Executive Summary

In this paper we explore in some detail a number of the features we consider important when assessing Commodity Trading Advisors (CTAs), from the perspective of an investor in the asset class as well as issues of a more technical nature which we hope will inform further those considering making an allocation to the sector. Throughout the paper we have tried to visit topics which are pertinent to this quest and, in so doing, limit re-visiting themes which are already much discussed; instead illustrating our assertions (where possible and appropriate) with technical data and examples of the techniques we have developed for finding, managing and monitoring managers in the space. We have covered a lot of ground: indeed this was the aim of our first paper on the sector and there exist many areas which may be the subject of dedicated papers in the future. Finally, we examine some traditionally held assertions with regards to CTAs and in turn assert that some hold true under analysis while others are likely not fully informed.

Below are some important conclusions which we believe are worth highlighting:

1. One of the common misconceptions about CTAs is that they are long volatility when in fact they are simply long ‘gamma’, meaning that they become more exposed to a trend (upwards or downwards) the more pronounced it becomes and, through this, can benefit from environments such as 2008 when correlation and liquidity traps force the fire sale of assets across the financial system.

2. Not all market volatility is good for CTAs. Indeed, if a volatile environment does not translate into sustained trends, it can be a harmful factor so while volatility is necessary for strong CTA performance it is not, in the absence of trends, sufficient. High levels of volatility alone do not ensure good performance.

3. Medium term CTAs have historically provided an offset in times of acute equity market stress but are importantly non-correlated rather than uncorrelated to equity markets. Correlations tend to hover close to zero between medium term CTAs and equity markets but they are not significantly negative. We should therefore expect CTAs to perform independently of equities but not hedge equity performance. While we are supportive of CTA de-risking capabilities we recommend caution when viewing the strategy as a hedge to equity exposure.

4. While the addition of CTAs can result in valuable portfolio properties such as risk reduction and return enhancement, there can be high levels of dispersion between managers as well as significant rotation amongst winners and losers: active monitoring and frequent rebalancing is required from an asset allocator’s perspective.

5. We contend that CTAs are among the most transparent and the least transparent hedge fund strategies at the same time. We argue that full position-level knowledge wins over model opacity if assimilated in the right way, and gives you all the information you need to understand the positioning of a CTA allocation.

6. CTAs can disappoint on a standalone basis (calendar annual or short term in general) but make a lot of sense in a portfolio context. They broadly de-risk traditional assets while re-risking hedge fund portfolios. This may not be the consensus view but we believe it was the source of some disappointment in 2011. Acknowledging this, we offer ways to look for meaningful and relevant transparency from CTAs which can be accretively plugged into existing risk frameworks.

7. One less publicised convex property of CTAs is that a unit of (CTA outperformance over a CTA index) return increases more than proportionally to a unit of (CTA relative riskiness) risk. Riskier and levered CTAs display a better up/down capture ratio (vs CTA indices). We therefore seek maximum convexity and capital efficiency when considering single programs for an allocation to a portfolio to maximize the benefits of ‘CTA-ness’. We define in some detail what we mean by ‘CTA-ness’ and why we think it’s important (and, as an aside, have built a managed account platform to take advantage of it).

8. Investors who chose to place most of their allocation with a single CTA program would typically choose a lower risk ‘all-weather’ program and may therefore forego convexity. Our extensive research of our CTA database concludes that the optimal number of CTA managers to exploit the trade off between idiosyncratic risk and diversification is between four and eight.

9. We believe a portfolio of CTAs that exploits intra-strategy diversification without diluting ‘CTA-ness’ is the most desirable outcome in a world where both the global risk-free rate and the secular sovereign bond bull market are increasingly challenged. Sentiment is likely to continue to swing between ‘risk on’ and ‘risk off’ driving much asset price covariance.

10. Systematic risk management is worth the fees charged and is a key driver in delivering hidden ‘alpha’ by itself. We believe this is often overlooked by investors.

Finally, due to the comparatively higher volatility and deeper drawdowns, CTAs will test an allocator’s confidence in both manager and models. The returns achievable and the ‘CTA-ness’ desired are best available if positions are held through a cycle as trends, price breakouts and spikes in volatility are extremely difficult to predict and time effectively.

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Head of Quantitative Research

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Head of CTA, Macro  & RV Strategies
CTAs: Shedding light on the black box

Introduction

In this paper, we will argue why we believe CTAs are a very transparent portfolio solution which require both disciplined management and deep understanding. We aim to underpin our qualitative assertions with sound quantitative evidence and in so doing, answer the long-running debate as to whether:

a. CTAs are a standalone alpha proposition or a portfolio solution and
b. whether they are liquid transparent vehicles or opaque model-driven black boxes.

The paper is organised into the following sections:

1. De-risking and Re-risking capabilities of CTAs: this section discusses the benefits and risks of investing in managed futures funds both from a standalone and portfolio perspective, touching also on the transparency conundrum.

2. Definition of ‘CTA-ness’: from their ‘momentum’ roots, research-hungry CTAs have delivered a multitude of interpretations of the original concept. We will attempt to map CTAs’ relative alpha and beta characteristics by reviewing their research, diversification and risk management drivers.

3. From CTAs in a portfolio to a portfolio of CTAs: How does one exploit ‘CTA-ness’ and combine styles to maximise alpha and its persistence? When is the right (or wrong) time to buy, hold or sell a CTA portfolio position?

Throughout this paper we will concentrate most of our discussion on the broad characteristics of Medium Term CTAs, loosely defined as systematic trend-based futures trading programs with a one to three month holding period (and representing the lion’s share of CTA assets under management).

Background

A Commodity Trading Advisor (CTA) is a professional futures investor aiming to profit from upward and downward price trends in the highly regulated and liquid global futures markets. The term ‘Managed Futures Fund’ is often used interchangeably to describe CTAs.

CTAs tend to be agnostic as to market direction, using price (and derivatives of price such as volatility) to extract returns from markets. While CTAs as a strategy have been in existence since the 1970s, their stellar positive performance over the 2008 crisis attracted the attention (once again) of the investment community. This recent focus by allocators on the sector led to strong (institutional) inflows to the space in 2011 on both an absolute basis as well as relative to the hedge fund industry as a whole (see Chart 1). Interestingly, of the $20 plus billion raised by CTAs in 2011, some 10% was raised by a single firm — Winton Capital. All of this occurred against a rather disappointing year in terms of performance for the industry (the Newedge CTA Trend Sub-Index was down 4.5% in 2011).
Section 1. De-risking and Re-risking capabilities of CTAs: PROs

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Long Gamma Profile: The CTA ‘smile’

One of the most appealing characteristics of the strategy is that it seems to have made money during extreme scenarios (both left and right tail events) and hence resembles a long straddle profile at a fraction of the cost available in the option market.

A concept borrowed from option pricing is the CTA ‘smile’, shown below. This chart illustrates the embedded convexity that is a property of most well diversified medium term trend-following systems. Along the x-axis is the MSCI All Country World Total Return Index monthly return in US Dollars which ranges from -20% to +12%. The y-axis is the monthly return of the Newedge CTA Trend Sub-Index over the same period.

Chart 3: Scatter plot of monthly returns for Newedge CTA Trend Sub-Index and MSCI World Equities (Source: Newedge/Bloomberg/BPK)

We would caution that the fit is purely illustrative and there is significant variance around the trend line. Nevertheless there are qualitative and structural reasons as to why this relationship should hold over the long term and we will return to them later in this paper.

The Newedge CTA Trend Sub-Index

The Newedge CTA Trend Sub-Index (Bloomberg ticker NEIXCTAT) is an equally-weighted gauge of the Medium Term trend-following specialists in the broader Newedge CTA Index. The index constituents must be open to new investors and provide daily returns. The constituent roster is revised annually and disclosed to users. Barclay Hedge, who owns one of the oldest and most comprehensive CTA databases available, acts as calculation agent. Unless specified differently, we have used this benchmark reference index throughout this paper. The Newedge CTA Trend Sub-Index currently comprises 6 managers, being Winton Capital, Man Investments (AHL Diversified), TransTrend, Aspect Capital, Brummer and Partners, Graham Capital Management and Campbell & Co.

One of the common misconceptions about CTAs is that they are long volatility when in fact they are simply long ‘gamma’, meaning that they become more exposed to a trend (upwards or downwards) the more pronounced it becomes and, through this, can benefit from environments such as 2008 when correlation and liquidity traps forced the fire sale of assets across the entire financial system.

