Managed Futures & Pension Funds: A Post-Crisis Assessment

By Galen Burghardt and Brian Walls

Last November we noticed something interesting about the audience at our research forums in New York and San Francisco. We have been organizing these forums for nearly 10 years as a way to discuss investment ideas with fund managers and other investment professionals. All of a sudden a host of pension fund representatives turned up with questions about managed futures. In fact, it appears that for some of these funds, the question is not if they should allocate to managed futures, it's how much. And that prompted us to take a closer look at what might be driving this upsurge of interest.

The financial crisis of 2008 and 2009 may well have been the knock on the head that pension funds—and especially defined benefit plans—needed to take managed futures seriously. Their portfolios are tilted heavily toward equities because they need return, but the crisis delivered the second 50% equity drawdown in less than 10 years. Since 1990, equities have produced staggering quantities of risk but have delivered no return to make up for it. For these two decades, even with the bull market of the 1990s, global equities produced a Sharpe ratio of only 0.07.

At the same time, the crisis provided an acid test of the claim that returns generated by commodity trading advisors are uncorrelated with stock and bond returns and therefore reduce the volatility of returns. The crisis also showed that CTAs can make money under the worst of market circumstances and revealed the fact that with CTAs, what you see is what you get. They were accurately valued and they were liquid, often with only a day's notice.

We also were invited this year to a two-day investment seminar in Geneva organized by the pension fund for CERN, the pan-European organization that operates one of the world's most advanced facilities for particle physics. CERN has been around since 1954 and its scientists do research into such things as what gives matter its mass and why nature prefers matter to antimatter.

We learned that CERN's pension fund is seriously underfunded and the current head of the fund is committed to new approaches to improving its returns and meeting its liabilities. We also learned that CERN has decided to commit 30% of its portfolio to true alternatives, of which managed futures are an important subset, and that CERN is now embarked on a plan to reach this goal over the next few years.

So clearly there is a lot of interest in the pension fund world in alternative sources of return and for a number of reasons managed futures seem to fit the bill.

The Problem Pension Funds Have to Solve

In a nutshell, the problem defined benefit plans face is this. They are seriously underfunded and they need to find returns somewhere. But the raw material they have to work with—global stocks and bonds—does not hold out much hope. As shown in

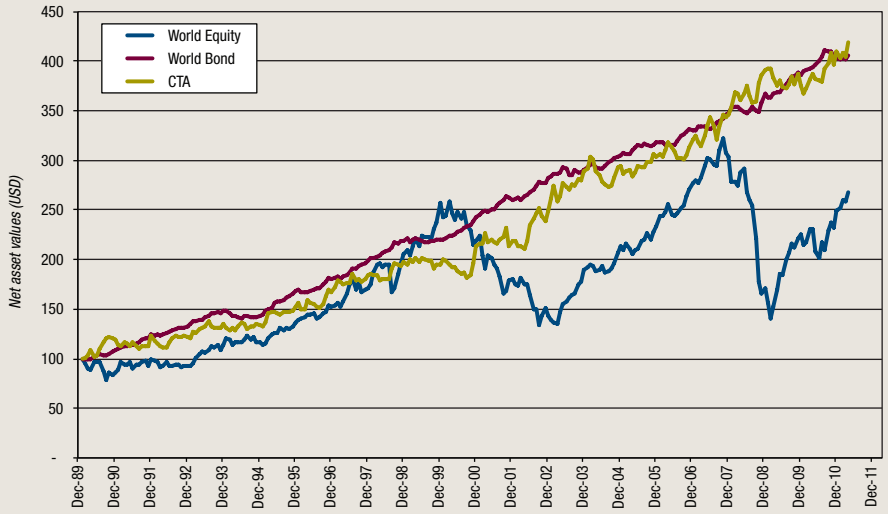
Exhibit 1, global stocks, which promise the highest risk premium, come with volatility and drawdown risks that are very costly for defined benefit plans. And global bonds, which turned in a fairly respectable performance with low volatility, just finished a 30-year run in a world of declining interest rates. Now that interest rates are very nearly zero, there is really no chance that bonds can repeat this performance.

Furthermore, pension funds cannot combine stocks and bonds in a portfolio that produces the highest risk adjusted return and then, as the finance textbooks show, leverage the resulting portfolio up to achieve the expected returns they need. So they take the risks they have to by loading up on stocks and underweighting bonds. As a result, we find that equities dominate pension fund portfolios, which can only be explained by their need for return.

