



Demystifying managed futures – why first class research and innovation are key to stay ahead of the game

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- It is our opinion that managed futures have historically provided excellent diversification, strong returns and good downside protection (however please note that past performance is not indicative of future performance and a significant risk of loss exists)
- Continuous shifts in risk premiums create new trends
- New derivative instruments, persistent research into trading and more efficient execution mean that the opportunity set is growing

Questions?

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material points which can also adversely affect actual trading results. There are numerous other factors related to the markets in general or to the implementation of any specific trading program which cannot be fully accounted for in the preparation of hypothetical performance results and all of which can adversely affect actual trading results.

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The types of transactions described herein involve significant risks. This is only a summary of certain risks of investing in a managed futures fund. Such Fund's Confidential Private Offering Memorandum ("Memorandum") contains a more exhaustive discussion of these issues and should be read in its entirety. Unless specified otherwise, the terms used herein have the same meaning as defined in the Fund's Memorandum.

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Use of leverage – Futures trading normally requires low margin requirements which allows for an extremely high degree of leverage. A relatively small movement in the price of a futures contract may result in immediate and substantial loss or gain to the Fund holding a position in such contract. The Fund may also invest in forward contracts, options, swaps and over-the-counter derivative instruments, among others. Like other leveraged investments, trading in these securities may result in losses in excess of the amount invested.

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Tax risks- Investors in hedge funds such as the Fund are subject to pass-through tax treatment of their investment. Since profits generally will be reinvested in the Fund rather than distributed to Limited Partners, investors may incur tax liabilities during a year in which they have not received a distribution of any cash from the fund. In addition, it is likely that the general partner will not be able to prepare its tax returns in time for investors to file their returns without requesting an extension of time to file.

Volatile markets – Trading in futures is a speculative activity. Futures prices may be highly volatile. Market prices are difficult to predict and are influenced by many factors, including: changes in interest rates, weather conditions, government intervention and changes in national and international political and economic events. Please refer to the Confidential Private Offering Memorandum for a more comprehensive description of volatility factors.

The above summary is not a complete list of the risks, tax considerations and other important disclosures involved in investing in a Fund and is subject to the more complete disclosures in such Fund's offering documents, which must be reviewed carefully prior to making an investment.

Executive summary

Managed futures traders – also called Commodity Trading Advisors (CTA) - mostly gain market exposures through global futures, forwards, and option contracts. They typically have a strong directional bias, i.e. net long or short exposures and can apply leverage. While there are a number of trading strategies among CTAs, some of the most popular ones focus on systematic trading rules which use technical data to anticipate future price movements.

CTA funds are a compelling choice for investors seeking to improve the risk-adjusted performance of both traditional portfolios (stocks and bonds) and fund of hedge funds portfolios. CTAs offer a low correlation to other investments and may thus enhance the risk-adjusted performance of a diversified portfolio in certain circumstances. Stress testing and a potentially favorable distribution of returns are also strong arguments for allocating to managed futures. Institutional investors will be attracted by the transparency and the cash efficiency offered.

Managed futures strategies seek to benefit from price trends. These trends are a persistent price phenomenon that stem from changes in risk premiums – the amount of return investors will demand to compensate the risks they are taking. Risk premiums vary significantly over time in response to new market information, changes in economic environment or even intangible factors like shifts in investor sentiment. When risk premiums decrease or increase, underlying assets will be re-priced. Since investors typically have different expectations, large shifts in markets result over several months or even years, as expectations are gradually adjusted. As long as there is uncertainty about the future, there will be trends for CTAs to capture.

Managed futures managers continuously research new technologies and trading approaches in order to identify and profit from these trends. This scientific approach to managed futures trading, has spawned a wide variety of different trading strategies, which today allow certain traders to capture even small trends. In addition, the introduction of electronic trading allows managed futures managers to execute their trades and, if needed, generally reduce their positions quickly and efficiently, thus making shorter-term and smaller scale opportunities accessible, and thereby expanding the investable universe for the investment approach.

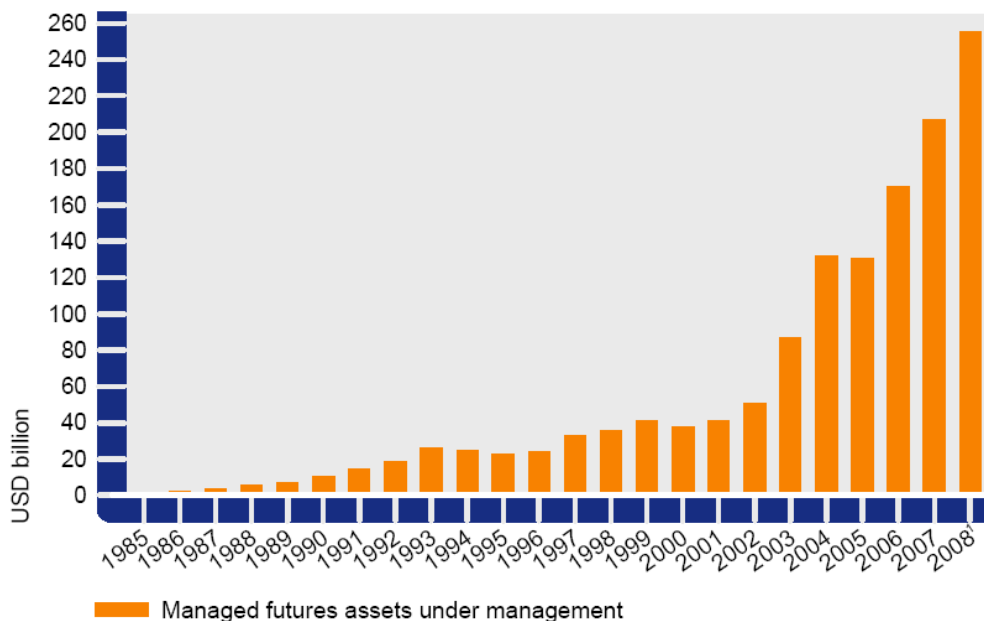
This combination of market growth, persistent trends and ongoing research means that there is still substantial room for development in the managed futures industry. However, as strategies become more sophisticated and the race to develop new techniques and trade infrastructure heats up, the gap between the most developed trading managers and the following pack may widen further.

Please note that in this research paper, the terms managed futures and CTAs are used interchangeably. See Appendix and Glossary at the end of this paper for certain definitions and descriptions used in this report. Please note that there is no guarantee of trading performance and past performance is not indicative of future results. CTAs can involve significant risks including a substantial risk of loss. This material is for educational purposes only and should not be relied upon for any other purpose.

Introduction to managed futures

As with many trading approaches, managed futures trading came to prominence in the US in the 1980s following the liberalization of financial markets. Global assets under management in managed futures have risen from around \$5 billion at the end of the 1980s to over \$225 billion at the end of the third quarter of 2008, according to Barclay Trading Group. The growth of the futures markets in the 1970s and the explosive development of technology have helped transform managed futures into one of the fastest growing hedge fund strategies.

Figure 1: Growth of the managed futures industry 1985 to September 30, 2008



Source: Barclay Trading Group. Latest data available.

Managed futures funds are pools of futures or forward contracts managed by professional investment managers. Unlike securities such as stocks and bonds which are held by mutual funds, a future or forward contract is a derivative instrument, the value of which depends on the value of an underlying instrument. A characteristic of derivatives is that they are leveraged, through margining, which can increase returns and magnify losses. Managed futures managers apply risk controls and mostly trade with counterparties on risk averse financial exchanges. While these steps can mitigate the risks associated with derivatives, it is important to realize that risk of loss is inherent to derivatives trading.

Futures markets have a number of properties that make them an attractive investment medium. First, they tend to be highly regulated by government appointed bodies, such as the Commodity Futures Trading Commission (CFTC) in the US. They also use clearing houses which guarantee transactions, thus removing counterparty risk. The high liquidity of futures markets is an added benefit – transaction costs are typically only a fraction of those charged in corresponding cash markets.

Growth of the global futures and forwards market

Until the late 1970s, the futures industry was dominated by agricultural markets, whereby market participants acted either as hedgers or speculators. Trading was referred to as “commodity trading” and this is also where the term Commodity Trading Adviser (CTA) comes from.

Organized futures markets began in the US with the opening of the Chicago Board of Trade (CBOT) in 1848 as American Midwest farmers trading with east coast merchants sought to establish a future value for their goods so they could ensure that the value they received offset their capital investment.

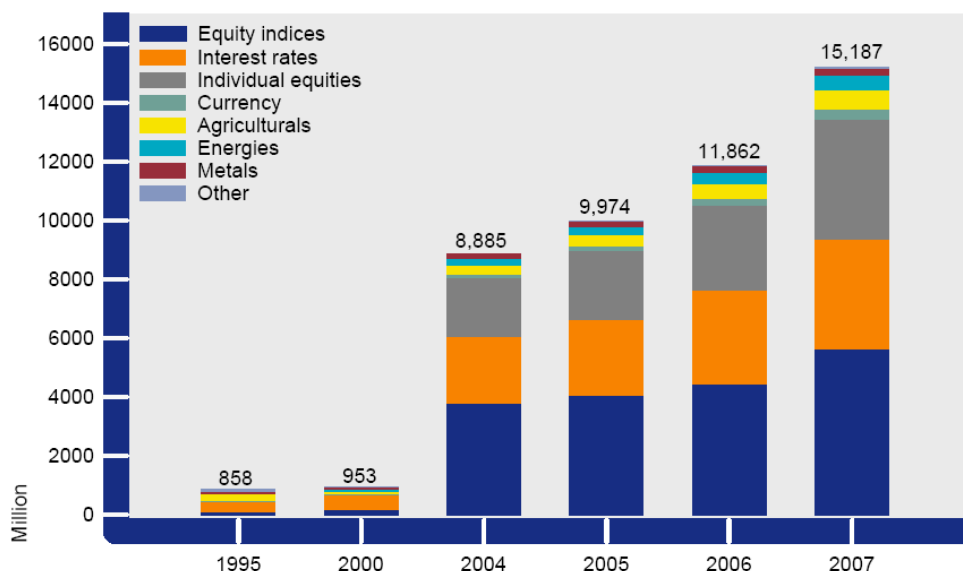
CBOT was founded by 82 grain merchants and the first exchange floor was above a flour store. The exchange was originally a cash market, where grain traders came to buy and sell supplies of flour, timothy seed and hay.

The earliest futures contract in the US was recorded in 1851 for the forward delivery of 3,000 bushels of corn. Two years later, CBOT established the first standard futures contract on corn as a mechanism for farmers to reduce volatility of earnings and increase predictability of cash flows.

The farmers sold their positions to shrewd market participants that had the knowledge and financial resources to withstand the increase in their own volatility while being compensated for the extra risk they were assuming. This represents the very basic risk transfer mechanism from commercial interest to non-commercial interests and is the very foundation upon which all managed futures managers base their returns. Today, a range of sophisticated strategies are used to identify the risk transfer and risk premium.