It is therefore important to point out that not all market volatility is good for CTAs. Indeed, if a volatile environment does not translate into sustained trends, it can actually be a harmful factor so while volatility is necessary for strong CTA performance, it is not on its own, sufficient. High levels of volatility alone do not ensure good performance (think of a highly volatile but directionless market). This is demonstrated in the following chart which plots the performance of 25 Medium Term CTAs for a range (10-60) of month-end VIX levels.

Chart 4: Performance heat map of selected CTAs against month-end VIX percentile (Source: Bloomberg/BPK)

As mentioned above, Medium Term CTAs have historically provided an offset in times of acute equity market stress. An important key to understanding this is that Medium Term trend followers are non-correlated but not uncorrelated to equity markets. Long-term correlations tend to hover close to zero between Medium Term CTAs and equity markets but they are not significantly negative. We should therefore expect CTAs to perform independently of equities but not hedge equity performance. While we are supportive of CTA de-risking capabilities we therefore recommend caution when viewing the strategy as a hedge to equity exposure.

Skewed Distribution of Returns

Related to the CTA ‘smile’ is the third moment in a distribution: skew. CTA price distributions tend to exhibit clear positive skew which is demonstrated in the next graph. This is explained in part by the relatively low trade hit ratio exhibited by managed futures programs which typically ranges from 30-45%. These losses are truncated quickly by the embedded stop loss driven risk management which features so prominently in most systems.
The transparency conundrum revolves around the notion that CTAs are considered to be among the most transparent of hedge fund strategies due to the availability of position level transparency while, at the same time, the least transparent because of the opaque, black box nature of the strategy. Going back to the 1970s and 1980s, CTAs as a strategy have been very willing to run managed accounts for clients. With these vehicles clients have full position level transparency on a daily basis. Every trade made by a program can be seen by a client so as an allocator, it is difficult to achieve a more granular level of transparency.

In addition, many CTAs are willing to disclose their portfolio positioning together with P&L attribution to non-managed account investors, making them possibly one of the most transparent strategies according to hedge fund standards.

Despite the high degree of position level transparency offered, there is another school of thought that questions what underpins this transparency. Some allocators will argue that because CTAs as a rule are extremely protective of their models, investors can never know exactly what drives any particular portfolio line item. Unless an investor has the source code for a CTA program's models it is therefore very difficult to know which specific algorithm(s) triggered any given trade. Contrast this, for example, with a discretionary long short manager where an allocator can ask for the logic and the thesis behind any particular trade. The protectiveness of the proprietary trading algorithms within CTAs leads to the often appropriate black box label for the industry.

We contend that CTAs are both the most transparent and the least transparent at the same time. In the portfolio context however we have to distinguish between good and bad transparency: we would argue that knowing when a CTA is risk on or risk off is both critical and entirely achievable. In fact we would rate full position level knowledge and directional exposure as more important than model transparency, Margin to Equity and VaR. It is important to bear in mind that (directional) exposures must be adjusted by delta, duration and currency risk to achieve a consistent picture: one of the tools we use to adjust derivatives contract market value is to apply the correct 'equivalence' (see the Useful CTA 'risk-metrics' section, which follows). For instance, a shorter termed Eurodollar contract cannot be compared on a notional to notional basis to a longer duration T-Bond future.

A straight forward risk return attribution by sector should not be difficult to access. Compare this to managers in the equity or credit space who may give you their exposures but don’t always reveal the attribution.

The chart above highlights that CTAs have more positive data points to the right of the distribution curve than both equities and the normally distributed curve. At the same time, CTAs will typically have a greater than expected number of observations just below 0% while truncating left tail losses. This is true positive skew which is difficult to access elsewhere in the financial world.

The transparency conundrum

The transparency conundrum revolves around the notion that CTAs are considered to be among the most transparent of hedge fund strategies due to the availability of position level transparency while, at the same time, the least transparent because of the opaque, black box nature of the strategy. Going back to the 1970s and 1980s, CTAs as a strategy have been very willing to run managed accounts for clients. With these vehicles clients have full position level transparency on a daily basis. Every trade made by a program can be seen by a client so as an allocator, it is difficult to achieve a more granular level of transparency.

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Another example to show how one can assess the different risk-taking patterns of CTAs can be found below where we scatter plot the theoretical P&L of two CTA programs in a flight-to-quality scenario such as 9/11 against the Margin to Equity level (which is a proxy for the amount of risk taken).

Chart 7: Flight-to-quality stress test and Margin to Equity of two invested managers (Source: BPK)

We can clearly see the different risk dynamic of the two CTA programs, Manager 2 being the more aggressive of the two. More importantly, we can observe how Manager 2 was bullish at the beginning of 2011 (very negative P&L outcome in the stress test) before turning bearish by the beginning of September. The manager continued to risk down as volatility propagated before becoming constructive on the markets again by January 2012. It is of note that had H2 2011 turned in a repetition of H2 2008, these two CTAs were positioned to profit (once again).

PROs
- Long gamma profile
- Skewed distribution
- Consistent risk
- Predictability

CONs
- Volatility
- Cyclical
- Trend dependency
- Intra-strategy dispersion

We need to make a more technical but necessary observation at this stage: volatility is broadly inversely correlated to (equity) markets and therefore behaves very differently during upside and downside gaps. This has a direct impact on CTA risk management as a market correction associated with a meaningful volatility spike would force a manager to act more quickly than during smoother moves in either direction.

In fact, filtering (momentum) signals according to the prevailing volatility regime (expanding and compressing) are quite popular among momentum traders.

Consistent Risk Management Offers Value

Systematic risk management is another distinguishing quality as, - all things being equal - it is proven to work better during market stress at the point where more discretionary approaches are often severely tested.

Most CTAs target an explicit ex-ante level of risk, which ensures that they will de-risk as turbulence increases and vice-versa. Even though targeting risk ex-ante does not imply a fixed realized risk output, CTAs’ realized risk is considered consistent and this makes them an appropriate tool to insert into broader risk budgeting frameworks.

The next charts demonstrate that the CTA Index (as measured by the Newedge CTA Trend Sub-Index) volatility actually decreased while equity volatility spiked during 2008.

Charts 8a and 8b: Rolling and Downside Volatilities (Source: Newedge/MSCI/Bloomberg/BPK)

At the same time there has always been a consistent spread between ‘bad’ (downside) and ‘good’ CTA volatility, and especially during the same critical 2008 period.

We need to make a more technical but necessary observation at this stage: volatility is broadly inversely correlated to (equity) markets and therefore behaves very differently during upside and downside gaps. This has a direct impact on CTA risk management as a market correction associated with a meaningful volatility spike would force a manager to act more quickly than during smoother moves in either direction.

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Trendiness Provides Predictability

Despite some black box negativity associated with CTAs, the strategy remains somewhat predictable because one of its main drivers is the amount of trendiness available in the market. In CTA-land, ‘the trend is your friend’ and the cyclicity (not to mention the P&L generation) can be largely explained by the quantity and quality of market patterns.
One such approach to assess predictability is to create a gauge that indicates market trendiness. We run this proprietary gauge on the most liquid futures markets divided across the four main sectors: equity indices, fixed income, commodities, and FX. Take for example a month in which the S&P500 begins the month at 1200 and ends at 1300. By regressing the daily price path to the straight line between the two points it is possible to assess trendiness. The tighter the path fits the straight line, the more trendy the market was that month.

A measure such as this is useful in shedding light on the relative opportunity set for trend followers to make money. If all stock indices exhibited relatively high ‘trendiness’ as indicated by this regression-based measure, we would have expected trend followers to make money that month from equities. It does not necessarily mean that trend followers did in fact make money that month - only that the environment presented trending opportunities. This type of trend analysis however does not have any ante predictive power as it is backward looking only.

Chart 9: Historical Proprietary Trend-Indicator gauge against Newedge CTA Trend Sub-Index (Source: Newedge/BPK)

In the above graph we have overlaid our 3 month Trend Indicator with the rolling 3 month return (using daily data) of the Newedge CTA Trend Sub-Index. The two data series are highly correlated as can be seen. Better trend opportunities as defined by the indicator seem to occur in tandem with better CTA performance. If this indicator creeps up through a given month, our trend-following CTAs should exhibit positive monthly performance. This helps gauge expectations.

This analysis is also useful in that the relative nature of the trendiness metric can be averaged across sectors and time frames. For example, we can take the trendiness levels of each market in the commodities sector and get an average reading. In turn the same calculation can be made for the three other major sectors to begin to get a sense for the variations in opportunities across sectors. Lastly we can average the trendiness levels for all markets to come up with a single number that helps to approximate trend-following opportunities in a certain time frame (the analysis is also helpful in the manager selection process).