Against this backdrop, it is no wonder that pension funds are flocking to our conferences in search of a source of returns that can improve things. In a way, the timing could not have been better. The CTA business has come out of the garage and matured in astonishing ways. In 1980, CTAs managed only $300 million in assets. By 1990, that had risen above $10 billion and today they manage nearly $300 billion. And they look like real asset management companies with the disciplined approaches to research, trading, and back office management that are so important to institutional investors.

To be clear, it should be noted that the term "managed futures" is broader than "commodity trading advisor," which is a regulatory designation. Many large hedge funds use the same tools as CTAs but prefer being thought of and regulated as a hedge fund. Our research focuses solely on CTAs and so we will stick with this subset of the hedge fund industry for the purposes of this article.

Exhibit 1 NAVS: Stocks, Bonds and CTAs



Source: Newedge Group

Exhibit 2 Return Distributions for Equities, Bonds and CTAs

(USD, 1990 through April 2011, risk free rate ~ 3.53%)

	Gross			Excess		
	World Equities	World Bonds	CTAs	World Equities	World Bonds	CTAs
Returns	4.65%	6.59%	6.74%	1.12%	3.08%	3.22%
Volatility	16%	3.06%	9.17%	16.07%	3.02%	9.19%
Ratio	0.291	2.153	0.735	0.07	1.02	0.351
Maximum Drawdown	-56.2%	-5.4%	-10.3%			
Assumed Ratio				0.25	0.4	0.35

Source: Newedge Group

Managed Futures Returns Are Real, Uncorrelated and Well-Behaved

The entire case for why pension funds need CTAs rests on three key characteristics of their returns: first, that they are both real and positive; second, that they are uncorrelated with stock and bond returns; and third, that their volatility is relatively stable.

• *CTA Returns Are Real and Positive*

While there is a contentious literature on whether CTAs make money or not, we have two indexes of CTA returns that are about as free from selection, survivor, backfill and other insidious biases that are the bane of the hedge fund world in which returns are self reported.

To show how CTAs have performed since 1990, we chained together two indices—the Newedge CTA Index and the Barclay CTA Index. Both indices are based on returns net of the usual hedge fund-like fees that CTAs charge.

For an investor, the Newedge CTA Index is probably the better index because it uses the returns of roughly 20 of the largest CTAs that are open for investment and willing to provide us with daily returns. It is reconstituted at the beginning of each calendar year, it has never been back-filled and since we began publishing this index in January 2000 there has been only one dropout—Bridgewater, which stopped reporting daily returns in August 2006, at which point their returns were replaced with 0% for the remainder of that year.

The main problem with our index is that its history is too short to compare with those of global stocks and bonds. To deal with this, we chose to fill in the 1990s with

the Barclay CTA Index. While it covers too many managers to be truly investable, it too has been run live and so is nearly 100% free of backfill bias. To be included, a CTA needs a four-year track record, which is long enough to get past all but the longest backfill periods. In 1990, it included 179 CTAs. By 1999, it included 319 CTAs. And so survivor bias was not a big issue either.

Finally, as a reasonable check, we compared the performance of the two indexes for the period from 2000 to April 2011 and they tracked well enough for us to have confidence in the return data we could calculate for the 1990s. When chained together, the result is a net asset value history like that shown in Exhibit 1. As shown in Exhibit 2, the average return over this period was 6.74%, of which 3.22% was over and above a risk-free rate of interest. The resulting Sharpe ratio was 0.35.

• CTA Returns Are Definitely Uncorrelated

As shown in Exhibit 3, CTAs returns over the past 20 years have exhibited very low correlations with global equities (slightly negative at -0.1) and with global bonds (slightly positive at 0.16). Correlations as low as these, assuming that the estimates are reliable, means that CTAs can be an excellent diversifying force in an otherwise conventional portfolio.

One of the things that concern investors most about correlations is that they let you down when the going gets tough. This is certainly true of many hedge fund returns that reveal their true colors whenever stock prices make big moves. For CTAs, though, the financial crisis of 2008 and 2009 provided about the most acid of tests one could imagine.

Comparing monthly returns for global equities and CTAs for these two years, it is clear that the returns are about as uncorrelated as they could be. The estimated correlation between equity and CTA returns for these two years turned out to be -0.38, which would have been a great thing considering what happened to equity returns. If one removes just one data point for October 2008, when stocks lost 22% and CTAs gained just under 5%, the estimated correlation for these two years would have been -0.18, almost exactly the same as it was for the full 20 years.