In 1975 CBOT introduced the first financial futures contract in the form of mortgage-backed certificates on the Governmental National Mortgage Association. Today, the forwards and futures market is dominated by financial futures offered around the globe. According to the Futures Industry Association (FIA), the total number of futures and options traded on exchanges around the world reached over 15 billion by the end of 2007, up 28% from the previous year. In fact, the pace of growth has been accelerating in recent years.

Figure 2: Growth in volume of global futures contracts



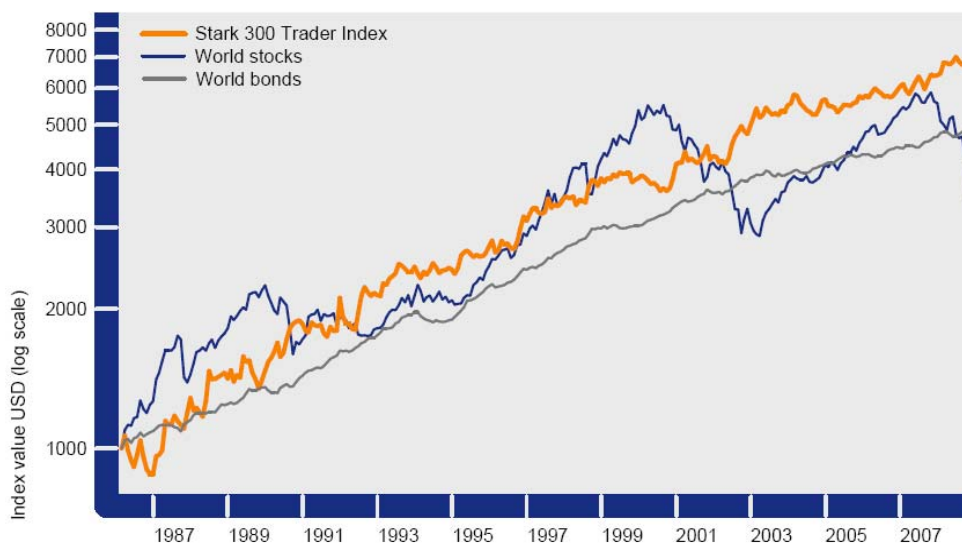
Source: Futures Industry Association (FIA). Latest data available

As the chart above shows, more than 90% of all trade in exchange-traded derivatives is tied to interest rates or equity prices today and we expect that this situation may persist over the next few years. Trading volumes have exploded in recent years as more and more exchanges introduced electronic trading and the cost of trading has fallen significantly. Today, trading advisors are active in over 150 different markets worldwide.

History of managed futures

The establishment of the Commodity Futures Trading Commission in 1974 was the catalyst for the rapid evolution of CTAs and the futures industry as a whole. In the beginning, the strategies were more fundamentally driven because the quantitative approaches and techniques that exist today had not yet been formalized. Computers, data providers such as Bloomberg and Reuters as well as quantitative/statistical models did not yet exist.

Figure 3: Managed futures track record (January 1985 to November 2008)



Source: Stark & Co., Inc. and Bloomberg. Performance in USD. As of November 30, 2008. Stark 300 Trader Index: Index of managed futures and some selected macro traders. World stocks = MSCI World Index (hedged to USD). World bonds = Citigroup World Government Bond Index (hedged to USD)

1970s – classical trading patterns

The first managed futures managers used classical technical trading patterns that were fairly simple in nature including “head and shoulders”, “support and resistance”, and “break-out” which have become less important and are now being combined with more scientific approaches.

- “Head and shoulders” is a chart formation, that rises to a peak and subsequently declines, then rises above the former peak and declines again and finally rises again, but not as high as the second peak, and declines once more. The first and third peaks are seen as shoulders, whereas the second peak forms the head.
- “Support and resistance” is a chart formation that shows prices oscillating between upper and/or lower boundaries on more than one occasion.
- “Break-out strategy” looks for instances where the price breaks through support or resistance levels. When it breaks through a level of resistance, a long position is initiated; the opposite is true when it breaks through a support level. To implement such a strategy, the manager programs computer algorithms saying that if the last close is higher than the highest close of the previous 100 days, then this creates a buy signal. Figure 4 shows an example of a break-out strategy.

Figure 4: Break-out strategy



Source: CSI Market Data. Five year US Treasury Note, daily prices. August 1998 to December 2000. Support and resistance lines have been added by Man Investments.

This chart offers a simplistic method of detecting the direction of changes in risk premia and hence movements in market sentiment. Today, some discretionary traders still rely on interpretations of these chart patterns, while most systematic managers have formalized the patterns that they seek to detect.

Beginning of 1980s – the age of the turtle traders

In 1983, two famous commodity traders, Richard Dennis and William Eckhardt ran an experiment to determine whether trading ability was genetically inherited or whether it could be learned and taught. Eckhardt thought it was an innate skill, while Dennis believed that any person could be trained. To test the idea, they recruited 23 people screened for particular qualities from over 1000 applicants. They were then trained to be highly capable traders in just two weeks by following a rule-based trading system. The traders ended up earning an average return of over 80 percent per year and generating profits of more than \$100 million.

In 1989, the Wall Street Journal quoted Dennis as saying “We are going to grow traders just like they grow turtles in Singapore” and the group was nicknamed “turtle traders” from that day forward. They became one of the industry’s leading pioneers of mechanical trading systems and software.

Although Dennis and Eckhardt’s underlying “break-out” system was still chart based and traders bought when prices broke to new highs and sold when prices broke to new lows, it was possible to replicate it successfully because of the systematic nature of the strategy. The strategies that were once used gradually declined in profitability and those managers who did not evolve and adapt to the ever changing markets gradually fell by the wayside.

The original rules followed by the “turtle traders” have been widely discussed but, while they were a highly sophisticated approach in the 1980s, technological and scientific progress since then have massively increased the spectrum of strategies available to managed futures traders. In addition to proving Dennis right, the test is often pointed to as proof that successful trading can be achieved through the use of mechanical rules, i.e. markets can be profitably traded in a rule-based manner so long as those rules are consistently applied.

Mid/end 1980s – computerized chart analyses

By the mid 1980s, strategies such as “breakouts” or “simple moving averages” were being supplemented by the use of 10-day look-back windows, which were calculated by hand. A simple or arithmetic moving average (SMA) is calculated by adding the closing price of a security for a certain number of time periods and then dividing this total by the number of time periods, i.e. it is the average price over a certain time period. For the calculation, each daily price is given equal weighting. Moving averages are typically used to identify the direction of price trends. When a short-term average (i.e. 15-day period SMA) crosses above a longer-term average (i.e. 50-day period SMA), this indicates upward momentum, whereas the opposite would indicate downward movement.

Figure 5: Simple moving averages



Source: CSI Market Data. 10 year treasury notes, daily prices. October 2001 to January 2003.

During that period, managed futures traders started to use computers to analyze historical market prices. As a consequence, trading signals were defined algorithmically, resulting in the automatic generation of both long and short signals. Although still simple, these programs began to use variable inputs (parameters), ranging from time periods of just a few days to up to 200 days. By the end of the 1980's, many of today's most liquid financial futures contracts had been introduced, but computer-driven trading was still in its infancy and was only practiced by a small minority.

Early 1990s – technological revolution

By the early 1990s, new analytical software such as TradeStation, and more importantly the technological revolution, had brought entire libraries of technical indicators to the trading floor. Many simple indicators (often with misleading names such as Stochastics, Momentum, RSI, Exponential Moving Average and MAC) had become readily available and were offered by most financial data vendors. This sparked a wave of strategy testing and development among aspiring system traders. Computerization allowed traders to sample more data in a far shorter time period. This increased the scope of their trading, allowing them to perform such tasks as finding the most profitable moving average length for a price series.

2000 – CTAs as a science

By 2000, the success of systematically driven CTAs was attracting researchers from a variety of scientific fields. They started researching continuous trading, price forecasting and portfolio optimization, which contributed to the continuing success and sophistication of managed futures traders.

2004 – Europe overtakes the US

2004 was a difficult year for managed futures traders. As a result, it was the year that separated the wheat from the chaff. While some US CTA managers – especially some of the industry pioneers – remained true to their original strategies on the assumption that they would be successful over the longer term, many European houses started to develop their strategies based on highly advanced research. In a further departure from the European experience, some managed futures traders in the US were predominantly global macro traders running managed futures portfolios on the side. Hence their expertise lay more in trading financial markets and less in quantitative research and modeling.

There have of course always been CTA managers in the US that have been focused on improving their research capabilities. Nonetheless, it is fair to say that while the managed futures universe ten years ago was dominated by US managers, European managers have caught up in the last few years. Today though, European CTA managers are on par with their US counterparts. No matter where a manager is based - US or Europe - only those CTA managers investing heavily in research and development will stay in the game.

Today – first class research

Today, CTAs need many billion dollars of assets under management to fund their technology and research

teams. System-driven trading represents the lion's share of futures trading volume and CTA managers use a vast range of different trading techniques. The table below is not intended to be exhaustive, but gives a snapshot of some of the techniques used today.

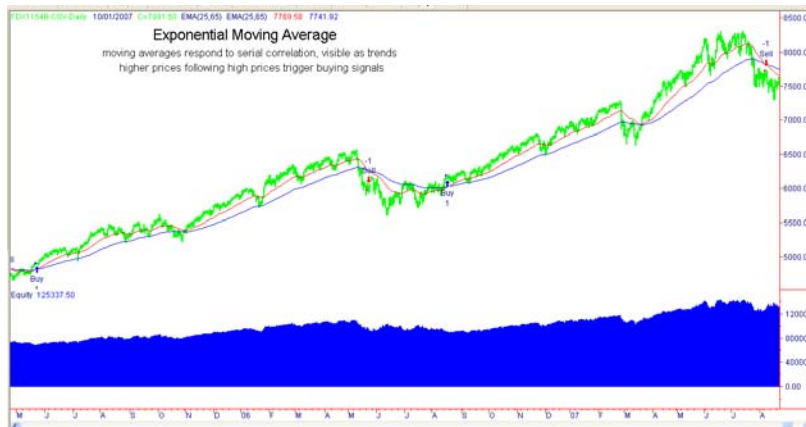
Table 1: A sample of CTA trading methods:

CTA trading techniques	Description
Serial correlation analysis	Correlation of a variable with itself over successive time intervals. Managed futures traders use serial correlation to check to what degree past prices predict future prices
Trading of volatility break-out	When the percentage price move of an asset exceeds a certain threshold
Position measuring based on volatility	Positions are sized as a function of volatility. In a high volatility market environment, positions are scaled down and vice versa
Conditional execution	Trading signals are placed in the market with pre-defined conditions attached to them, i.e. "buy at market" if "volatility is below x and price above 100".
Term structure trading	Analysis of interest rate differentials as well as term structure premia in the markets. One implementation of this is the ever popular carry trade in the currency markets.
Reversal pattern trading	Predictive strategy that tries to time significant market reversals.
Probability signals: position weighting	If statistically favorable probabilities of a directional move are measured, then position sizes are increased
Algorithmic trading/high frequency trading/execution robots	Traders are replaced by computers which execute the trades automatically, often generating very short-term (intra-day) trading
Non-parametric approaches	Reduce the reliance on a particular time frame in order to derive more stable performance. Trading is also spread out to a larger time frame in order to reduce market footprint.
Dynamic sector allocation	Allocation to different market sectors such as commodities or currencies are adjusted in size, depending on opportunities and/or trends.
Behavioral finance	Strategies that rely on persistent errors in the marketplace driven by biases of the human behavior.
Fundamental methods	Econometric models that value certain markets in relationship to the economic cycle.