On a scale from 0-100%, the table in the next chart shows the level of trend, by category and by look back period (in days) based on our mid-March readings. It can be seen, for example, that on a 70-day look back, livestock was more trendy than emissions, while more recently, over a 5-10-day look back, metals and energies were more trendy than other sectors over other time frames. The chart clearly shows that the shorter-term look back periods, or faster programs, found more favourable environments (as at the time of the study) than those with longer look back periods.

Chart 10: Mid-March readings of our Proprietary Trend Indicator for a selected sample of commodity future contracts and look backs (Source: Bloomberg/BPK)

Naturally there are many other ways to estimate and benchmark CTA positioning but we have found the above method to be both instructive and reliable.
Section 1. De-risking and Re-risking capabilities of CTAs: CONs

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Volatility is a Feature of CTA Programs

A natural starting point for any discourse on CTA risk is with volatility. CTAs are typically designed to run at a relatively high level of volatility compared to most hedge fund strategies. In general, a representative Medium Term CTA might have an annualized volatility of 15%.

Volatility is a feature of CTA programs. It is not a new phenomenon.

The higher appetite for volatility within CTA programs appears to be rooted in the history of the sector. Some of the very first commercially successful CTA programs within the United States were products of Richard Dennis’ and Bill Eckhardt’s ‘Turtle Trading Program’. Dennis was a notorious risk taker and was very comfortable running his and his students’ trend-following programs with annualized volatilities of upwards of 40%. Other successful trend-following products in the 1980s such as John Henry & Company and Dunn Capital Management had similar volatility profiles. The inertia of this higher volatility appetite, although dampened in today’s environment continues to leave CTAs with persistently higher volatility levels than the volatilities of other hedge fund strategies.

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Run-ups and Drawdowns are Cyclical

Due to the combination of the relatively higher volatility and lower Sharpe Ratio of the strategy, another reality is the staccato Run-up versus Drawdown imprint. We see below that Medium Term CTAs tend to spend a fair amount of time in drawdown, which can be psychologically challenging. It is somewhat rare for these programs to enjoy prolonged or sustained runs of greater than 6 months.

Such cyclicity combined with the fact that systematic programs are agnostic as to the overall market configuration has contributed to some of the disappointment of 2011. CTAs approached the late summer market turbulence from a risk on perspective and were subsequently whipsawed twice as the market first plummeted and then rebounded. Nevertheless, as was said before, had 2011 turned into a 2008, CTAs were set up to profit (although the correction was too short lived to...
allow for trend-followers to establish their trades and instead caused losses due to the extreme whipsawing of price action).

Chart 14: Rolling 12m Returns for the CTA Trend Sub-index against risk off phases (Source: Newedge/Bloomberg/BPK)

As the next table aims to show, not all the bullish and bearish phases are characterized by the same price pattern and associated volatility, and this has a very direct influence on CTA performance. 2011, for instance, was characterized by an unusual combination of a consolidating market pattern (a sort of W since the start up the Greek debt crisis in 2010) with an extremely high (implied) volatility (of volatility)

We would argue that CTAs showcased the ‘cost’ of (systematic) risk management during 2011.

Chart 15: CTA configuration and returns against S&P 500 price pattern and (implied) volatility regime (Source: Bloomberg/BPK)

We will elaborate further on this topic at the end of Section 2.

A Strategy which Requires Trends

As implied by the strategy name, trend followers require trends to generate returns. Without trends in markets, there is nothing to follow and returns will suffer. This can be seen in Chart 9 (see page 5) where returns line up relatively neatly with trends in markets.

Whereas discretionary strategies can adapt a more tactical trading style in directionless markets, trend followers do not have that option. A good discretionary macro manager might be able to weather a trendless period by shifting to a shorter holding horizon. They might additionally move into more spread-related opportunities or might emphasize carry trades. The narrow focus on alpha extraction is certainly a drawback of the CTA strategy.

To redress this weakness, some CTAs have worked to fight this reliance on trend by incorporating other model types into their programs. This is discussed in more detail below (see ‘Signal Generation’ on page 11). Examples of other model types may include mean reversion, carry, fundamental, and short-term trend. The intention of these managers is to diversify across alpha generating engines.

While such an approach smooths a return profile, the trade off is a less predictable product in that it loses some of its ‘CTA-ness’. Perhaps these multi-strategy programs have more appeal as stand-alone investments.

One of the best ways to mitigate this trend dependency is through using CTAs as a component in a larger, well diversified portfolio.

Look through the Black Box

The information available to investors in CTAs during times of stress might appear limited. While a risk report or a position file from a CTA offers little intuition on the face of it, we would argue that used intelligently this information can be very valuable. Nevertheless, allocators who prefer rationale behind positioning, assessment, outlooks and historical insight into reactions to market turmoil will fail to find assurances in a model-based approach.

On the flip side, a rules-based black box strategy can provide a level of comfort or understanding that is rarely (if ever) available from a discretionary manager. Assurance can be found through the repetition of a process in which a trade set up today will be the same as that set up in 6 months time, assuming the same price patterns are identified. Contrast this to a discretionary manager on whom the investor is relying to generate consistently attractive new trade ideas, each of which is based on the discrete collation of fundamental and quantitative data as well as the mood of the manager on that particular day. These will combine in a lack of consistency despite (in theory) identical circumstances.

As with other systematic managers and given the same trade setup (price paths primarily), CTAs will put on the identical trade today as they will in the future. There is no guessing whether this will be the case: the model will not miss (for example) a 50-day breakout. It will capture it and initiate a trade. While allocators can never know all the granular detail of a model, good analysts can create close approximations over time. In a perfect world, given a trade setup, allocators can ‘see into the future’ and know with some precision the positions that a CTA will take.

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The Challenge of Program Selection

CTA programs are thus volatile strategies that are subject to both prolonged and frequent periods of drawdowns. This poses timing and holding challenges to investors who seek consistent absolute returns. Furthermore, CTAs display significant intra-strategy dispersion, which results in program selection challenges.

Chart 16: Dispersion of Annual Returns for Medium Term CTA universe (Source: BPK)

As is the case for the equity market, correlation and volatility do not tell the full story until one looks at the ‘true’ dispersion of returns, being a better proxy for the stock/fund-picking opportunity set. The chart above demonstrates that CTAs have been widely dispersed in their annual outcomes; however this has somewhat reduced recently where dispersion has compressed and there has been little convexity between high risk and low risk programs. Market configuration resulted in both approaches ending in a narrow band (although this is not without historical precedent: witness 2000 and 2006).

The Portfolio Solution Mitigates the CONs

As mentioned at the outset, the properties of Medium Term CTAs (i.e. higher volatility, choppy run-up profiles and so forth) combined with non correlation to most other hedge funds as well as long only strategies result in valuable portfolio properties: risk reduction and return enhancement.

The Portfolio ‘de’-risking argument

The need for portfolio de-risking is what we believe is driving the recent appetite for the space and there is little doubt that these properties are established on very solid foundations as can be seen in the next two charts.

Chart 17-18: Historical Worst 10 months for Global Equity and Fund of Hedge Fund indices against Newedge CTA Trend Sub-Index performance (Source: Newedge/MSCI/Bloomberg/HFR/BPK)

There are three principal drivers that give CTAs these characteristics: (1) a long gamma profile (2) diversification across markets and (3) an agnostic stance towards long and short positioning.

1. To begin with, CTAs’ dogmatic adherence to cutting losers and letting winners run provides the long gamma profile which was discussed earlier. In fact, the Medium Term CTA return profile can be replicated through a series of look back straddles which benefit in periods of high volatility when these straddles go deep in-the-money. Higher volatility means bigger market moves and is generally constructive for trend followers. So when equities experience sharp downdrafts, CTAs should (in theory) be able to capture these moves through equity index shorts.

2. A second driver of this de-risking is the diversification embedded within the breadth of markets traded by these systems. This allows trend followers to trade not only equities, but bonds, commodities and FX during an equity pullback. In a classic risk off flight-to-quality scenario, CTAs will often make just as much money from being long fixed income instruments as they do from being short equities.
The correlation structure of a Medium Term CTA’s market set can generate multiple opportunities to make money in a slumping equity market.

In the chart below (which isolates 2008 when the S&P500 lost some 40%) is laid out the P&L attribution by sector of six representative CTAs.

Chart 19: 2008 performance attribution for selected representative Medium Term CTA managers (Source: BPK)

3. Thirdly, CTAs typically are agnostic about long and short positioning. This is in contrast to long only equity managers and most equity long short hedge funds which have a net long bias. By and large, managed futures programs can be short a market as easily as they can be long. This ability to take short trades can be a powerful P&L contributor in risk off environments.