This aspect of CTA returns has impressed Antti Ilmanen, an authority on investment theory who has published extensively in finance and investment journals. In his recent book, *Expected Returns*, he notes that trend-following strategies, which dominate returns in the managed futures space, display particularly attractive diversification characteristics. Not only are the correlations to other asset classes low but they appear especially negative exactly when most risky assets and institutional portfolios are struggling. He shows in his book that a broad composite of trend-following strategies would have been profitable in 13 of the 15 worst months for global equities between 1985 and 2009 (the 5% tail of 300 months). The empirical track record of trend-followers as safe havens thus challenges that of government bonds—an immensely valuable characteristic for many investors.

• The Volatility of CTA Returns Is Well-Behaved

Pension funds are beginning to pay closer attention to managing their risks and on this front, they cannot help but notice that return volatilities in the managed futures realm are fairly stable while volatilities in equities are hugely variable. This is a lesson that we learned when we asked why drawdowns in equities would be deeper and longer than those we observe in managed futures even if the overall or average return volatilities in the two markets were set equal to one another. The answer lies in the behavior of return volatilities.

In equities, as shown in Exhibit 4, return volatilities have varied widely over the past 20 years. And it is apparent that volatility "regimes" can last a long time in equities. For several years in the mid to late 1990s, and again in the middle of the 2000s, equity volatilities were 10% or less. Then, for several years from the late 1990s to the mid-2000s, volatilities traded around 20% for several years. And then came the financial crisis of 2008 and 2009 when equity volatilities were as high as 80% annualized.

EXHIBIT 3 **Actual Correlations**

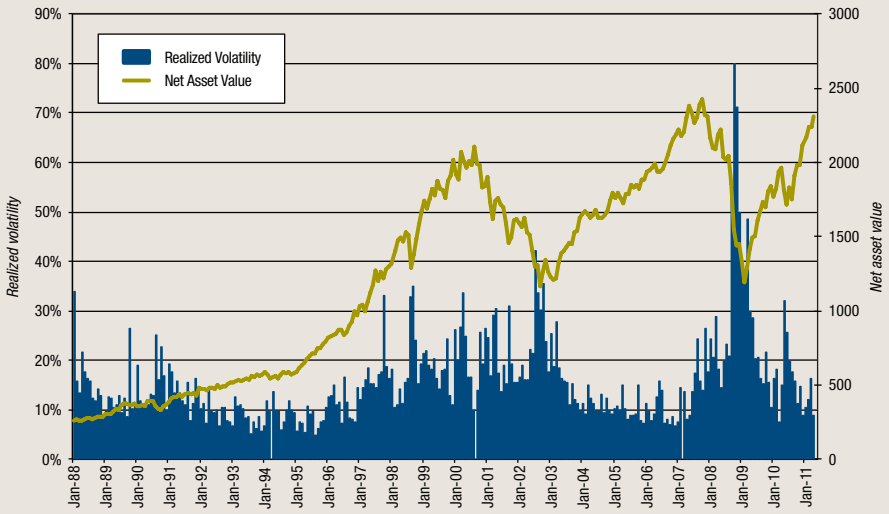
(Based on monthly returns, 1990 through April 2011)

	World Equities	World Bonds	CTAs
World Equities	1.00	0.11	-0.10
World Bonds	0.11	1.00	0.16
CTAs	-0.10	0.16	1.00

Source: Newedge Group

FIGURE 4 **Annualized Volatilities and Net Asset Values**

S&P 500 Index



Source: Newedge Group

In contrast, CTAs work hard to keep their return volatilities under control as part of their business model. As a result, when markets are highly volatile, CTAs scale back their positions to bring risk into line with their goals. These tight risk controls produced the following return volatilities:

2007	8.19%
2008	7.50%
2009	7.14%
2010	7.51%

From these, one would never know that 2008 and 2009 were crisis years.

The Problems That CTAs Can Help Pension Funds Solve

Because CTAs' returns are what they are and behave the way they do, they provide a way for pension funds to tackle three problems—smoothing return, increasing returns and reducing the depth and length of drawdowns.