Following are some of the above mentioned strategies in more detail. No representation is made that any CTA trading strategy will be profitable or will not incur losses.

Figure 6: Serial correlation analysis

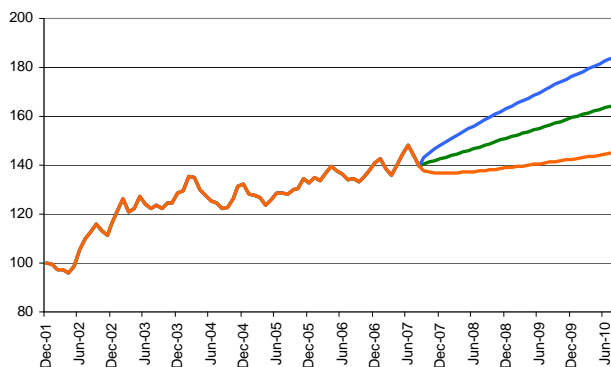
- Moving averages respond to serial correlation which are visible as trends
- Short-term moving averages that are higher than long-term moving averages trigger buying signals



Source: CSI Market Data. DAX futures, back-adjusted futures contracts. April 2005 to August 2007.

Figure 7: Trading of volatility break-out

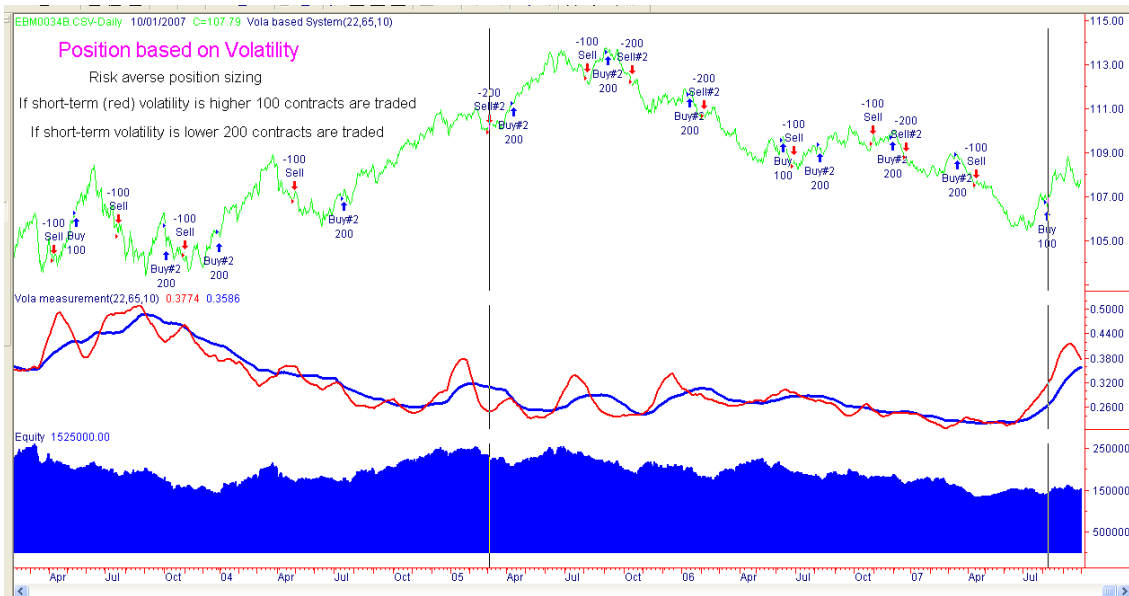
- The green line is the “expected drift”, i.e. assuming no volatility. That is where the manager wishes to end up in one, two or three months assuming average performance every month
- The cone, i.e. the two lines in orange and blue, show one standard deviation from the expected path, both positive and negative. A performance of one standard deviation above the mean in one, two or three months should lift the manager to the upper line
- Conclusion: by calculating the cone, the manager can estimate the expected return of the trade by judging what the probability of a positive result versus a negative result is. As always, there can be no guarantees of successful trading, and it is important to note that trading derivatives involves significant risks.



Source: Stark & Co., Inc. Stark 300 Trader Index. December 2001 to July 2007. Cone calculated by RMF Investment Management, a wholly owned subsidiary of Man Group plc.

Figure 8: Position measuring based on volatility

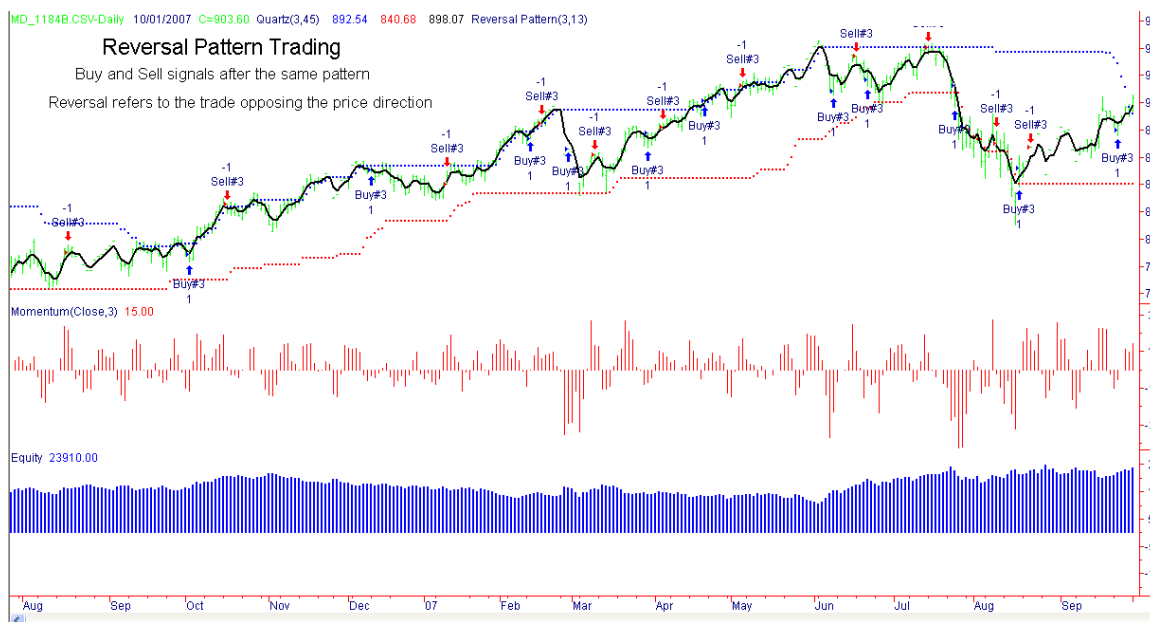
- Risk averse position sizing
- If short-term (red) volatility is higher, 100 contracts are traded
- If short-term volatility is lower, 200 contracts are traded



Source: CSI Market data. Bund futures, back-adjusted futures contracts. February 2004 to October 2007.

Figure 9: Reversal pattern trading

- Buy and sell signals follow the same pattern
- Reversal refers to the trade opposing the price direction



Source: CSI Market data. S&P 400 Midcap, daily prices. July 2006 to September 2007.

The competitive pressure in financial markets forces CTAs to continuously develop their trading strategies so as to stay ahead of the competition and to mitigate the gradual erosion of returns applicable to all statistically

driven trading systems. Returns from CTA managers that have not been investing sufficient time and capital in research and development, have consistently lagged in the past few years.

Some people call managed futures black box trading. A black box is an input/output device such as a transistor. Many users are not familiar with the logic inside a black box. The term black box suggests that CTAs trade strategies that investors cannot understand. As the above description of the evolution of managed futures shows, this is misleading. Within the investment world, CTAs are characterized by rule based investment strategies. Trading strategies are hard coded and often programmed into computer algorithms, such as the break-out strategy shown in Figure 4.

Managers are typically reluctant to divulge the exact composition of their trading models to prevent their proprietary ideas from being stolen. However, while a managed futures manager will not be asked to reveal the exact programming for his trades when being screened by a fund of hedge fund manager, it is crucial that the developer understands and explains its trading strategy and the associated risks. Only when the managed futures manager is adhering to a predefined strategy can it give the investors more comfort in evaluating past performance and in estimating future risk and returns.

Compared to managed futures managers, most traditional equity portfolio advisors, such as mutual funds, conclude their investment decisions from a changing mix of fundamentals, news and technical data. To this end, their cause and effect may be much more unpredictable than systematic CTA models, which as we have seen, are not based upon ad hoc trading decisions

Research is key

The increasing liquidity of new instruments and markets such as credit derivatives, emerging markets, ETFs and swaps has generated many more trading opportunities for CTA managers, emphasizing the importance of strong research capabilities. The research race is continuing and the entry level cost for new CTAs has become very high due to the institutional standard of computing and analytics. The evolution of fully automated trading systems has continued since the introduction of electronic futures exchanges. But research is not only key for systematic traders, it is equally important for discretionary traders. In order to detect new trading opportunities, CTA managers must constantly adapt their systems. Ensuring interoperability with the evolving programs run by the various stock exchanges around the globe is an important part of this and ensures that data can be analyzed quickly. Further research and analysis into market developments is carried out and new trading systems/ideas are also developed.

As Table 1 showed, today's trading systems are complex and rely on different techniques to analyze the vast quantities of data available. The zero sum game of futures trading forces all participants to continuously research the behavior of their peers and to adapt their strategy in an effort to stay ahead in the pursuit of excess returns. However, while systematic and discretionary traders use similar tools to analyze the market, they execute their trades differently. A high percentage of systematic trades are executed automatically, whereas discretionary trades are executed on a discretionary, fundamental basis (as the name suggests). In these trades, topical information, such as latest market news, may be taken into account, and position weightings may be adjusted prior to execution.

Exposures across a wide range of sectors may help to smooth returns, as individual sectors often tend to exhibit, different behavioral characteristics. The factors affecting the world commodity markets, for example, differ from those influencing financial futures. While long-term trends are usually driven by economic growth and stability in both cases, short or medium term movements in the commodity markets are sensitive to seasonal effects as well as sudden changes in supply or demand resulting from environmental or political factors. Commodities futures trading allows investors to reap gains (and also experience losses) from the sometimes fervent upward and downward price movements that result from the consequent uncertainty that frequently drives these markets.

The significant growth in the number and diversity of futures markets in recent years has facilitated a broadly diversified approach across geographical regions and asset classes. This approach aims to control risk by avoiding over-concentration within particular sectors and markets.

Sub-strategies within managed futures

The managed futures universe can be broadly divided into systematic and discretionary strategies. Systematic strategies make use of historical price data and/or historical relationships that can be tested and which may help to anticipate future price movements. These strategies rely heavily on computer generated, technical trading signals. Conversely, discretionary traders rely on the judgment of the manager and their expertise in a

particular market to make investment decisions. Both methods have their advantages and disadvantages; however, they are complementary as they tend to experience losses at different points of a market cycle.