CTAs are generally agnostic as to market direction:

It should be mentioned however that there are CTA programs which embed a directional bias in some of their models and not all are completely agnostic as to market direction. Interestingly, the preponderance of CTA returns come from long trades over time. This holds true for programs that have no long or short bias (i.e. they are just as likely to take a long trade as they are a short trade depending on the market setup).

This fact has led some managers to impose a long bias on their programs. In some cases entire programs are long biased. Typically this means that in order to generate a short signal and initiate a short trade, the trend must be much stronger than it would have to be on the long side for a long trade set up.

Other programs have introduced long biases on a per sector or per market basis. For example, because of the general upward drift associated with equity indices over time, some programs will only take long positions in equities. In down equity markets, these programs must rely on the negative correlation that long fixed income positions can provide to generate positive returns.

In the following chart we see the benefits of adding Medium Term CTAs (proxied by the Newedge CTA Trend Sub-Index) to a portfolio of traditional assets (50% treasury bonds proxied by the Citi Global Government Bond Index; 40% equities proxied by MSCI AC World Index and 10% commodities proxied by the DJ UBS Commodity Index; all Total Return and in USD) and hedge fund assets (proxied by HFRI FoF Index). We kept the simulation deliberately simplistic.

If the addition of CTAs is beneficial to either the (50/40/10) traditional assets portfolio or to the hedge fund assets portfolio, a green symbol is turned on in the respective return or risk categories. Otherwise the symbol light is set to red.

The analysis suggests that CTAs have been a portfolio de-risking solution for traditional (equity and fixed income) asset investors while a re-risking solution for alpha-seeking hedge fund portfolios. This is not a trivial conclusion and it is something which is often overlooked when looking at 5+ year investment horizons on average.

Furthermore, if we look at the calendar year findings, CTAs improved return and risk in 2001, 2002, 2008 and 2010 against traditional assets and only in 2008 against hedge funds. We would call this total diversification, being marked by an ‘all green’ in the table. More intuitively, there are observations when CTAs reduced risk of the portfolio at a marginal cost in terms of return (2000, 2011) however, there are also a significant number of observations (concentrated in the 2003-2007 bull market) when CTAs were not efficient at all and received ‘all red’ lights in the table.

Controversially, it is hard to argue that CTAs are a definitive de-risking solution for hedge fund portfolios (aside from 2008) although they are clearly additive during a number of difficult years (2000, 2002, 2003, 2008, 2010).

Depending on what they are long or short CTAs can be risk on or risk off and hence become a ‘re-’ or ‘de-’risking solution. We advise a frequent assessment of their ‘re-’ or ‘de-’risking positioning and capabilities.

In order to do that, we monitor positioning on a weekly basis from data which is received daily, as can be seen from this extract from our risk report (which is itself aggregated to month end for February 2012). Not only does this breakdown the sector exposures (by gross and net) but also the risk by manager, by sector and in the aggregate. From this can be monitored the full exposure, the risk on or risk off nature of the exposure and the beta of this exposure to equities.
Historical Sector Exposures

Data as at end of Feb 2012

Net Exposure (% of NAV)

End of Month Account Snapshot

Data as at the end of Feb 2012

Adjusted Exposures (% of NAV)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Mgr 1</th>
<th>Mgr 2</th>
<th>Mgr 3</th>
<th>Mgr 4</th>
<th>Mgr 5</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
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<td>0.4%</td>
</tr>
<tr>
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<td>0.0%</td>
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<tr>
<td>CAD</td>
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<td>0.0%</td>
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<tr>
<td>NZD</td>
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</tr>
<tr>
<td>Other Dev. Europe</td>
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<tr>
<td>Other Dev. Asia</td>
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</tr>
<tr>
<td>EM Europe</td>
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<td>0.0%</td>
</tr>
<tr>
<td>Other</td>
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<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
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<td>0.0%</td>
</tr>
<tr>
<td>TOTAL</td>
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<td>50.0%</td>
<td>50.0%</td>
<td>50.0%</td>
<td>250.0%</td>
</tr>
</tbody>
</table>

Source: Hermes BPK Partners.
Section 2. Definition of ‘CTA-ness’

Not all CTAs are equal as highlighted in chart 16. Below we look at the concept of ‘CTA-ness’ and some of its characteristics.

<table>
<thead>
<tr>
<th>‘CTA-ness’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Momentum bias</td>
</tr>
<tr>
<td>Research-driven process</td>
</tr>
<tr>
<td>Extreme diversification</td>
</tr>
<tr>
<td>Systematic risk management</td>
</tr>
</tbody>
</table>

A few broad comments are warranted regarding trend following in general. Trend followers are not looking to make predictions on market direction or moves. At the most basic level, they simply attempt to jump onto market moves hoping they will extend further. While there can be a great deal of sophistication surrounding signal generation and risk management, the basic premise is to go long when markets are moving up and go short when markets are moving lower.

Why should this work? The three key theories are:

1. Trend followers and, in particular breakout-based programs, identify pressure points in markets that signify a resolution of true supply and demand imbalance (i.e. buyers and sellers). For example when a market moves out of a channel and above a 50-day high, bullish participation has been signalled (i.e. it has won in the resolution of the supply and demand imbalance).

2. Certain markets do move in natural cycles which offer opportunities to trade prolonged price trends. Crops have sowing and reaping seasons, energies have storage and injection seasons, fixed income markets have central bank meetings and stock indices have earnings seasons. Of course some markets (commodities) have clearer cycles but there is an intrinsic appeal to trading the seasonality of markets.

3. Large market moves occur much more frequently than the commonly accepted financial mathematical models predict.

Clearly it would have been impossible to predict the frequency and scale of these outlier moves in the above text box using any popularly taught and accepted financial model. In the same way we all need home and life insurance, our portfolios need protection against these drastic market moves. CTAs, while by no means guaranteeing positive returns in these scenarios, at least offer a chance to profit in severe market dislocations.

The primary and original driver of most managed futures strategies is trend following or momentum investing. Even when it does not represent the majority of the risk, more often than not it has driven the bulk of the profits.

We propose that purity of trend following is one of the distinctive features of ‘CTA-ness’, alongside a research-driven investment process, a broad diversification amongst liquid instruments and systematic risk management.

As discussed above, CTAs are rooted in a momentum or trend bias. Some of the very first CTAs were based on simple moving average or breakout strategies. To varying degrees, most CTAs retain some vestige of this trend-following heritage. At its very basic level, trend followers need trends to succeed. This is the core fundamental (and necessary) component of our concept of ‘CTA-ness’.

<table>
<thead>
<tr>
<th>‘CTA-ness’</th>
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<tbody>
<tr>
<td>Momentum bias</td>
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<tr>
<td>Extreme diversification</td>
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<tr>
<td>Systematic risk management</td>
</tr>
</tbody>
</table>

The process of building / refining the models and the trading / execution platform requires a significant R&D spend. Most of the available budget will be spent on systems (or P&L drivers) and the management of trades being made in the market. While the first is necessary for generating profits, the second plays an important role in optimising those profits further.

A research-driven investment process is possibly the second most distinguishing category in what we call ‘CTA-ness’ so below we take a brief look at four elements of this process: signal generation, signal trading, portfolio construction and execution.

<table>
<thead>
<tr>
<th>Signal Generation</th>
<th>Signal Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio Construction</td>
<td>Execution</td>
</tr>
</tbody>
</table>

In terms of signal generation an interesting and current topic of discussion is the proliferation of dynamic, self learning models into programs.

Most of the original generation of CTAs which launched in the 1970s and 1980s came to market with a single model. A single 20-day breakout model, for example may have been the entire program. Today most CTAs incorporate a multi-model approach to help smooth out the return profile.

Diversification in programs traditionally is achieved by broadening model offerings along time, markets, and alpha sources. As one would expect, the level of diversification...
varies. For some funds, especially those with AHL lineage, the biggest area of model diversification is along the time spectrum. These funds may use one common moving average crossover model across 8 different look-back combinations. Such an approach keeps a sense of robustness by utilizing only one core model while accessing trend following on different time scales from several days to several months. If there are few trends in the long-term space, it is unlikely that both the short and intermediate term models would be encountering trendless periods concurrently. This set up allows for a more robust and stable return profile while still retaining a trend-following quality.

Another form of model diversification moves beyond time and into true model type diversification. Some single CTA programs incorporate FX carry, fundamental factors (such as commodity supply and demand information), mean reversion, inter-market spreads and intra-market spreads. These programs move away from the trend-following ethos and into a more multi-strategy systematic approach. With their more diverse return stream, they generally will have a smoother return profile than the purer trend-following programs. Sharpe Ratios tend to be higher and drawdowns less severe but the trade off is that these programs are less reactive to strong trends (importantly, they offer less ‘CTA-ness’). They tend to deliver a return profile that makes them more appealing as stand-alone funds but may interact less well in the context of a broader portfolio.