To illustrate these points, we set up the problem this way. First, we decided to "shrink" equity and bond Sharpe ratios back to values that would be plausible. For example, anyone who invests in equities cannot possibly believe that their true Sharpe ratio is only 0.07 and so we increased this value of 0.25. At the same time, we have just experienced roughly 30 years of falling interest rates and the Sharpe ratio of 1.02 for bonds seems high. So we decreased this to a value of 0.40. We left the Sharpe ratio for CTAs at 0.35 because we had no reason to suppose that this value was either too high or too low.

We believe that the historical volatility values, however, are fairly realistic for an exercise like this. And so we used 16% for equity volatility, 3% for bond volatility and 9% for CTA volatility. Then we assumed that the base case would be a portfolio comprising 60% equities and 40% bonds.

Anyone doing this kind of analysis must keep in mind that Sharpe ratios have wide distributions and not to demand more precision than randomness allows. At the same time, we think these are reasonably representative values for the problem at hand. As Mark Carhart and Kurt Winkelmann show in *Modern Investment Management*, one of the classic textbooks in this field, an equity risk premium of 4% for global equities is consistent with decades of return history and so would translate into a Sharpe ratio of 0.25 given the 16% volatility we have estimated here. Similarly, Antti Ilmanen shows in *Expected Returns* that a bond risk premium of 1% for a globally diversified portfolio of bonds would be in line with experience for periods that are not heavily influenced by excessive volatility.

The 60/40 equity/debt mix we work with is wildly at odds with any kind of mean/variance optimum and with the global equity and bond portfolio, both of which are closer to 20/80 or 25/75, but is clearly a reflection of that fact that pension funds are leverage constrained and can achieve their expected return goals only by taking very large amounts of risk with equities.

And so, using these values, here is what we found when we included CTAs in a conventional equity/debt portfolio.

• *If the Problem Is Volatility*

If the primary objective of the pension fund is to smooth returns, then the results in Exhibit 6 show that return volatility could be reduced dramatically with no real change in expected excess returns. An allocation of 30% to CTAs, for example, would reduce the volatility of this portfolio's returns from 9.8% to 7.2%—a reduction that would have a highly tonic effect on the portfolio's Sharpe ratio. Moreover, because CTAs manage their risks the way they do, the portfolio's return volatility also would be more stable than what they now experience given the influence of equities on their portfolios.

• *If the Problem Is Total Return*

On the other hand, if the pension seeks to increase returns, they can take advantage of the fact that CTA business model produces a portfolio of cash and futures that is very heavy on cash. The reason is simply this. Gains and losses on futures can be translated into returns only by choosing a dollar value that can serve as the denominator. The 9% return volatility that we show here is what one would calculate if you assume that an investor's funding level (i.e., the amount of cash given over the CTA) is the same as the CTA's trading level (i.e., the hypothetical amount of money used as the denominator when calculating returns).

In practice, most of this cash is not needed for risk management purposes and it is possible to invest in CTAs using funding levels that are lower than the CTAs' trading levels. And, in the next set of columns in Exhibit 6, we show what would have happened to portfolio returns and volatilities if the funding level were set equal to half the trading level.

The effects on returns are astonishing. A 30% allocation to CTAs would increase the

Exhibit 5 **Return Characteristics with CTAs Included in a 60/40 Equity/Bond**

Percent allocated to 60/40 portfolio	Percent allocated to CTAs	Funding level = Trading level			Funding level = 0.5 x Trdg level		
		Excess return	Volatility	Maximum drawdown*	Excess return	Volatility	Maximum drawdown*
(percent)		(percent)			(percent)		
100	0	2.89	9.81	-26.8%	2.89	9.81	-26.8%
90	10	2.92	8.80	-23.3%	3.24	8.71	-22.9%
80	20	2.95	7.91	-20.5%	3.60	8.09	-20.3%
70	30	2.99	7.18	-17.6%	3.95	8.06	-19.3%
60	40	3.02	6.67	-15.5%	4.30	8.61	-20.0%
50	50	3.05	6.43	-14.2%	4.65	9.66	-22.2%

**Maximum drawdown is an expected value.*

Source: Newedge Group

overall portfolio's excess return by 1% and it would accomplish this with a reduction in overall return volatility as a bonus.