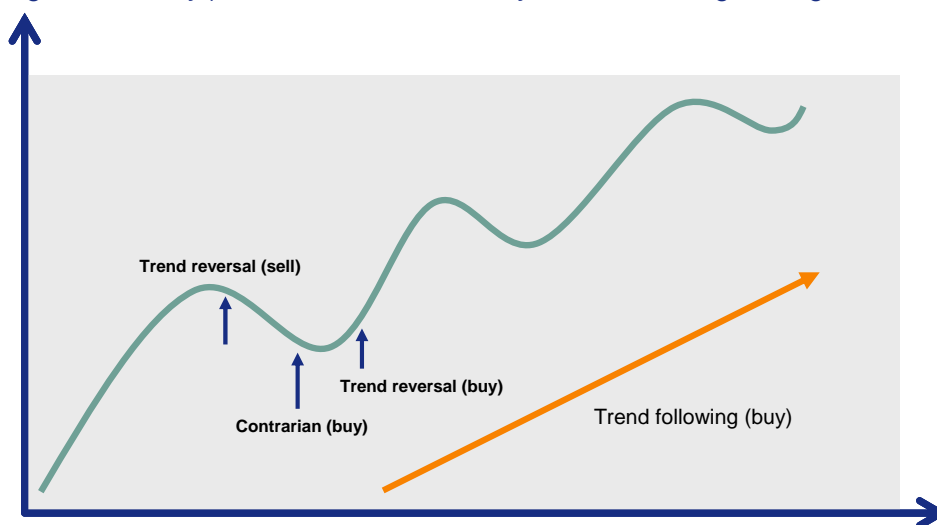
The more prevalent systematic approach relies on the application of statistical analysis to evaluate the movements of markets. Such information may include daily, weekly or monthly price fluctuations, volume variations, and changes in open interest. This approach relies heavily on computer generated trading signals to maintain a systematic and disciplined approach and it can be used to construct highly diversified portfolios through the combination of multiple systems and time frames to reduce overall volatility.

A number of sub-strategies can be identified within systematic trend-following strategies. Here we are going to focus on just three:

- **Trend following** – seeks to capitalize on medium to long-term trends in a variety of markets
- **Trend reversal** – seeks to capitalize on key turning points in liquid futures markets
- **Contrarian** (counter-trend) – aims to sell near market tops and buy at market bottoms

The chart below shows the entry points for the three different systematic trading strategies.

Figure 10: Entry points of three different systematic trading strategies



Schematic illustration (not reflective of actual trading)

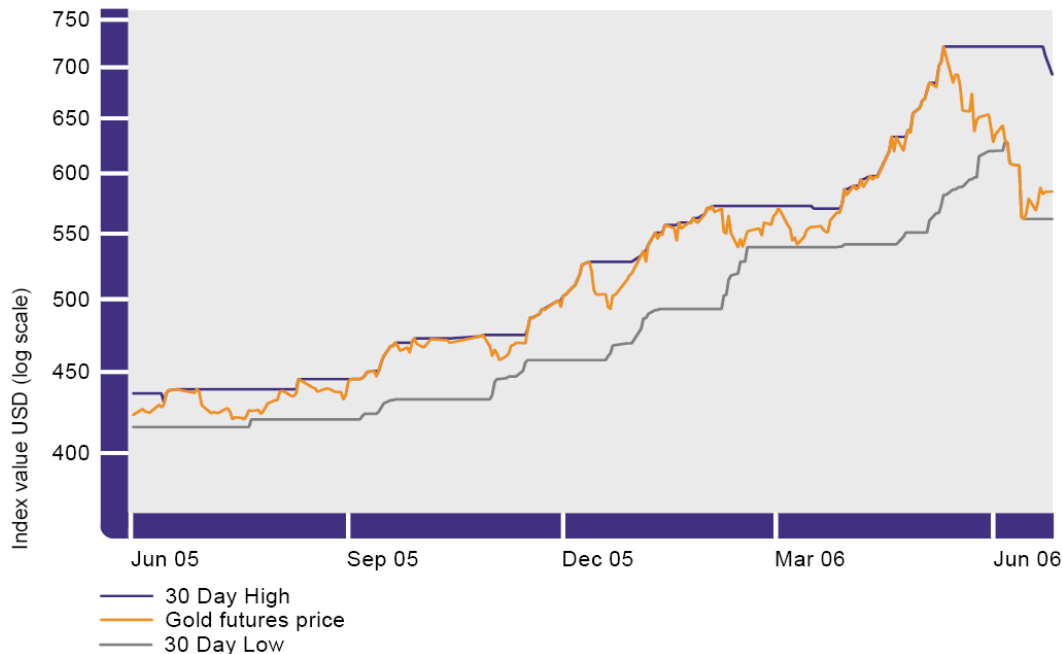
Systematic trading is based on computerized quantitative models that use moving average prices, break-outs of price ranges or other technical rules to generate buy and sell signals for a set of markets. With the emergence of electronic trading, execution of these strategies is becoming increasingly automated.

Systematic trend-following strategies

Systematic trend followers are a sub-category within systematic strategies. They can pursue opportunities across many different time periods. Short-term trades typically last between three to five days, but they can be as short as intraday or as long as a month. These trades try to capture rapid moves and the managers base their activity on swift fluctuations in prices. They rely heavily on liquidity and high volatility for returns, and typically have a low correlation to long-term CTA managers. Unlike long-term CTAs, shorter term traders are often hampered by strong, persistent trends as these periods tend to offer fewer short-term price fluctuations. The time horizon for medium-term trades lasts on average twelve weeks and long-term trades typically exceed nine months.

The following is an illustrative example of how a managed futures trade implemented by a long-term systematic trend-follower might work. It demonstrates a simple channel breakout strategy applied to the gold futures market. The chart on the following page shows a price channel created using 30 day high and low prices as represented by the blue and grey lines respectively. Long and short trading signals are generated as the price reaches the upper or lower boundaries.

Figure 11: 30-day price channel in the gold futures market



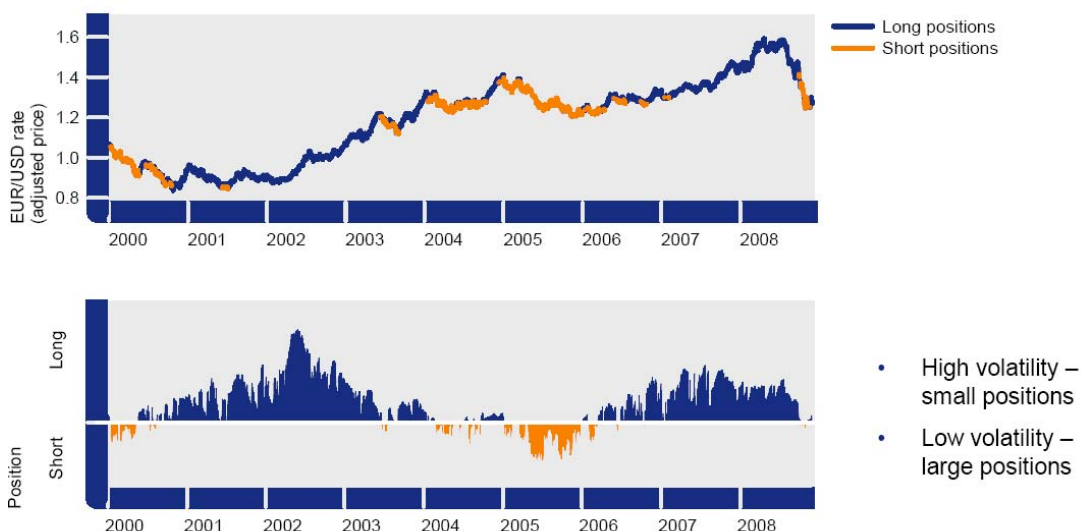
Source: Bloomberg. Performance in USD.

Managers will typically use a number of different signals in combination to determine trade entry and exit points. Furthermore, it is unlikely that allocation size will remain constant during the life of the trade as managers may vary the size and degree of leverage of their position based on contract volatility. In addition, managers have to roll the contracts, which results in small additional transaction costs being incurred.

Man-AHL (USA) Ltd, a systematic managed futures trading advisor owned by Man Group plc, runs programs that are quantitative and primarily directional in nature. Trading takes place around the clock and real-time price information is used to respond to price movements across a diverse range of global markets encompassing stock indices, bonds, currencies, short-term interest rates and commodities. The instruments traded are primarily futures contracts and foreign exchange and metal forwards. Investment rules are executed within a systematic framework.

Figure 12 shows the application of AHL's systematic directional strategy to the Euro/US dollar currency pair. One can see that this strategy is able to generate returns from both long and short positions. AHL scales down positions when market volatility rises and vice versa as part of its risk management process. In addition, portfolio risk is monitored on a daily basis to review that instrument, sector and regional exposures are within predefined limits.

Figure 12: Example of active trading in a single market – EUR/USD currency pair



Source: Man database/AHL. AHL is a systematic managed futures advisor owned by Man Group plc. The illustration is based on simulated rather than actual positions and returns. It does not represent the actual performance AHL has achieved in this market during this time. Date range: January 1, 2000 to November 30, 2008.

Discretionary strategies

Discretionary managed futures managers apply opportunistic strategies drawing on both fundamental and technical market analysis. They rely less on computer generated signals and more on their experience and trading skills. Discretionary traders rely on fundamental analysis by studying factors that affect supply and demand of a particular commodity to predict future prices. These may cover issues as diverse as economic strength, governmental policies, domestic and foreign political events and the weather. Fundamental analysts believe that markets have a fair value to which they must converge over the medium term and seek to identify and profit from periods of over-/under-valuation. As discretionary traders rely on human input, the number of opportunities that can be traded is smaller compared to systematic trading strategies.

CTAs may benefit from changes in market perception of risk and return

In general, managed futures managers tend to view price trends as a function of supply and demand for a particular commodity or financial instrument or as shifts in risk premium for different asset classes. There are a large number of factors that can lead to such shifts in risk premia, such as the changing state of the economy, specific events, market news, or the emergence of information not yet incorporated in the current price. Market participants have different expectations of the future, so adjustments to expectations and the inclusion of new information in the price tends to be a gradual process.

CTAs often employ strategies that are constructed to take advantage of such movements. In most cases the strategies do not seek to identify the source of the change, but rather, aim to take advantage of the change in the prices themselves. This is an important factor regarding the potential long term profitability of managed futures, since drivers and events continuously change over time and trying to identify an unknown source for an unknown event is a strategy that eventually becomes less stable as a forecasting tool. However, by identifying changes in risk premia through prices, the strategy may become more robust over time. Trend followers, for example, take advantage of the emergence of trends and dynamically manage exposure to such movements. In short, trend following strategies attempt to identify the beginning of a trend, take a position and exit it as it ends.