New time frames and model types are required because the 20-day breakout model will certainly experience challenging periods that may last for years.

There is another approach to diversification that many managers are taking. Instead of building a suite of models large enough to capture as many environments as possible, they prefer to focus on building models that will adapt to environments. In effect, they learn to trade the markets.

One such technique managers are employing is digital signal processing. Broadly the goal of digital signal processing is to measure, filter and/or compress continuous real-world analogue signals. A branch of this learning is involved in such areas as tuning a radio to a proper frequency by allowing a listener to hear music while filtering out any disruptive noise. Some CTAs are using this methodology to, in effect, tune into a market’s current frequency. If a market is choppy and more volatile, the market is likely trading on a shorter frequency. If a market is more stable, the trade off is that these programs are less reactive to strong trends (importantly, they offer less ‘CTA-ness’). They tend to deliver a return profile that makes them more appealing as stand-alone funds but may interact less well in the context of a broader portfolio.

Other self learning and dynamic modelling approaches such as genetic algorithms and neural networks are also used. It is not clear that these self adaptive approaches can produce superior results to a collection of frugal and non parametric models (the more traditional CTA portfolio approach mentioned above). What is clear however is that these types of models are consuming more and more of the research budgets of leading CTAs and it is incumbent upon investors to have more than a cursory understanding of these techniques.

Within the trading of signals there are several key points of note. One of the more interesting is how and when CTAs should exit a trade and take profits. This is one of the more crucial aspects to any trend-following program.

A traditional approach to trend following takes profits based on a trailing stop loss which ratchets up (but never down) as a trade is making money. When the trend finally exhausts, the trailing stop will get a program out of a trade. Getting out on a reversal design can be painful, as traders must suffer through a correction of what could be 10-50% of profits before the trailing stop is hit. This give-back can be psychologically challenging as a manager has to watch as his open trade profits reverse and P&L diminish.

Some managers firmly believe that profit taking is in opposition to the philosophy of trend following. They argue that because trend followers are not in the business of predicting trends, but rather jumping on trends after they form, then how can they predict the end of a trend and accurately exit beforehand? Additionally if trend followers can make their entire year’s P&L from just a handful of big trends, why should they risk cutting one short by taking profits before it has turned?

Alternatively, other managers prefer to have a smoother equity curve and wish to mitigate the challenging trend reversal periods by embedding some profit taking mechanisms. Most of these will be triggered by open equity (defined as unrealized trading gains) levels either on a trade, sector or program level. As this open equity level reaches a pre-defined threshold, profitable trades will be exited. For example, a manager might have a rule stating that when open trade equity at the program level exceeds 15% of NAV, trades must be closed to bring the number back down to 10%. This has two main effects. One is that one third of the program’s profits have just been booked as realized gains that cannot evaporate in the next trend reversal. The other effect is that the program is still in the trend but just in smaller size.

Of course there are several ways to think about closing these trades which further differentiates managers. Some will close all trades on a pro rata basis. Another is to book profits on the positions with the most open equity first, then close or partially close other positions from the next biggest on down until the overall 15% open equity is reduced to 10%. Then some managers might prefer to take profits on a sector basis - first taking open equity down from the most profitable sector on a pro rata basis before moving on to the next most profitable sector.

Lastly we should mention the profit taking approach of managers focused more on continuous trading, such as many of the large moving-average based managers. These managers will use a set of moving average pairs to comprise their system: perhaps as many as 8. Each pair of moving averages can be called an oscillator. For example, a 10-day moving average paired with a 100-day longer moving average could be considered one oscillator. The oscillator results (say the 10-day average is 1.1 times as high as the 100-day average) are generally translated into a z-score (which standardises data to allow for easier comparison). That z-score is then mapped to a continuous position function which dictates a position size (subject to the currently volatility and liquidity of a given market).

This type of position sizing allows for another technique of profit taking. When a trend weakens slightly, the oscillator value will reduce and a smaller position will be preferred by the position function. In this way, as trends wane positions are being peeled off to crystallize profits. Also, at extreme
levels of market trendiness, some position functions may reduce rather than add to position sizes given the increased risk of market reversals.

While no one technique is bullet proof, and all of the above approaches have merit, it is critical that an investor understands the implications of these different profit-taking methodologies.

<table>
<thead>
<tr>
<th>Signal Generation</th>
<th>Signal Trading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portfolio Construction</td>
<td>Execution</td>
</tr>
</tbody>
</table>

Portfolio optimization is one of the most compelling long-running debates within portfolio construction.

In a non-optimized approach a portfolio is built organically at the model-market level. For example, if a breakout manager has a signal to go long 100 contracts of wheat it will put that trade on without consideration to other markets or its overall effect on the portfolio. This approach can lead to an imbalanced portfolio in certain circumstances. In early 2009 for example, many non-optimized CTAs were extremely over balanced towards longs in fixed income. If all but one sector is trending it is possible to have heavy concentration in that one sector.

An advantage of this approach is that it remains very robust and not overfitted. At the base level, if a market is trending its inclusion in the portfolio makes sense; otherwise it does not. Also, this approach does not rely on correlation structure holding or any such assumptions. One could argue that it is a robust approach in that regard.

Managers who prefer optimization tend to be more academic in terms of their background. They believe that by optimizing a portfolio based on Sharpe Ratio (or some other such measure) the resultant portfolio will be more efficient. Trades with a lower forecasted Sharpe may not be taken in favour of those with higher forecasted levels. Additionally portfolio hedges may be used in optimized portfolios. For example an optimizer can help determine whether it is more efficient to hedge a Hang Seng long with an S&P 500 short as opposed to simply selling out of the long position.

Transaction costs can also be incorporated into an optimization process. Whereas in a non-optimized world all trades will be taken if a signal is generated, an optimizer will only allow trading if expected returns are projected to overcome trading costs. This shares some resemblance with the portfolio challenges faced in the statistical arbitrage world.

Through optimization, an arguably more sophisticated and nuanced portfolio can be created. A chief concern for investors should be how much robustness is foreground when optimization is introduced to a program.

Creating a negative impact on capacity is the effect of slippage. This is generally defined as the price at which a trade gets filled in the market versus the price at which the models want to transact. For example if a program generated a signal to go long a market at a price of $100, but the transaction took place at $101 there is $1 of slippage on that trade. Market liquidity and bid/offer spreads are the largest components of slippage. Another way to define slippage is ‘what is a specific trade’s impact on the price of that market’?

In an infinitely deep market any individual trade should have no incremental impact on price. However, at the other extreme, where a market trades once per day, there will be massive slippage as we would expect a very wide bid/offer spread. As such, especially for programs with relatively high trading velocity, good execution (i.e. low slippage) is paramount to success.

As a simplified example of the impact of slippage, let’s continue with the above trade where our models wanted to transact at a price of $100 and our final execution was filled at $101. A faster trading program might have a profit expectation of $1 per trade while a slower system might have a trade expectation of $3 per trade (due to its ability to trade on longer horizons and let trends develop). When, in our example there is $1 of slippage, the shorter term program’s profit expectation of $1 is completely wiped out by the slippage on that trade. The slower trading program, on the other hand, is still left with $2 of profit expectation after slippage. It is much less sensitive to slippage as a result.

We can see through this stylized example, that the success of CTAs can be heavily tied to execution, particularly as asset levels increase. Firms with better, more sophisticated execution capabilities have less slippage per trade and in turn more profit expectation. While slippage numbers are considered to be extremely proprietary by CTAs, it can be estimated that on average short term CTA programs realize 12-18% of NAV annually in slippage. Put another way, an average short term CTA starts the year 15% ‘in the hole’: an average short term CTA has to generate 15% returns just to break even. In contrast it is fair to estimate slippage for Medium Term CTAs to be in the area of 2-5% of NAV. This means the slippage headwinds are far lighter for the Medium Term programs.

We can see therefore, how an increase in assets under management can be troublesome for performance. If a program’s AUM doubles and slippage increases by just 25% the negative impact on bottom line performance can be significant. One common way that CTAs attempt to fight this is to lengthen their holding time as program AUM increases. While it generally does help with slippage, it also is a classic case of style drift. The manager now is delivering to allocators a different program than was initially purchased. This is often the first sign that a CTA is having difficulty digesting new assets.

Programs will also attempt to combat slippage related to asset increases by capping or eliminating certain markets with lower liquidity. Commonly the first markets to be cut are commodities markets such as cotton, cocoa, and orange juice. By reducing exposure to markets, these programs are changing their forward looking return profile which is another example of style drift.