• *If the Problem Is Drawdown*

Of course, almost anything that reduces the influence of equity returns on a portfolio stands to reduce the portfolio's drawdowns when times are tough. We find here that in the first case, where the funding level equals the trading level, increasing the allocation to CTAs steadily reduces the portfolio's expected maximum drawdown even up to an allocation of 50% to CTAs. What is more remarkable is that we find decreases in the portfolio's expected maximum drawdown up to a point (that is, an allocation of 30% in this example), even though we are introducing a return series whose volatility is 18% and is therefore higher than that of equity volatility. Part of the decrease is the natural effect of diversification. But at least part of the decrease is because the steady, well behaved volatility of CTA returns is better for a pension fund than is the highly variable volatility that one can expect from equity returns.

How Much Should Pension Funds Invest in CTAs?

This question has come up at our research forums and it is the question we addressed at the CERN asset management seminar in Geneva. The answer is surprisingly large, if you take as a starting point a portfolio that is too heavily weighted toward equities and if you grant the correlation and Sharpe ratio assumptions we used above.

The question we asked and answered for our presentation was simply this. If you start with a 60/40 stock/bond portfolio, just how good do CTAs have to be for an allocation of X% to be an optimal allocation? Here is what we found:

Percent allocated to CTAs	Required Sharpe ratio
0%	-0.024
10%	0.006
20%	0.045
30%	0.097
40%	0.168
50%	0.272

We stopped at 50% for two reasons. First, an assumed allocation of 60% would require a Sharpe ratio for CTAs of 0.440, which was more than what they have delivered over the past two decades. The other was that it is almost inconceivable that a pension fund would actually commit more than 50% to something like CTAs. The important lesson to draw from this exercise, though, is that these Sharpe ratios are minimum performance standards for an alternative to stocks and bonds and CTAs have done better than these standards.

Managed Futures as a Model of How Good Hedge Funds Can Be

Investing in hedge funds—CTAs included—poses several problems for institutional investors, not the least of which is that returns are self-reported. On other fronts, however, managed futures set a standard that is rarely matched and almost impossible for other classes of hedge funds to exceed. In particular, managed futures afford high transparency and liquidity and can be used with very low foreign exchange risk.

Transparency comes from the fact that everything is marked to market daily at real market prices. The liquidity stems from the fact that the CTA model combines positions in futures, which are extremely liquid, with large quantities of cash. One of the ironies of the financial crisis of 2008 was that many institutional investors turned to their CTA investments for cash because they could.

As a further bonus, foreign exchange is extremely easy to manage in a CTA portfolio. The cash can be held in nearly any currency the investor chooses and the gains and losses on futures positions can be swept into the home currency with whatever frequency the investor wants. As a result, much of the foreign exchange risk that plagues a conventional globally diversified asset portfolio is minimal for investments in CTAs.

Is there a capacity problem? We think that for all practical purposes the answer is no. This question was on everyone's lips when CTAs managed only $100 billion,and since then CTAs have found ways to grow well beyond what they thought were their capacity constraints.

Part of the explanation is that the bulk of what CTAs do is based on momentum trading in a highly diversified set of broad and liquid markets. Another part is that their chief trading tool is futures, where volume and open interest are defined largely by the market's demand for activity and open positions. And part of the explanation is that the largest and most successful CTAs diversify across momentum models. So there is not the same rush to get into a trade or out of a trade that brought down the quant equity strategy in August 2007.

So what's not to like? Pension funds have serious problems that conventional assets may not be able to help them solve. Their returns have been too low, too volatile and their drawdowns have been too deep and too long. At the same time, the managed futures industry has matured to the point where it can offer a credible and hugely valuable investment tool that affords positive, uncorrelated and stable returns. These three things alone would make CTAs ideal for pension funds. And knowing that they work in a tightly regulated environment, that their valuations are accurate and transparent and that they afford such a high level of liquidity will assure chief investment officers that they are dealing with experienced professionals who know how to manage money. It seems to us that pension funds need what CTAs offer and they are now ready to take them seriously.

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Galen Burghardt and **Brian Walls** work in the prime brokerage unit of Newedge and co-wrote *Managed Futures for Institutional Investors* (Bloomberg, 2011). They thank **Mark Carhart** (Kepos Capital), **Antti Ilmanen** (AQR Capital Management) and **Theodore Economou** and **Gregoire Haenni** (CERN pension fund) for many lively conversations and for their guidance in this research. They also thank their colleagues in research at Newedge, **Ryan Duncan** and **Lianyan Liu**. Any questions about analysis or sources of data and information can be addressed directly to the authors at either galen.burghardt@newedge.com or brian.walls@newedge.com.