Risk management plays a crucial role for CTA traders

Managed futures managers – whether systematic or discretionary – allocate a significant amount of their time to risk management. The major risk monitoring measures and focus areas are the following:

- Value-at-Risk (VaR) - measures the expected maximum loss from an investment portfolio when futures markets conditions are similar to those in the model. The value is determined for a specific time interval and certain level of confidence.
- Stress testing - measures current market positions against historical price data. This allows the CTA manager to see how his current position sizes would have performed historically, especially during periods of market stress.
- Implied volatility - is a forward-looking measure of potential risk that is analyzed for each market
- Leverage - if levels approach certain multiples of prevailing net asset value, a review is triggered
- Margin-to-equity ratios – if initial margin requirements relative to prevailing net asset value reach predefined levels, a review is undertaken that may result in a reduction in positions
- Net exposures to sectors and different currencies

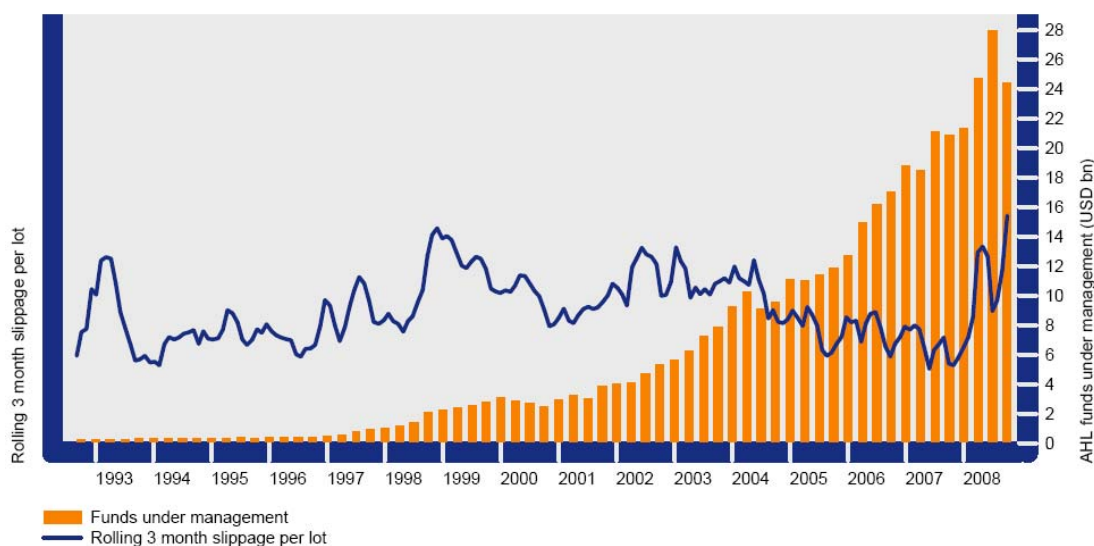
At the end of the day the infrastructure of the managed futures manager is key. Only managers that stay at the forefront of new research and trading ideas will be able to cope with today's increasingly difficult risk monitoring challenges. In many respects research and risk management go hand in glove, as new trading ideas will often require new or additional risk monitoring tools. Of course, there is no guarantee that a manager's risk controls will be successful or will prevent losses.

Electronic trading and slippage

The introduction of electronic trading technology is having a positive impact on industry liquidity. Costs are falling, and trades are now being executed within a couple of minutes of price sampling and the issuance of trade instructions. In recent years, this has helped managers to increase their assets under management while controlling slippage costs (the difference between sample price and execution price), as shown in figure 13 below. Temporary slippage fluctuations in a particular market are normal and can occur as a result of variations in liquidity or execution quality. However, a sustained and significant increase in overall slippage across all markets is a warning sign that the weight of capital being placed behind trades cannot be sustained without degrading returns. Consequently, CTA managers monitor slippage closely in order to assess execution quality as well as gauge capacity, which is a crucial consideration for any alternative investment approach premised on the exploitation of recurrent market inefficiencies.

Despite a steady increase in assets under management over the years, the leading CTAs have successfully contained overall slippage within a relatively tight band. As assets under management have increased, these managers have been able to extend trading opportunities by taking advantage of the steady proliferation in futures markets and contracts, and by developing and diversifying systems, for example, order streaming processes have improved order placement and execution and helped manage slippage. Managers with long track records are able to draw on extensive slippage data, analysis and experience to determine capacity limits. More recently, since the beginning of the credit crisis, the slippage numbers for AHL show a pronounced spike. The main reasons for this are market concerns about broker liquidity, the huge price volatility in all asset classes and strong reversals across all sectors.

Figure 13: Electronic trading enables reduction of slippage per lot



Source: Man database/AHL. All data have been extracted from the underlying AHL trading system. AHL is a systematic managed futures advisor owned by Man Group plc. The rolling 3 month slippage per lot figures are based upon daily dollar slippage per lot and the daily absolute number of lots traded. Prior to October 13, 1993 the data were stored in a different format and so may not be as reliable as the data after that date. As of November 30, 2008.

Trading on margin, leverage and notional funding – a cash efficient trading methodology

Trading on margin

Futures and forwards are traded on margin – meaning that only a small deposit is required to take a position. Depending on the volatility of a commodity, margins can vary between 0.05% and 5% of the notional value of the commodity. One can therefore achieve 100% investment exposure with just a fraction of the capital required through the inherent leverage of futures contracts. This frees up capital can be invested elsewhere or used to adjust the leverage of one’s portfolio to match the client’s risk appetite. Hedge funds and CTAs that have no interest in the delivery of the physical commodities, but use offsetting trades, make active use of the cash efficiency of futures contracts through leveraging. As always, there can be no guarantees of successful trading, and it is important to note that trading derivatives involves significant risks.

Leverage

The leverage is the ratio between the actual notional contract value and the deposited cash in the brokerage account. An investor in T-Bond futures who chooses to deposit 10% of the actual underlying commodity has the following leverage. One T-bond contract has a notional value of \$100,000 and can be purchased based on a deposit of \$10,000 at the broker. If the \$100,000 bond moves by 1%, equaling \$1000, the futures investor has earned or lost 10% on his \$10,000 deposit, which reflects 10 times leverage. If the trader had decided to purchase two contracts with the \$10,000 deposit the leverage would have been 20-fold.

Notional funding

Notional funding is a structure predominantly used in the hedge fund sector, and in particular it is applied by CTA investors (and fund of hedge funds allocating to CTAs), to make the most efficient use of the capital invested. The concept suggests replacing some of the equity invested with supplemental funding that is neither cash nor other assets, such as trading on margin. The model was further enhanced when managed accounts became a common tool in the hedge fund sector, helping investors to take advantage of the benefits of levering up low-risk assets. The investment is effectively the margin assets plus a security cash cushion. The margin-to-equity ratio measures how much of an investor’s money is tied up to meet margin requirements. A margin-to-equity ratio of 20% indicates that only a fifth of the investor’s investment or managed account balance is tied up in margin. Most managers target an annual return volatility of between 10 and 15% per annum. This translates to a gross leverage for the average manager of around 300-800% of NAV, or a margin-to-equity ratio (ME ratio)

of 5-15%. These will fluctuate in accordance to prevailing market conditions. For example, in turbulent markets characterized by high volatility and sudden reversals, directional managers sought to significantly reduce their market exposures.

It is important to understand the approach and consequences of notional funding as it may change the return on an investment. If a CTA has a minimum account size of \$5 million and only \$2 million is used as margin, an investor (such as a fund of hedge funds) will often wish to merely deposit \$2.5 million and instruct the CTA to trade the account as though it were fully funded at \$5 million. Notional funding may, however, be a double-edged sword.

During a drawdown, accounts that are notionally funded will always suffer larger percentage declines than fully funded accounts. Notional funding increases the volatility of the returns in percentage of the invested capital. A cash investment of \$2.5 million with another \$2.5 million as notional funding effectively doubles the amount invested for a total trading level of \$5 million. So, a gain of \$1 million would represent a 40% return on the notional capital while a loss of \$1 million would represent a negative return of -40%.

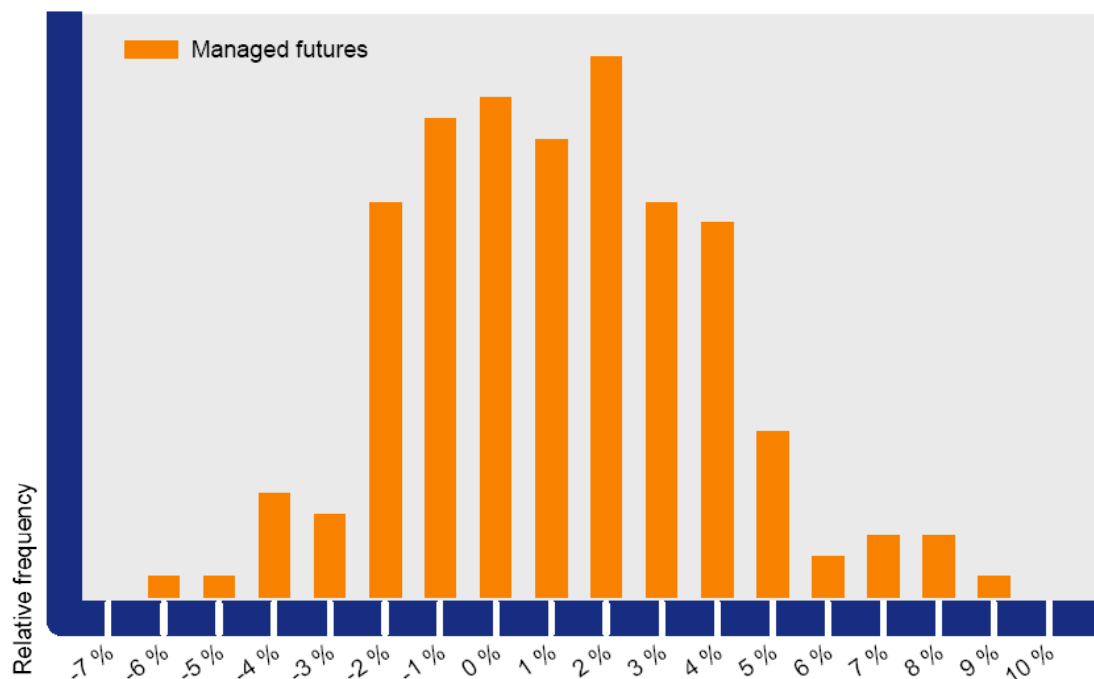
Technically, there are two ways to incorporate the notional funding concept. The first is called 'cash free-up', which enables an existing trading level to be maintained while cash is withdrawn and replaced with a notional amount. The withdrawn capital may then be reinvested in order to increase total exposure but levered up by the ratio between the trading level and the notional capital. If the notional funding concept uses capital free-up then one should keep in mind that there are always opportunity costs, and this freed cash should at least outperform the risk-free rate (i.e. T-bills). The other method would be to boost the trading level by increasing the notional amount. Both methods are accepted in the industry and are widely used. A hedge fund will accept notional funding depending on the assessment of the availability of market opportunities for the fund.

