

# Crisis Alpha and Risk in Alternative Investment Strategies



KATHRYN M. KAMINSKI, PHD, RPM RISK & PORTFOLIO MANAGEMENT AB  
ALEXANDER MENDE, PHD, RPM RISK & PORTFOLIO MANAGEMENT AB

## INTRODUCTION

The investment community has heard and is following the siren call of Alternative Investments. Their seductive return properties and the mystique surrounding how they make money has tantalized investors resulting in exponential growth of assets under management. The key issue remains that dynamic strategies in Alternative Investments perform differently and are exposed to a different set of underlying risks than traditional investment vehicles. By taking a closer look into times when markets are stressed or in crisis (often called “tail risk” events), this investment primer will explain how some Alternative Investment strategies provide crisis alpha opportunities while others suffer substantial losses during times of market stress. Crisis alpha opportunities are profits which are gained by exploiting the persistent trends that occur across markets during crisis. By gaining a better understanding of what happens during crisis, the underlying risks in Alternative Investment strategies can be divided into three key groups: price risk, credit risk, and liquidity risk. By understanding and classifying Alternative Investments according to their underlying risks, performance metrics commonly used in this industry can be explained in simpler terms helping investors to use them more effectively as part of a larger investment portfolio strategy or philosophy.

## WHAT ARE ALTERNATIVE INVESTMENTS?

Alternative Investment strategies represent a wide class of dynamic investment approaches. These strategies are lightly regulated and they invest in a wide range of asset classes and financial markets. Since they are subject to less regulatory constraints, they are highly adaptable, competitive, able to invest in all sorts of liquid and illiquid, regulated and unregulated securities, and able to use leverage and risk in ways uncommon in a traditional mutual fund. This flexibility allows them to provide a drastically different risk return profile for investors. It is particularly this return profile which has attracted investment. If the Alternative Investment universe is restricted to Hedge Funds and Commodity Trading Advisors (CTAs), these strategies can be classified into two key groups: directional strategies and non-directional strategies. Directional strategies take long or short positions in financial securities in hopes of profiting from directional moves. Managed Futures (CTAs), Equity Long Bias, Equity Short Bias,

and Global Macro are generally classified as directional strategies. Non-directional strategies focus on taking relative value positions where the positions are both long and short (often) in the same asset class at the same time. Convertible Arbitrage, Fixed Income Arbitrage, Merger Arbitrage, Equity Long/Short, and several others are often classified as non-directional strategies. Due to investment restrictions, all traditional investment strategies, such as mutual funds, are long-only directional strategies.

## WHAT CHARACTERISTICS MAKE ALTERNATIVE INVESTMENT STRATEGIES “ALTERNATIVE”?

Financial markets and the market players who participate in them are not created equal. Each market player is susceptible to the rules and regulations which govern their ability to invest. Alternative Investments, given the relatively lax regulation of their risk-taking, access to short selling, and ease in use of leverage, are able to take advantage of opportunities in markets (and in ways) which traditional investors and traditional investment portfolios do not have access to. The existence and supply of these opportunities drives competition in the Alternative Investment space. It is precisely the fact that these opportunities require the use of dynamic portfolio strategies which couple short positions, leverage, and sometimes time varying risk taking that create a set of risks and performance characteristics different from traditional investments. The use of both short and long positions allow Alternative Investment strategies to isolate relative differences in prices which create risks isolated in relative price movements as opposed to the absolute movements in long-only portfolios. Relative price behavior exhibits risk and reward profiles which are often magnified by the use of leverage and aggressive risk taking.

## WHAT HAPPENS DURING EQUITY MARKET CRISIS?

When equity markets go down, the vast majority of investors, including Hedge Funds, are long biased to equities and they realize losses. Losses represent periods when investors are more likely to be governed by behavioral biases and emotional based decision making. When this is coupled with the widespread use of institutionalized drawdown, leverage, and risk limits – which are all triggered by losses, increased volatility and correlation – given an investment community which is fundamentally long biased, equity losses will force and/or drive large groups of investors into action.

When large groups of investors are forced into action, liquidity disappears, credit issues come to the forefront, fundamental valuation becomes less relevant, and persistent trends occur across markets while investors fervently attempt to change their positions desperately seeking liquidity.

Thus, times of market crisis, for both behavioral and institutional reasons mentioned above, represent times when market participants become synchronized in their actions creating trends across markets. It is only the select (few) most adaptable market players who are able to take advantage of these “crisis alpha” opportunities.<sup>1</sup> The majority of market players, especially those which are the most exposed to underlying liquidity and credit risks, can suffer losses which may often be further magnified by the use of leverage.

