfortunately, it's not that easy.

Yet, if CTAs are not consistently persistent, then the problem of CTA allocation becomes more complex, and the risk of underperforming allocations becomes greater. We already published research on this topic (Molyboga, M, S Baek, J Bilson "CTA Performance Persistence: 1994-2010" in Journal of Alternative Investments, Spring 2014). The basic finding is that the persistence of top performing CTAs is likely driven by backfill and liquidation biases, while persistence of the bottom performing CTAs are robust to biases in the data.

Further, if it is true that top CTAs are not likely to be persistent, then allocators may be more prone to chase recent performance, but then

DIVERSIFICATION AMONG BALANCED PORTFOLIO OF CTAS



underperform in the future. In other words, portfolio results over time look like the concentrated portfolios in the box plots above, swinging from top to bottom parts of the distribution. Unfortunately, in the past year, some of the most successful CTAs in the industry have signifi-

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cantly underperformed. For many CTA investors, this story isn't an object lesson – it's their recent experience. If top CTAs are not robust in persistence, then diversification becomes more important.

Reasons against diversification?

So why do many investors not use diversified approaches, even if they understand the quantitative evidence? Here are some of the reasons we have encountered.

▶ There is the **false-uniformity assumption**. Often CTA investments are in the context of a hedge fund portfolio of complimentary hedge fund strategies. CTAs may be seen as diversifying to other strategies, such as long/short equity, credit, event-driven, etc, but not to each other.

▶ There is the **relationship burden** of initial and ongoing due diligence with many hedge fund managers. If an investor has three managers in each of 10 strategy categories, instead of one, there are 30 managers instead of 10 to maintain. Five in each is 50 instead of 10. This can become a real burden for the investor that needs to do on-site due diligence both before investing and in ongoing due diligence.

▶ There is the concern of **indexation**. This concern is the more managers are added the more performance can resemble an index. This is a problem if it is the portfolio manager's job to outperform the index. Furthermore, index performance can be underwhelming.

▶ **Fee** concerns are two-sided. On the one hand, with a higher manager count, you allocate smaller amounts to managers. Smaller allocations reduce fee concession power with managers. On the other hand, you could be paying some managers incentive fees even when the overall portfolio is flat or negative and end up paying more in fees on a portfolio level.

All these concerns beg the question: is the benefit of diversification purely theoretical, but not practical? Even though the math of reduced volatility and increased return-to-risk is easy to demonstrate, do these concerns overwhelm the benefits?

Solutions

In spite of all these concerns, we believe there is substantial benefit to be derived from a diversified CTA allocation. Diversification clearly adds the benefits of increased portfolio return-to-risk and more predictable portfolio results over concentrated portfolios. To take advantage of diversification, investors can either choose to build the in-house staff and expertise to take advantage of diversification themselves, or partner with an experienced multi-manager.

CTAs are diverse and are not uniform. Many follow styles, strategies and timeframes very

different from classic long-term trend-following, and hence have very low or negative correlations to CTA benchmarks. As we have shown, diversified portfolios of CTAs are beneficial to concentrated approaches.

Although managing a large number of hedge fund manager relationships would be burdensome to many institutional investors who do not have the staffing in-house, there are professional multi-managers who have the experience and staff to concentrate on knowing a manager universe in depth. For investors who are able to partner with a multi-manager, outsourcing some of the initial and ongoing due diligence can be a benefit both in reduced costs and added information gathering.

For those concerned about index-like returns, hiring staff or a multi-manager who has demonstrated consistent skill in manager selection and outperformance can deliver the diversification benefits without muting returns.

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Finally, for all but the largest investors who may have fee concession leverage even with a diversified portfolio, partnering with a large multi-manager gives similar fee concession power. Large multi-managers are large allocators. Many multi-managers are able to negotiate very competitive fee terms with managers so that all-in portfolio costs are similar to, or less than, what a typical institutional investor would be able to achieve with a direct program. In fact, some multi-managers are creating customised fee structures for investors that are very investor friendly. It is no longer necessarily the case that using a multi-manager gives the diversification benefit but at a high cost premium.

For these and other reasons we hope that CTA investors can have their diversification free lunch, and eat it, too. [CTA](#)

CONCLUSIONS

1. There is significant diversification in CTA/managed futures space
2. Concentrated portfolios of one to three CTAs are sub-optimal
3. Performance of top performing CTA funds are not likely persistent
4. Diversified CTA portfolios have higher return-to-risk and more predictable results