A manager trading with notional funding considerably increases its investment exposure and thus the opportunity to generate excess returns as well as the risk of generating significant losses. Notional funding provides a cost effective way of levering an investment portfolio as it does not require credit lines. Financing is, in fact, free and profit opportunities are not reduced. Adopting this approach, a fund of hedge funds provider may substantially enhance its cash management, as the cash saved with notional funding can be invested into other strategies, which is beneficial as long as its return is higher than the return of T-bills. Nevertheless, if such an approach is run by a single hedge fund or a fund of hedge funds, a state-of-the-art risk management system is essential for monitoring the account on a daily basis, the margin-to-equity ratio and the exposure in order to assess the risk properly and intervene according to pre-defined risk parameters.

Performance characteristics of managed futures

The managed futures style is generally characterized by large return distributions. Figure 14 shows the monthly distribution of the Stark 300 Trader Index, which is compiled using the top 300 trading programs from Stark's database of CTA programs. The top 300 programs are determined on a quarterly basis based on assets under management. For the period January 1994 to November 30, 2008, the monthly distribution of returns for this index ranged from -6.39% to 8.16%.

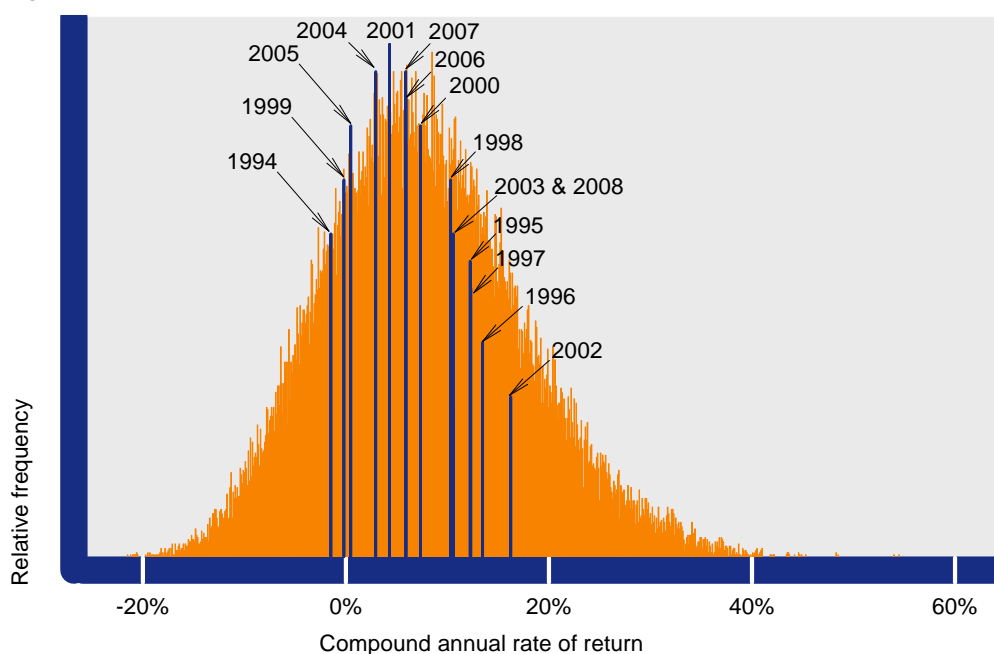
Figure 14: Monthly distribution of Stark 300 Trader Index (January 1994 to November, 2008)



Source: Bloomberg. Performance in USD. Calculated by Man Investments.

The distribution above only reflects historical aggregated CTA performance; however, it does not capture the entire range of possible returns that are typical for a single CTA manager. Figure 15 shows the results of Monte Carlo modeling using the Stark 300 Trader Index, which is a combination of several single CTA managers. The probability distribution shows that the expected annual return ranges from around -30% to over 50%. It also shows that the distribution of returns is positively skewed. This is an attractive feature of trend-following CTA programs. The wide range of possible returns is indicative of CTA managers' high volatility targets.

Figure 15: Probability distribution of Stark 300 Trader Index



Source: Stark & Co., Inc. Performance in USD. Calculated by Man Investments.

Compared to other hedge fund styles, managed futures have the highest return potential but also high volatility and downside deviation. They also have lower Sharpe and Sortino ratios than other hedge fund styles, reflecting their greater volatility. However, as managed futures typically have a low correlation to these hedge fund styles, the strategy tends to enhance the overall Sharpe and Sortino ratio of a diversified fund of hedge fund portfolio. (See section “Diversification benefits of managed futures” below where the correlation and long term benefits of managed futures will be explored in greater detail).

Investors should also be reminded that Sharpe and Sortino ratios are not the only statistical measures one should look at. As managed futures are not normally distributed, these statistical figures may not correctly capture the complete risk/return profile of this style. Hence higher moments such as skewness and kurtosis should also be taken into account.

Diversification benefits of managed futures

The developments over the last twenty years have made managed futures a specialized but increasingly significant asset class. Many high quality managers have proved capable of achieving attractive returns with risks comparable to those of a traditional stock investment over this period. Furthermore, managed futures may enhance the diversification of a portfolio and thus potentially improve the risk and reward characteristics of that portfolio, whether traditional or alternative. Please note that there is no guarantee of trading performance and past performance is not indicative of future results. CTAs can involve significant risks including a substantial risk of loss.

CTAs may provide downside protection due to low correlation

Because managed futures provide an opportunity to profit (or experience losses) from both upward and downward moves in the underlying assets and cover a wide range of commodity and financial contracts, it is possible to achieve a low level of correlation with both alternative and traditional forms of investment, as can be seen in the figures below. Please refer to the Appendix for a description of the indices used.

Figure 16: Correlation of hedge fund styles and FoF (January 1994 to November 2008)

	Equity hedge	Event driven	Global macro	Relative value	Managed futures
Managed futures	0.00	-0.03	0.49	-0.08	1.00
Relative value	0.70	0.80	0.32	1.00	
Global macro	0.57	0.53	1.00		
Event driven	0.86	1.00			
Equity hedged	1.00				

Source: Bloomberg. Performance in USD. Calculated by Man Investments.

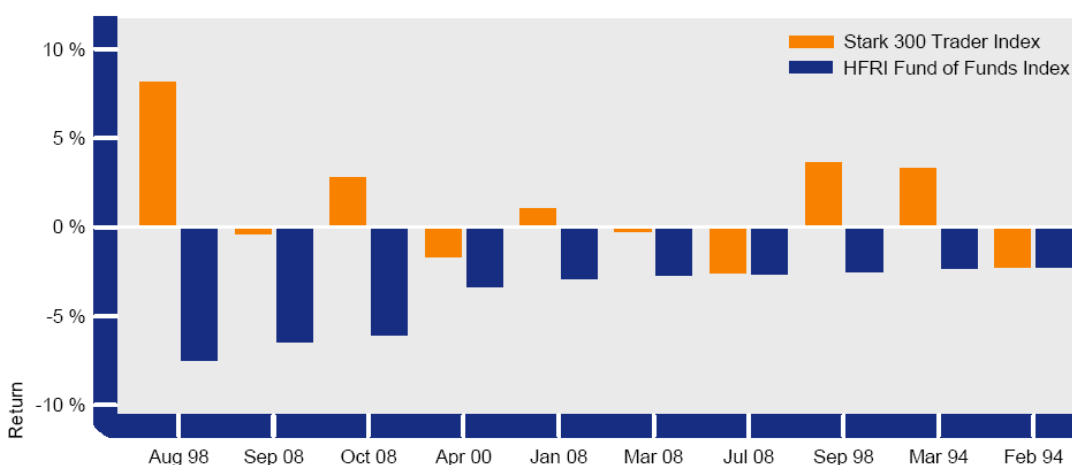
Figure 17: Correlation of stocks and bonds (January 1994 to November 2008)

	World stocks	World bonds	Managed futures
Managed futures	-0.13	0.30	1.00
World bonds	-0.15	1.00	
World stocks	1.00		

Source: Bloomberg. Performance in USD. Calculated by Man Investments.

Generally, optimal diversification can be achieved when there is no, or only low, correlation between the constituent elements of a diversified portfolio. The less correlated that the returns of a CTA fund are to other hedge fund styles and traditional investments - when these struggle - the more value the CTA can add in a diversified portfolio. Figure 18 below shows that managed futures generated returns quite independently from fund of hedge funds (consisting of equity hedge, relative value, event driven and global macro) during their ten worst months.

Figure 18: Performance of managed futures during worst months for funds of hedge funds (January 1994 to November 2008)



Source: Bloomberg, and Stark & Co., Inc. Performance in USD. Calculated by Man Investments.

Furthermore, managed futures have shown indications that they are able to protect capital during market shocks, such as when the tech bubble burst or during the Russian credit crisis.

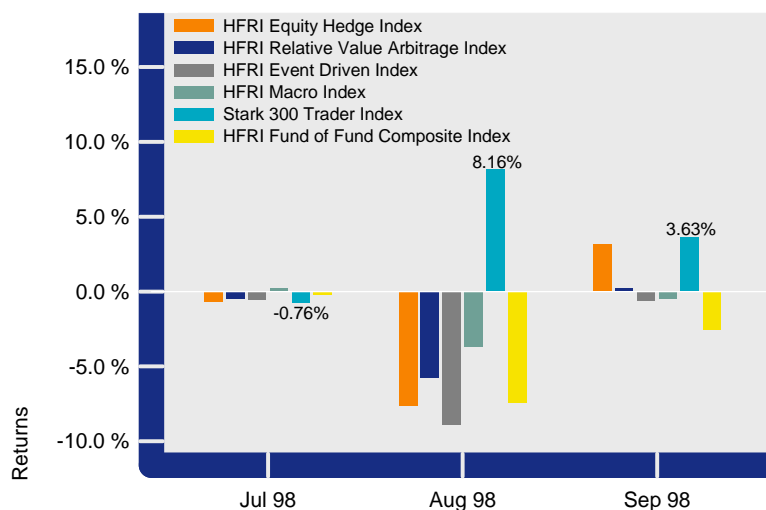
Figure 19: Correlation to managed futures during the bursting of the tech bubble, including 9/11 (August 30, 2000 to March 30, 2003)

	Fund of funds	Equity hedge	Event driven	Global macro	Relative value	Managed futures
Managed futures	-0.06	-0.29	-0.33	0.65	-0.18	1.00
Relative value	0.70	0.64	0.76	0.19	1.00	
Global macro	0.56	0.34	0.25	1.00		
Event driven	0.83	0.84	1.00			
Equity hedge	0.90	1.00				
Fund of funds	1.00					

Source: Bloomberg. Performance in USD. Calculated by Man Investments.

The high correlation of managed futures to global macro shown in the figures above is due to the fact that the differentiation between global macro and managed futures is sometimes blurred. Within the HFRI Macro Index, roughly 20% can be considered systematic managed futures managers, whereas the remaining 80% are discretionary traders. But as they also rely on models to a certain extent, their performance may be fairly similar to managed futures performance.

Figure 20: Monthly returns during the Russian credit crisis (July 1, 1998 to September 30, 1998)



Source: Bloomberg and Stark & Co., Inc. Performance in USD.