The upshot of these execution challenges is that allocators must put a premium on those managers with stronger execution capabilities. This means favouring those managers
with a deeper investment in algorithmic trading and technology overall. Funds with stronger execution platforms can fight slippage better today and be better prepared to combat it in the future. To compete and survive, CTAs need continually to evolve by spending on the development of their systems.

As one true pioneer of the CTA industry said at an investor conference “the only free lunch there is in investing is diversification”.

To reduce risk, CTAs will run different models and apply them across various commodities, equity indices, currencies and government bond markets – with the majority of risk typically residing with the larger and more liquid sectors. The number of models used can vary widely: from two to more than 50. In terms of markets, most CTAs will trade between 25 and 75 while there is at least one very established manager that will trade upwards of 400 markets.

Not all markets can be traded with the same risk weighting due to liquidity differences. For example, the very liquid S&P 500 contract can be traded in much greater size than the less liquid commodity contracts such as Orange Juice and Lumber. Generally, programs will use average daily volume and open interest levels to guide the trade sizing of markets, nevertheless, we would caution that a ‘true’ liquidity metric should look beyond these traditional datasets and assess market depth by looking at quantity executed in the context of (intra-day) price movements.

The greater the quantity executed without moving the price, the more depth and liquidity is available in the marketplace.

Chart 22: Extrapolation from BPK CTA platform as of the end of March 2012 (Source: BPK).

CTAs rely on this market diversification to stabilize returns by not being overly reliant on any one asset class or specific market. This very concept is what drives much of the CTA industry’s non correlation to other markets and hedge fund strategies. Of course some of this benefit can be lost when markets become correlated.

We have seen this rise in futures market correlation recently and it at least helps to partially explain the somewhat lacklustre recent performance over the past 2-3 years. Over the past 40 years, the average pair-wise correlation of the 50 most liquid futures markets is now the highest it has been outside the financial crisis of 2008. Instead of being able to trade a portfolio of 50 individual markets, CTAs of late have been relegated to trading what principal component analysis reveals is actually closer to 2 broad markets: risk on and risk off. Such a dynamic is also characterized by abnormally high and positive correlation between equities, commodities (including gold and agricultural), global treasury yields and FX (against USD).

To investigate further the implication of the statement above, we took an original approach and 1) computed the probability of being long (or short, shown as negative percentage) a futures sector using our proprietary Trend Indicator (the long/short ‘likelihood’). As this does not tell us as much about market risk (CTAs can easily be long treasuries or gold to express bearishness), we subsequently 2) weighted each sector likelihood by its beta (to the S&P500 index) over a 3 month rolling window. We then 3) obtained a theoretical gauge of CTA market directionality which we call our Risk on Risk off Indicator.

Chart 23: Long/Short Likelihood based on our Proprietary Trend Indicator (Source: Bloomberg/BPK).

In late 2010 – early 2011, while the long / short ratio was consistent as usual the correlation melt-up led to an (absolute) all time reading in our risk (on) estimate (273% or 2.73 beta to SPX), which is materially higher than the (-159% or -1.59 beta to SPX) late 2008 – early 2009 measurement. In other words, futures market internal correlation (not directionality) was significantly higher in 2010-11 than in the global financial crisis.

The opportunity for diversification in the latter scenario is quite limited and may therefore, under certain circumstances, become an explosive mix for the strategy as a whole as:

a) CTAs frequently adopt a ‘long everything’ stance, which speaks of little diversification to a long-only diversified portfolio
b) Macroeconomic news flow drives correlations significantly higher
c) Binary sentiment prevails and leads to numerous whipsaws
d) Diversification of opportunity set relies only on fixed-income rather than a healthier more balanced mix of commodities and FX

Chart 24: Since 2007, fixed Income has dominated performance but since then rates have declined dramatically (Source: BPK).

A key signature of trend followers is a mechanical and intrinsic risk management framework.

In addition to being weighted by liquidity considerations, markets are typically traded in a constant volatility framework. This means that positions are sized inversely to volatility. In a simplified example that does not account for any correlation benefit that different markets may offer, let us assume that a given CTA program aims to deliver 15% volatility annually. By delivering 15% volatility at the program level, this means that each individual market targets a 15% volatility (again, a simple example where correlation benefits do not accrue).

What happens when these programs trade natural gas, which can have annualized volatility of 45%? Or what about trading the very low volatility short term interest rate contracts such as eurodollar which might have an annualized volatility of 5%? The answer is that CTAs adjust the number of contracts traded to deliver a consistent dollar volatility contribution of 15% per market in our example.

Volatility targeting stands for scaling leverage inversely to volatility, aiming to keep the latter constant. In the chart below, we present the total (log) return and rolling volatilities of S&P 500 (1st generic future contract), before and after daily volatility (ex-ante!) normalisation using a base GARCH estimator.

What is GARCH?

GARCH is a popular volatility forecasting technique that uses (in our example below) the previous day variance and return observation (error term or innovation) to forecast the next day volatility. As such it is more reactive to spikes than a simple rolling methodology and it is somewhat comparable to exponentially weighting recent information.

We can conclude that:

1. The outperformance in the late ‘90s was due to leverage in a low volatility environment
2. Conversely, 2008 outperformance was due to deleveraging while volatility was high
3. Garch-controlled leverage achieved a more manageable realized volatility range of 10-30 on any 22 trading-day trailing window while true S&P future realized volatility spiked well above 40, a significant

4. On a calendar annual basis, overall efficiency (e.g. Sharpe Ratio) is staggering but there are occasions (low volatility bear markets) where such an approach underperforms

5. Results are also very interesting in terms of portfolio construction stability

Volatility contribution can be managed through position sizing:

It is worth noting that within a portfolio context, CTAs should be viewed through the lens of volatility contribution. For example, if a $10 million investment into a CTA with an annualized volatility of 15% is judged to be too high for a portfolio, a simple reduction in investment size would bring the volatility contribution potential more into the ‘comfort zone’ of a hedge fund allocator. Reducing the above allocation by half would also halve the risk contribution to the portfolio. This means that instead of contributing 15% of risk to the portfolio at a full size of $10 million, the half position would contribute half of the volatility to the portfolio. By halving the investment size, an investor can have all of the positive CTA attributes with an annualized contribution to the portfolio volatility of just 7.5%. In short, a reduction in size can help make the volatility more palatable to some investors and also allow for a more efficient use of capital in the sense that higher notional exposures can be achieved with less capital at work. Lower correlation benefits can lower the contribution further with the resultant contribution to the portfolio volatility being likely to undershoot even 7.5%.

Our approach to risk management led us to expand on the single-contract experiment and construct a daily rebalanced long-only portfolio with very tight (volatility) risk management in order to evaluate the risk-management alpha described above (and with leverage levels similar to CTA programs i.e a 15% volatility target). It is worth noting that no expected return consideration has been made during the process; hence this approach can be only as good as our risk forecasting capability. 15 indices and 3 spreads, all tradable via liquid listed contracts, have been selected to enforce diversification. The ones with lower volatility and/or correlation (e.g. lower contribution to portfolio risk) get a higher allocation into the next day and vice-versa. We rebalanced on a daily basis starting in 1991.

During the simulation we have controlled (ex-ante and on a very fast look back) both underlying component (specific volatilities) and overall portfolio (cross-correlation element) volatility to target 15% annualised at each level and adjusted leverage accordingly on a day-lag basis at the close. Given the respective weights, most of the leverage is employed in short-duration US treasuries while equity and commodities are run on an unlevered basis (to meet the 15% constraint). Also of note is the increased Treasuries allocation over the last 5 years due to the increasingly negative correlation to other asset classes.

The next chart displays how much active management is required to pursue (ex-ante) daily constant volatility on a relatively fast look back (2 trading weeks, exponentially-weighted). No transaction costs have been taken into account but all underlying assets are assumed to have traded only once a day and are available in listed future or ETF formats (S&P500, EuroStoxx 50, Hang Seng, Nikkei, US 2 and 10 Year, Euro Bund, JGB, Gilt, AUDUSD, BRLUSD, Russell 2000, Russell Value, S&P ATM straddle writing, liquid US HY).

It is quite telling that 1994 was a worse year than 2008, as treasuries, equities and fixed-income plummeted at the same time.

We believe the results are impressive enough to justify hedge fund fees even though the risk parity and risk control concepts are now commoditized in various ETF formats (constant or low vol equity indices).