The above shows that managed futures may have the potential to provide significant downside protection during periods of market turbulence. Please note that there is no guarantee of trading performance and past performance is not indicative of future results. CTAs can involve significant risks including a substantial risk of loss.

Managed futures in a diversified fund of hedge fund portfolio

The below table shows that adding 20% managed futures (as represented by Stark 300 Trader Index) to a diversified fund of hedge fund portfolio consisting of four hedge fund styles (i.e. equity hedge, relative value, event driven, and global macro) may have a positive impact on the distribution of monthly returns and significantly reduce fat tail risk.

Table 2: Diversified fund of hedge fund portfolio with/without managed futures

January 1994 to November 2008	HFRI Fund of Funds Index	80% FoF/ 20% MF	Change
Ann. return	5.80 %	6.18 %	0.38 %
Ann. volatility	6.32 %	5.64 %	-0.68 %
Ann. downside deviation	4.59 %	3.78 %	-0.81 %
Sharpe ratio	0.24	0.33	0.09
Sortino ratio	0.33	0.49	0.16
Min	-7.47 %	-5.24 %	2.23 %
Max	6.85 %	5.62 %	-1.23 %
Skewness	-0.69	-0.17	0.52
Excess kurtosis	3.72	1.20	-2.52

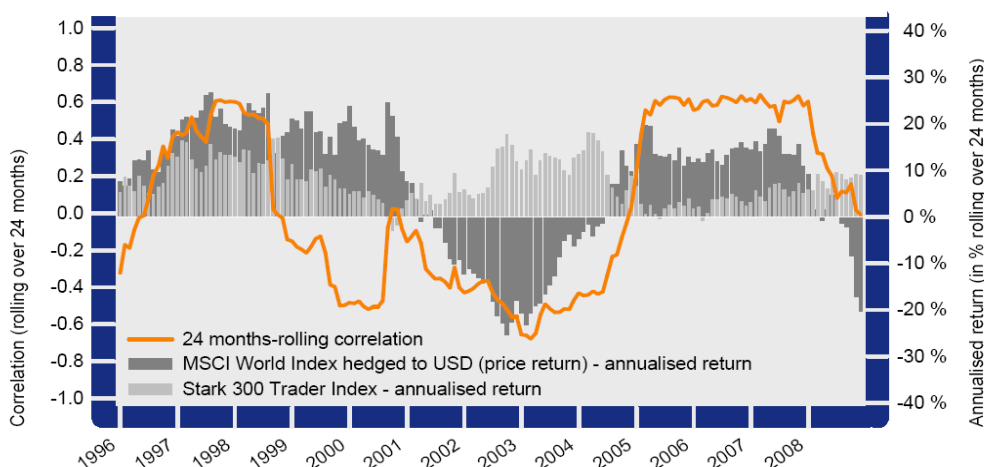
Source: Bloomberg. Performance in USD. Please note that the green color represents favorable changes, whereas the red color reflects unfavorable changes. Calculated by Man Investments.

In addition, several of the statistics, such as downside risk, kurtosis, negative skewness and maximum drawdown may be improved by introducing managed futures into the portfolio. The portfolio risk may be reduced significantly at the expense of a very small decrease in returns.

Managed futures versus traditional investments

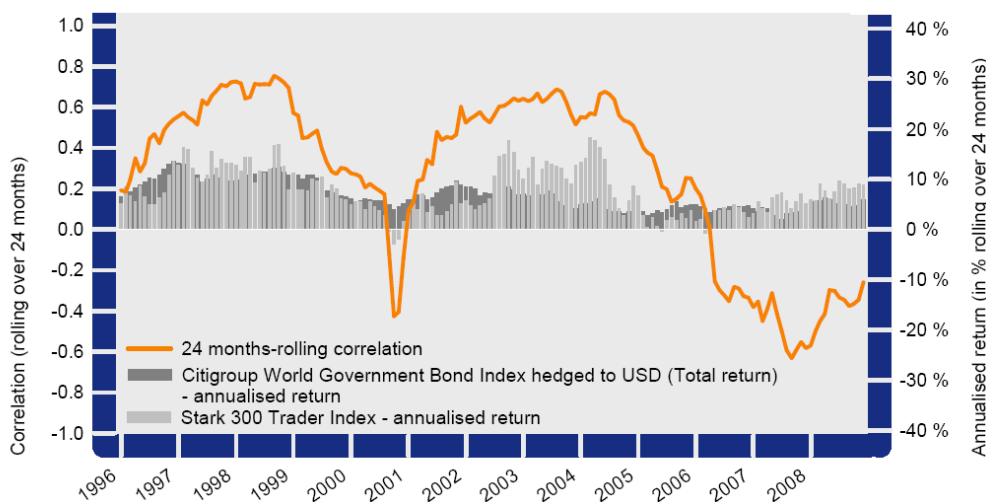
In addition to potentially improving the risk/return profile of diversified hedge fund portfolios, CTAs may also be able to enhance the characteristics of traditional portfolios. The correlation of managed futures with equities and bonds is time-varying. It is positive during up markets and negative during down markets. This can be seen in figure 21 below.

Figure 21: 24 months rolling correlation of managed futures to world equities (January 1994 to November 2008)



Source: Stark & Co., Inc., and Bloomberg. Performance in USD. Calculated by RMF Investment Management, a wholly owned subsidiary of Man Group plc.

Figure 22: 24 months rolling correlation of managed futures to world bonds (January 1994 to November 2008)

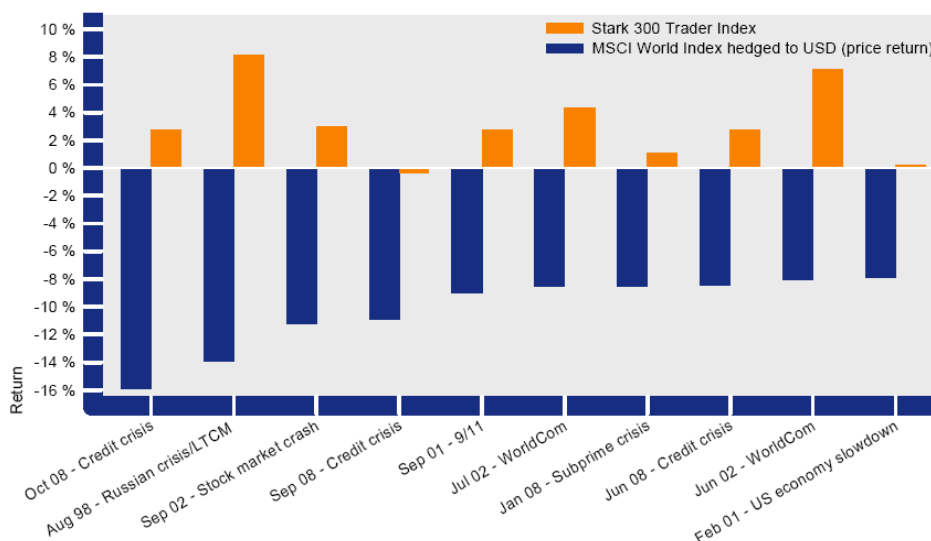


Source: Stark & Co., Inc., and Bloomberg. Performance in USD. Calculated by RMF Investment Management, a wholly owned subsidiary of Man Group plc.

The figures show that while managed futures may have a low correlation to world equities, they are slightly correlated to bonds in the long run. During market shocks for equities, managed futures tend to generate returns by being short equities and long bonds, but they may also benefit from simultaneous strong trends in other sectors. As CTAs are primarily trend following in nature, their returns are highest in periods of best/worst months for equities, as markets with the strongest up/down movements, provide the best opportunity to catch a trend. Negative trends are usually stronger than positive ones. Hence, managed futures generally profit more in falling markets than in rising markets. This was for example the case during several months in 2001 and 2002 (e.g. September 2001 or June 2002) as seen in the next chart.

The below chart shows that managed futures are fairly resistant to equity market shocks. During the ten worst drawdowns for world equities since 1994, managed futures touched negative territory only once in September 2008. In the other nine drawdowns, they were able to generate positive returns and thus protect capital.

Figure 23: Managed futures during ten worst months for world stocks since January 1994



Source: Bloomberg. Performance in USD.

These characteristics imply, and table 3 shows, that adding 20% managed futures (as represented by Stark 300 Trader Index) to a portfolio of US and non-US equities may significantly improve the risk/return profile of the portfolio.

Table 3: World stocks with/without managed futures

January 1994 to November 2008	World stocks	80 % WS/ 20 % MF	Change
Ann. return	2.99 %	4.11 %	1.12 %
Ann. volatility	14.34 %	11.39 %	-2.95 %
Ann. downside deviation	11.27 %	8.74 %	-2.53 %
Sharpe ratio	n/a	0.03	n/a
Sortino ratio	n/a	0.04	n/a
Min	-15.86 %	-12.13 %	3.73 %
Max	8.09 %	6.70 %	-1.39 %
Skewness	-0.96	-0.81	0.15
Excess kurtosis	1.51	0.94	-0.57

Source: Bloomberg and Stark & Co., Inc. Performance in USD. Please note that green represents favorable changes, whereas red reflects unfavorable changes. Calculated by Man Investments.

Managed futures also provided protection during the worst months for world bonds, although to a lesser degree than for the worst equity months.

Managed futures in 2008

Financial markets were severely stressed in 2008, particularly in the final four months of the year, as the widening credit crisis led to a failure of confidence in the banking system. Almost all asset classes, including hedge funds, incurred significant losses. Managed futures was one of the few exceptions, with both main CTA indices (Barclays CTA and Stark 300) delivering double digit gains. Almost all sectors were profitable, with most gains coming from strong trends in bond, currency and energy markets. Trades in crude oil were particularly profitable as prices rose steadily from \$100 to \$147 per barrel in the first six months of 2008 only to reverse and subsequently fall below \$40 by December. Further strong gains were achieved in currency markets with trades like long Japanese yen, short USD, GBP and other high yielding currencies such as the AUD proving profitable. The strong rally in government bonds towards year end provided further profitable trends.

Managed futures going forward

In our view, managed futures will generally provide capital protection during adverse market conditions in the future. Whenever there are market panics, strong trends in markets emerge, which can create profitable trading opportunities for CTA managers. While investors can protect themselves from stock market declines with long bond positions (flight to quality reaction), protection may also come from other sectors such as currencies and commodities which may offer offsetting opportunities during volatile markets.

However, one should not forget that managed futures may not protect against adverse market conditions over short time periods. If markets suddenly sell off after a strong rally, managed futures funds may lose money. It usually takes a CTA manager between one and two weeks to reposition. However, if a bear market lasts for several months, managed futures may benefit from this situation (as in 2008) by building up short positions. Nevertheless, fast reversals can be partially protected with other market exposures or with short-term strategies, and sometimes, managed futures systems will hold short positions before the final price collapse.

Conclusion

Managed futures, as shown by the Stark 300 Trader Index have a proven long term performance track record. This, alongside features such as high liquidity, strong regulations, low or no counterparty risk, transparency and cash efficiency, combine to create an appealing investment proposition on a stand alone basis for suitable investors.

However, while managed futures may be of interest as a stand alone investment, they also have the potential to add value as a portfolio diversifier. When combined with a fund of hedge fund portfolio or with equities and bonds, managed futures may have the potential to substantially reduce downside deviation and worst drawdown, thereby smoothing the overall risk/return profile.

Additionally, the futures industry is evolving as new technologies and trading approaches are continuously developed. This process is driven by continuous research and requires persistent investment in infrastructure and systems. As a result, it is creating clear economies of scale and constantly widening the gap between the largest and most established players and the rest of the industry while creating massive barriers to entry to new players.

An investor considering an allocation to managed futures should view them as a long-term investment, with a holding period of at least three to five years. A manager's track record, reputation and experience should all be considered when selecting a CTA manager. Alternatively, investors can obtain a CTA allocation by investing in a fund of hedge fund portfolio that includes managed futures. Managed futures are not suitable for all investors, especially given the significant risk of loss. Investors should consult with appropriate investment professionals to determine if managed futures are a suitable investment.

Please note that there is no guarantee of trading performance and past performance is not indicative of future results. CTAs can involve significant risks including a substantial risk of loss. This material is for educational purposes only and should not be relied upon for any other purpose.

Appendix

Indices used:

Style/security	Index name
Managed futures (MF)	Stark 300 Trader Index
Equity hedge (EH)	HFRI Equity Hedge Index
Relative value (RV)	HFRI Relative Value Index
Event driven (ED)	HFRI Event Driven Index
Global macro (GM)	HFRI Macro Index
Fund of hedge funds (FoHF)	HFRI Fund of Funds Composite Index
World stocks (WS)	MSCI World Total Return Index (hedged to USD)
World bonds (WB)	Citigroup WGB Index (hedged to USD)

Please note: As the investable hedge fund indices only have a track record going back to 2003, the non-investable indices have been used. Due to survivorship and backfilling biases, only the time period starting in January 1994 has been considered. There is no guarantee of trading performance and past performance is no indication of current or future performance/results.

Benchmarks and financial indices are shown for illustrative purposes only, may not be available for direct investment, are unmanaged, assume reinvestment of income, do not reflect the impact of any management or incentive fees and have limitations when used for comparison or other purposes because they may have different volatility or other material characteristics (such as number and types of instruments). A fund's investments are not restricted to the instruments comprising any one index. Certain information is based on data provided by third-party sources and, although believed to be reliable, has not been independently verified and its accuracy or completeness cannot be guaranteed.

Glossary of financial terms:

- **Annualized return (also: compound annual rate of return)**
 The compounded rate of change in the value of an investment that has been achieved each year to enable the initial price to grow or decline to the latest selected price over a particular time period.
- **Commodity Trading Adviser (CTA)**
 The manager or adviser of a managed futures [see [Managed futures](#)] fund. The term reflects the fact that early futures markets [see [Futures](#)] were commodities-based and were set up to enable manufacturers, shippers and buyers to protect themselves against possible adverse price movements in the underlying asset.
- **Correlation**
 Correlation is a measure of the interdependence or strength of the relationship between two investments. It tells us something about the degree to which the variations of returns from their respective means move together. So if two investments are positively correlated, when one performs above its mean return it is likely that the other will also perform above its own mean return. If two investments are negatively correlated, when one performs above its mean return it is likely that the other will perform below its mean return. Note that correlation says nothing about the mean returns themselves - they could both be up, or both down, or one could be up and one down. To measure the strength of the relationship, we use the correlation coefficient. Values range from -1 (perfect negative correlation), through 0 (no correlation or uncorrelated) to $+1$ (perfect positive correlation). From a risk management perspective, it is generally favorable if two investments are uncorrelated because it means that there is no identifiable directional pattern or proportional relationship between the deviations of their monthly returns from each of their respective trends. Sometimes investment B is positively correlated to investment A when the returns of A are positive and negatively correlated when they are negative, meaning that over a period of time the combined strategy returns get closer to non-correlation. This produces a smoother overall return profile.
- **Derivatives**
 Financial contracts such as futures, options and various securities that offer 'synthetic' access to an underlying asset such as a commodity, stock market or fixed income security. The price movements of a derivative generally follow the price movements of the underlying asset but derivatives generally require only small amounts of capital (margin) as security against future losses in order to gain exposure to the underlying asset.
- **Downside deviation/downside risk**
 Downside deviation is a measure of downside volatility. It is calculated by taking the annualized standard deviation (i.e. volatility) of the monthly returns that fall below the monthly risk-free rate. It differs from the volatility in that it recognizes investors' preference for upside ('good') over downside ('bad') volatility. The value thus calculated mixes information about both the severity and the likelihood of a downside event in a single figure.
- **Fat tail risk**
 Fat tails, especially negative, carry risks which are not correctly captured by volatility. Fat tail risk corresponds to large negative returns compared to what would be expected from a normal distribution. A negative skewness [see [Skewness](#)] and high kurtosis [see [Kurtosis](#)] are usually indicators of fat tail risk.
- **Futures**
 A future is a derivative instrument that involves a contract to buy or sell an asset (stock index, commodity, currency, fixed income or other security) for delivery at a future date at a specific price.
- **Kurtosis**
 Kurtosis measures how fat the positive and the negative tails of a distribution are. A positive value of kurtosis indicates that the distribution of returns has greater probability mass in the tail of the distribution than would be expected compared to a normal distribution. A negative value of kurtosis indicates the reverse, i.e. that there is less probability mass in the tails (fewer outlier events) than a normal distribution.
- **Leverage**
 Leverage and gearing effectively mean the same thing: the process or effect of 'gearing up' or magnifying exposure to an investment strategy, manager or asset. Leverage can be achieved by borrowing capital or using derivatives. A leveraged investment is subject to a multiplied effect in the profit or loss resulting from a comparatively small change in price. Thus leverage offers the opportunity to achieve enhanced returns, but

at the same time typically involves greater risk and can result in a loss that is proportionally greater than the amount invested.

- **Managed futures**

The segment of the alternative investment industry which actively trades and manages futures instruments. The advisers that focus their asset management efforts on futures are known as CTAs [see [Commodity Trading Adviser](#)]. They invest on both the long and short side of the market and usually employ quantitative or technical analysis [see [Quantitative analysis/approach](#)] and systematic investment processes.

- **Margin**

The amount of capital that has to be deposited as collateral against future losses in order to enter into an investment which gives exposure to the changes in the market value of an asset of greater value.

- **(Maximum) drawdown**

An investment is said to be in a drawdown when its price falls below its last peak. The drawdown is the percentage drop in the price of an investment from its last peak price. The period between the peak level and the trough is called the length of the drawdown, and the period between the trough and the recapturing of the peak is called the recovery. The worst or maximum drawdown represents the greatest peak to trough decline over the life of an investment.

- **Monte Carlo simulation**

A mathematical technique used to model the price characteristics of an investment structure based on random simulations of the underlying assets or variables that affect the price of that investment. In the context of the modelling carried out at Man Investments, the analysis involves constructing multiple NAV paths for a product (or an index), net of all appropriate fees and interest (in case of a product), using random samples of gross returns. The price characteristics that can be modelled using this powerful technique are known as 'path-dependent' characteristics, such as risk, return, and drawdowns, which depend on NAV movements over the life of an investment structure.

- **Option**

A derivative instrument [see [Derivatives](#)] that gives the holder the right, but not the obligation, to buy (call) or sell (put) a security or asset at a fixed price within a specified period or at a particular future date.

- **Quantitative analysis/approach**

An approach to research and investment that focuses purely on the technical aspects of price and market movements rather than on the supply and demand fundamentals, economic trends and underlying causes of price movements. The central premise is that all information relevant to understanding price levels and movements is contained within the price/s. Quantitative or technical analysis tends to be synonymous with a systematic approach to investment and can be contrasted with fundamental or qualitative analysis and a discretionary approach to investment.

- **Risk-adjusted performance**

Risk relative to return - the return achieved per unit of risk or the risk associated with a particular level of reward, typically represented by the Sharpe ratio [see [Sharpe ratio](#)]. Improving the risk-adjusted return depends either on increasing returns without a commensurate increase in the level of risk, or maintaining the level of returns while lowering the associated risk.

- **Sharpe ratio**

A measure of risk-adjusted performance [see [Risk-adjusted performance](#)] that indicates the level of excess return per unit of risk. In the calculation of Sharpe ratio, excess return is the return over and above the short-term risk free rate of return and this figure is divided by the risk, which is represented by the annualized volatility or standard deviation [see [Volatility](#)]. The greater the Sharpe ratio the greater the risk-adjusted return.

- **Short selling**

Selling securities that are either not owned or are borrowed in the expectation of buying them back at a cheaper price.

- **Skewness**

Skewness measures the asymmetry in a distribution around its mean. A positive skew indicates that the mean of the distribution is to the right of the median and that there are more frequent large positive returns than there are large negative returns. A positive skew thus demonstrates a bias to the upside. A negative skew indicates that the mean of the distribution is to the left of the median of the distribution. This means that there are more frequent large return observations to the left of the distribution (negative returns) and there are more small- and midrange positive return observations to the right of the distribution.

- **Slippage**
The difference between the sample or target price for buying or selling an asset and the actual price at which the transaction takes place.
- **Sortino ratio**
A measure of risk-adjusted performance [see [Risk-adjusted performance](#)] that indicates the level of excess return per unit of downside risk. It differs from the Sharpe ratio [see [Sharpe ratio](#)] in that it recognizes investors' greater tolerance for volatility in profitable periods ('good volatility') compared with their tolerance for volatility in periods of negative performance ('bad volatility'), and uses a measure of 'bad volatility' as provided by semi-deviation - the annualized standard deviation of the returns that fall below a target return.
- **Style**
A generic investment approach, such as equity hedge and long/short, event driven, arbitrage, global macro, or fund of funds, which has developed as a result of numerous managers aiming to exploit a particular type of market inefficiency, sharing a broadly similar conceptual understanding of that inefficiency, and employing a broadly similar investment methodology in order to extract value. Practitioners of a particular style will have their own investment process or strategy with unique distinguishing features and techniques.
- **Total return**
The total percentage return of an investment over a specified period, calculated by expressing the difference between the investment's initial price and final price as a percentage of the initial price.
- **Track record**
The actual performance of an investment since inception, usually represented by audited monthly returns, net of fees.
- **Trend**
The general direction of the market, sometimes represented by the mean of price changes in that period.
- **Value-at-risk (VaR)**
A widely used risk measurement technique that calculates (at a pre-specified level of probability) the loss that would be experienced in a day or some other pre-specified time horizon in the event of an increase in volatility or an adverse correlated move in market prices, assets or the investments making up a portfolio. At Man Investments, the proprietary measure of VAR is also known as Total Portfolio Risk (TPR).
- **Volatility**
Volatility is the measurement of risk used most often in the investment industry. Put simply, it measures how variable price changes are in relation to the price trend for an investment. It is important to note that volatility says nothing about the direction of the trend itself. Expressed in slightly more technical terms, volatility is a measure of how much a set of returns for an investment deviates from the price trend or mean of that investment. It is usually calculated as 'standard deviation' and expressed as 'annualized volatility' – the standard deviation on a yearly basis.

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