Furthermore, we would hint at using a robust risk-parity weighting methodology for portfolios of CTAs in general to improve efficiency and alpha generation as well. We would refer readers to a Newedge research paper “Teamwork against Superstars” paper (Newedge, May 4, 2007) for further academic back-up to our conclusion. One of the main takeaways was that while past returns offer no indication to future performance, there is valuable information in the (CTA) recent past risk.
Section 3. From CTAs in a Portfolio to a Portfolio of CTAs

While Section 1 focuses on the pros and cons of CTA investing before suggesting a 'transparent' portfolio solution and Section 2 highlights the key characteristics of 'CTA-ness', here we focus on the challenge of building a portfolio of CTAs (rather than adding CTAs to a diversified portfolio).

Exploiting ‘CTA-ness’

One less publicized convex property of CTAs is that a unit of CTA performance (over a CTA index) return increases more than proportionally to a unit of CTA relative riskiness. Riskier and levered CTAs display a better up/down capture ratio (vs CTA indices). We can elaborate the concept with an example: for instance, CTA manager X who had run a punchy 40% volatile mid-to-long-term mandate could have returned 100% in 2008 (a good year for CTAs) and subsequently lost 30% in 2009. At the opposite end of the spectrum, a lower volatility program Y could have made 15% in 2008 and lost 8% in 2009 (a difficult year for the strategy). This signifies that if one is after ‘CTA-ness’ in a portfolio context, the allocator should consider riskier but purer programs that achieved (or are designed to make) abnormal gains in a 2008 scenario and will get compensated by a less than proportional downside when markets deteriorate.

We therefore seek maximum convexity and capital efficiency when considering single programs for an allocation to a portfolio.

To prove our point, rather than focusing on ex-post efficient frontier portfolios (which describe the past but have very little to do with out-of-sample reality), we have adopted the concept of the ‘Achievable Frontier’ meaning that we run all possible risk-weighted combinations with quarterly rebalancing of 10 managers (1000+ portfolio combinations!). Such an approach should help us to cluster underlying components against a “cloud” of achievable portfolios and more importantly, against the more efficient ones sitting on the upper-left side of the graphic trend line (see below).

Chart 28: CTA Convexity (Source: BPK)

We have in effect captured a call option of ‘CTA-ness’ and this is of great value in a portfolio context.

If we believe, as the numbers seem to indicate, that CTAs are capable of managing downside risk well and offering convexity vs an index, we should then exploit the embedded leverage of such optionality.

Clearly, an investor looking to put most of his wealth in a single CTA program would rather choose a lower risk ‘all-weather’ program but, on the other hand, a portfolio manager should be enticed by such convexity.

Why does it pay to invest in CTA (good) volatility and exploit capital efficiency? Some of the reasons behind this ‘free’-leverage effect are:

a) CTAs do not borrow to achieve leverage as they are margin funded and sit on large amounts of unencumbered cash

b) CTA distribution is (more normal and) positively skewed, hence leverage is not associated with left-tail risks in the same way it is with many other hedge fund strategies

c) Asymmetry between profit taking and stopping losses maximises the compounding wealth effect and allows them to capitalize from crises or volatility break-outs thanks to built-in and hard-coded risk management

A case for short-term CTAs?

Within the spectrum of trend-following styles, the next important distinction is on the time horizon traded, which is much more important than a specialization in any one asset class. Managers who focus on shorter time frames and hence trade with higher frequency can attain a wider range of outcomes and as a result are much less correlated to each other.

Chart 29: Correlation matrix and PCA-Map of selected Short Term and Medium-to-Long Term CTA programs (Source: BPK proprietary database)
Hermes BPK Partners

While the majority of the paper is focused on medium term (and longer term) trend following, short term managers can be an important component of a broad CTA portfolio.

In the short term arena, managers can be trend focused as well as reversion focused. Mean reversion is difficult to trade in the futures world for holding periods beyond 5 days. However, at the shorter end of the time horizon, reversionary strategies are more numerous. To an extent, contrarian or higher-frequency models can be seen as a profit taking or stop loss overlay to the main 'momentum' driver.

With a shorter look-back window to generate trading signals, and an ability to trade from a mean reversion standpoint, short term CTAs can be quite useful to allocators. Much of their attraction stems from the ability to offset troublesome periods for the medium and longer term trend followers. One such period is that of a sharp reversal in markets. When there has been an extended trend in one direction, Medium Term CTAs tend to be fully invested. If this trend were to suddenly reverse, Medium Term CTAs will suffer losses and not be able to get out of trades quickly due to their look back period which extends typically 1-3 months.

Short term CTAs on the other hand, can be quite reactive to these instances of sharp reversals. While they are likely to suffer losses in the first move of a reversal, by days 2 or 3 they should be able to nimbly reverse positioning to trade in the direction of the reversal. The ability to trade on a different wavelength than the Medium Term CTAs can help to provide offsets in a portfolio context.

Short term CTAs also have the ability to generate profits in another typically challenging period for Medium Term CTAs—that of whipsawing market conditions where markets are moving but without a prevailing direction. In such a scenario, we would expect the Medium Term CTAs to be challenged. The lack of direction will mean that current trades on the book will struggle to profit as prices will neither be moving up nor down. To make matters worse, oftentimes these choppy markets can create false breakouts, where it looks as though a new trend is forming only to be stopped out a couple of days later. This type of environment is very detrimental to Medium Term trend followers.

Short term managers can benefit from such an environment. Both short term trend models and mean reversion models can capture such market behaviour. By trading on a ‘zoomed in’ time fractal, short term CTAs can help portfolios to weather choppy, directionless markets that are challenging to Medium Term trend followers.

We see in chart 29 (above, on page 18) that there are real correlation benefits to having a portfolio with blended time frames but it is important to highlight that the inter-manager correlation (as seen in the above table) which seems attractive comes at a cost of diminished predictability and a reduction in ‘TA-ness’.

Measuring and Maximizing Alpha in a Portfolio of CTAs

Measuring alpha is a necessary step to building a portfolio of CTAs (and hedge funds in general) even though it is clearly not sufficient to achieve superior performance.

A very important preliminary step in measuring each CTA program is to normalize its statistics as they may run very different risk mandates. Some managers can run mandates with volatility as low as 10% while other target 30%.

We have devised two metrics to set a statistical framework to select, monitor and evaluate Medium Term trend-following CTA programs, with the aim of delivering CTA convexity and exploiting CTA idiosyncratic alpha.

The first is the Appraisal Ratio and the second is the Upside/Downside Capture spread.

1) Appraisal Ratio (alpha/specific risk against a CTA benchmark)

For example:
- CTA Manager return +20%
- CTA Index return +10%
- (regression) beta of manager to index 1.5
- Alpha = 20% - 1.5 * |10%| = 5%
- Specific risk = stdv of (regression) residual 2.5%
- Appraisal Ratio = Alpha/specific risk = 5% / 2.5% = 2

This analysis provides a risk-adjusted framework to research the program’s alpha and to assess how idiosyncratic the models are. Furthermore, it is well suited to source CTA programs from a standalone investment perspective.

The Appraisal Ratio

This is a financial measure of how a fund manager is fairing against a relevant benchmark. It was first introduced by Treynor and Black to assess fund picking ability back in 1973. By taking the alpha of the hedge fund portfolio (return over a beta-adjusted benchmark and normalized by risk) and dividing it by the non-systematic risk of the portfolio, the result is a ratio that measures the abnormal returns per unit of risk that could at least in principle be diversified away (specific risk or volatility of regression residuals). Medium-term CTAs tend to be positively correlated to each other as well as to strategy indices (and are as close to normally distributed as it gets in the hedge fund industry. Nevertheless, negative figures have been adjusted to preserve consistency in the ranking; however this makes the magnitude of the ratio not directly comparable to the magnitude of positive ones. This is comparable to the issue of using Sharpe Ratio ranking in the case of negative excess returns.

Upside/Downside Capture

Upside/Downside Capture ratio shows you whether a given fund has outperformed (i.e. gained more or lost less) a broad market benchmark during periods of market strength and weakness, and it so, by how much. Capture ratios for funds are calculated by taking the fund's total return during months when the benchmark had a positive (negative) return and dividing it by the benchmark return during those same months. Computing the spread (difference) between upside and downside ratio allows measuring 'normalized' convexity against the selected reference.

2) Upside/Downside Capture spread (against a CTA benchmark)

For example:
- CTA Manager total return (when index is up) +50%
- CTA Index (upside) total return +25%
- Upside Capture = 50%/25% = 2
- CTA Manager total return (when index is down) -20%
- CTA Index (downside) total return -15%
- Downside Capture = -20%/-15% = 1.33
- Capture Skew = Upside – Downside Capture = 2 – 1.33 = 0.67

The higher the difference between the Up and the Down Capture the more convexity the fund is offering, taking full advantage of up movements of the CTA benchmark as well as offsetting it when in negative periods. This metric should be
read in conjunction with a downside severity indicator which represents a positive function of magnitude and overlap of losses as well as a negative function of the ratio’s significance (expressed in number of months).

It is also a ‘normalised’ metric that does not assume linearity (it compounds gains and losses to take into account fatter tails) and is well suited when CTAs are purchased in a portfolio context.

Chart 30: Bubble-scatter chart for Appraisal Ratio and Capture Spread (Source: BPK).

We extensively researched our CTA database via those metrics and concluded that 4-8 is the optimal number of CTA managers to exploit the trade off between idiosyncratic risk and diversification benefit.

Furthermore, rebalancing leaders and laggards and a robust risk-parity weighting methodology does improve CTA portfolio efficiency and alpha generation. We would refer again to our risk management alpha findings and Newedge paper “Teamwork against Superstars” paper (May, 2007) for further evidence.

Alpha Decay Risks: the persistency question

Not all models are made equal:

CTA models work with variable levels of intensity and success. Sometimes they will work for many years and then start to work less effectively for no discernable reason. Aside from human intervention or override, which is never desirable in a systematic approach, models can go through periods when they are simply out of step with the market. If an individual model becomes a consistent non-performer, it will be down-weighted within the portfolio context and then, ultimately, relegated. The tolerance of a model’s underperformance will be a function of many things, not least the number of models used and the relative importance of the model which has become defective. Even at a zero allocation of capital, a model may still be run on paper and re-commissioned if it starts to work once again.

Model Intervention:

An important point arises here in the form of intervention in models. The models are the result of human endeavour but, once backtested, commissioned and live, should not suffer subjective interference ideally. Typically models are commissioned or de-commissioned (either individually or as a group) as opposed to being adapted or adjusted once in service. This is important because in the absence of this assumption it is hard for an investor to build an understanding of the risk which is being managed.

A typical hedge fund question is how persistent is the alpha of a manager or a strategy. This is driven by the evidence: superior skill is diluted as assets grow and capacity becomes exhausted.

Below we present the quartile transition matrices (a concept borrowed from rating language) of a sample of Medium Term CTA funds from our database. The quartile transitions are indicative of where the fund was, relative to the peers, at the end of both annual windows as well as the end of the prior 12 month period. The objective of this analysis is to map out the relative alpha dynamics including its persistence, decay, reversion and magnitude.

To obtain the quartiles, we first looked at the rolling calendar returns of each of the funds and calculated the quartiles within strategy groups. All quartile scores are relative to the strategy universe and are therefore a relative metric. In each cell in the following table we have shown the number of CTA funds within the row that had been in the quartile listed on the left, and have migrated to the respective quartile listed on the top.

Chart 31: 2010-2011 Quartile Transition Matrix (Source: BPK)

We can see from the example table above that 6% of the 50 funds that were in the 1st quartile in 2010 remained in the 1st quartile into 2011. All funds on the diagonal are persistent within their category, however, those sitting on the upper-left quadrant are ‘good’ persistent while the lower-right ones are ‘bad’ persistent. The funds highlighted in the red block are ‘fallen angels’, i.e. they had been in the top quartile but fell down the ranks to 3rd or 4th later on. All funds above the diagonal have been falling off. In contrast to this, the block highlighted in blue are ‘rising stars’. They moved up to the top rank recently having been in the 3rd or 4th quartile before. All funds below the diagonal have been rising up.

We repeated the exercise for each calendar year going back to 1997 and summarised the results in the next chart.

Chart 32: Historical (annual) Quartile Transitions (Source: BPK)

SOURCE: BPK
We observe that:

1. In most years there were more than 1 in 2 odds of picking a program that would fall down the rankings (either a ‘fallen angel’ or a ‘falling off’) and migrate from a good quartile to a sub-par one.

2. There is a significant turnover between quartiles prompting again the argument for rebalancing frequently from recent outperformers to laggard programs that offer diversification benefits in a contrarian fashion.

Additionally we calculated the average rolling return for the 1st and 4th quartiles to quantify the spread between leaders and laggards.

One approach which we favour is therefore:

1) Monitoring outliers against expectations using a bi-variate empirical z-score against each manager’s historical distribution but also transversally against the peer group to mark-up consecutive and abnormal return observations, after having modified to account for non-normality

2) Max drawdown bootstrapping to assess how much a new drawdown is in the order of things. This is done by randomly re-ordering historical monthly returns and then sampling out the combinations that experienced the worse drawdowns. We would obtain a ‘bad luck’ distribution (of peak-to-trough) against which to benchmark new empirical drawdowns, with a given interval of confidence.

3) Flagging actual returns that are beyond multiples of the standard deviation since inception or a conditional rolling window to investigate CTA programs realizing risk above stated targets.

Managed Accounts or Funds?

While it is not the purpose of this paper to debate whether access to CTAs is best achieved through managed accounts or funds (a topic which has gained significant prominence since 2008) in the box below we highlight a number of thoughts on the matter which we consider to be relevant.

CTAs: Operational Risks and Alignment

Accessing hedge funds via managed accounts has always provided investors with greater transparency and enhanced liquidity. However, the focus on liquidity that was so evident post 2008 has shifted: more and more investors now believe that managed accounts can also represent a very efficient approach to mitigate operational risk. Furthermore, while CTAs can be considered ‘vanilla’ hedge fund programs, history (the Sentinel, Lehman, MF Global cases for instance) cannot be ignored.

Institutional investors now use platforms which provide supervision of third-party service providers such as the administrator and trading counterparties while controlling net asset value (NAV). Quite often, they also require qualitative and operational due diligence, customised risk and performance reporting as well as daily risk management.

The benefits of managed accounts are often cited; many of them are mentioned above. We believe that other factors should be taken into consideration when establishing and supporting managed accounts.

They include:

- Good corporate governance
- The integrity of the platform, its robustness to provide true segregation of assets and liabilities in difficult times, its location in a strong regulatory framework and finally, its supervision by an active, knowledgeable and independent board can often be overlooked by investors.

- Enhanced alignment of interests
- Unnecessary conflicts of interests can be avoided by maintaining independence from all 3rd party service providers.

We further observe that:

3. The absolute return nature of the strategy manifests itself into extremely positive performers (the ‘leaders’) and ‘below-zero’ laggards. This is not the case for long-biased strategies where the quartile dynamics are more exposed to market cyclicality.

4. The spread between being in the top or bottom quartile is significant and consistent over time but we note a widening in 2008 that confirms our thesis of favouring capital efficiency (riskier programs) to achieve maximum payout during crisis.

Monitoring style drift: when to ‘decommission’ a program?

The challenge of deciding when to redeem or add to a CTA holding within a CTA portfolio is somewhat similar to the challenge described above which face the underlying CTAs. CTA programs can after all be described as nothing but a ‘model’ to a portfolio allocator: the systematic nature of a CTA, the inherent volatility, frequent drawdowns and performance cyclicality does not help here at all.

Furthermore, investors are not immune from common behavioural biases. Resisting the temptation of replacing a recent poor performer with a winner is very difficult given that there is no assurance that the recent outperformance will continue into the future.

One piece of advice we would offer is to follow single manager best practice: be systematic and highly disciplined in the approach and avoid ‘trading the traders’.
such as the prime brokers or the administrators. Also, in addition to the obvious liquidity factor, we believe that investors should demand performance fee models better aligned to their own investment horizons. If both the managed account and the underlying manager are focused on long-term performance, as they should be, such accounts should calculate performance fees not quarterly but at the very least on an annual basis. With the right approach, investors can enjoy the benefits of reduced operating costs and re-aligned incentive fees.

- Customised approach
Separately managed accounts should provide clients with the flexibility to choose investment portfolios formulated for their specific needs, objectives and restrictions. This approach encompasses cash management where clients should be offered direct control over the management process, the counterparties with whom they want to interact and the operating model. Particular needs and specific fiduciary requirements can only be met in flexible platforms but this should never be at the cost of the platform’s robustness.

Conclusion

Through this paper we have covered much ground and aimed to shed a little more light on a strategy which is often perceived as opaque and inaccessible. Contrary to popular belief, we believe that careful study of CTAs will throw up numerous sources of transparency which can be aggregated to amply meet overall requirements as well as the broader risk and return objectives in the portfolio context. The conclusion is that CTAs are in fact a transparent portfolio solution which require disciplined management and a deep understanding to exploit properly. For investors prepared to spend the time in this endeavour the benefits of the strategy can be very rewarding.