### WHY DO SOME ALTERNATIVE INVESTMENT STRATEGIES DELIVER CRISIS ALPHA?

Alternative Investment strategies are also subject to both self-imposed and institutionalized investment rules which will also force them into action when equity markets take losses, volatility increases, and correlations rise. Strategies with larger equity long bias will be more susceptible to these rules and more likely to be taking losses. In addition, strategies which bear more underlying liquidity and credit or counterparty risk will be less adaptable during a moment of equity market crisis. In the Hedge Fund industry where risk taking is not regulated, the widespread use of leverage will magnify these effects. Strategies such as Equity Short Bias, Managed Futures (CTAs), and Equity Market Neutral strategies seem to be immune to the devastating losses during equity market crisis for these exact reasons.

In the following section, a decomposition of performance by crisis alpha will help to distinguish which investment strategies can deliver crisis alpha and which cannot.

### DECOMPOSING PERFORMANCE IN ALTERNATIVE INVESTMENTS BY CRISIS ALPHA

Crisis periods in equity returns are periods where equity markets realize large and/or sustained losses. These periods represent the exact periods when the vast majority of investors will take losses, be forced into action based on investment rules, and be more susceptible to behavioral based decision making based on loss aversion. Markets will behave drastically differently than under ordinary circumstances. By taking a closer look at these specific crisis periods, the performance of Alternative Investment strategies can be decomposed into three pieces: the risk free rate, a risk premium in excess of the risk free rate, and crisis alpha. Crisis alpha represents the performance effect of these crisis periods. For most of the strategies, the sign of crisis alpha is

actually negative. The risk premium represents the performance gained by taking on price risk, credit risk, and liquidity risk outside of crisis periods. A decomposition of crisis alpha can help to explain when risks related to credit and liquidity issues, which often come to the forefront during a crisis, manifest themselves in Hedge Fund returns. In Figure 1, the largest crisis periods in equity returns are highlighted.

These crisis periods are then applied to Alternative Investment strategies to deduce the crisis alpha component of returns. Crisis alpha represents the difference between the original Alternative Investment strategy and the strategy without crisis periods where the performance of the strategy is substituted with an investment in the short-term debt rate (here the 3-month T-bill is used as a proxy). Figure 2 and Figure 3 demonstrate the performance decomposition of the Barclay CTA Index and the BarclayHedge Index. A closer look at the decomposition of performance shows a clear distinction between the BarclayHedge Index and the Barclay CTA Index. The Barclay CTA Index earns “crisis alpha” where the BarclayHedge Index suffers during equity crisis. The same methodology for decomposing performance by crisis alpha can be applied for all sub-strategies; the decomposition of performance is presented in Figure 4. Indices are adjusted to the same volatility beforehand.

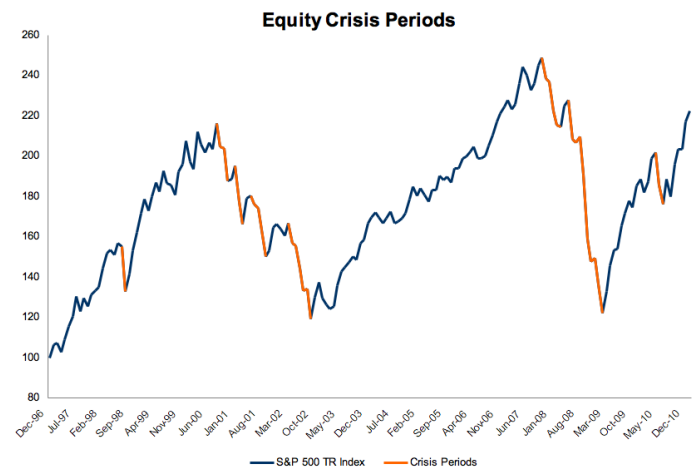


Figure 1: S&P500 Total Return Index and Crisis Periods, monthly data (Jan-97 to Jan-11)

<sup>1</sup> For further discussion of crisis alpha see Kaminski, 2011, “In Search of Crisis Alpha: A Short Guide to Investing in Managed Futures”, CME Group Education and Kaminski, 2011, “Diversify with Crisis Alpha”, Futures Magazine.

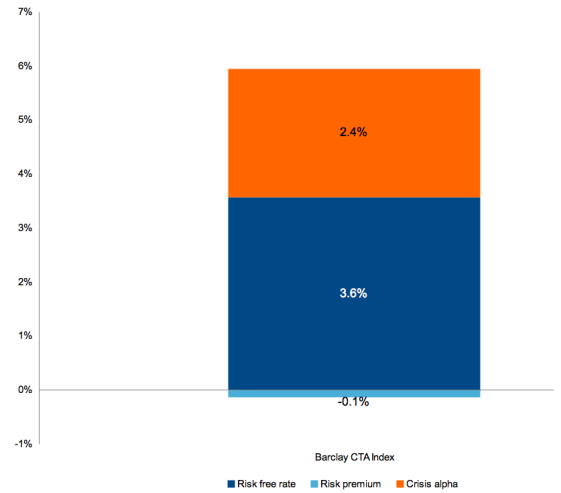
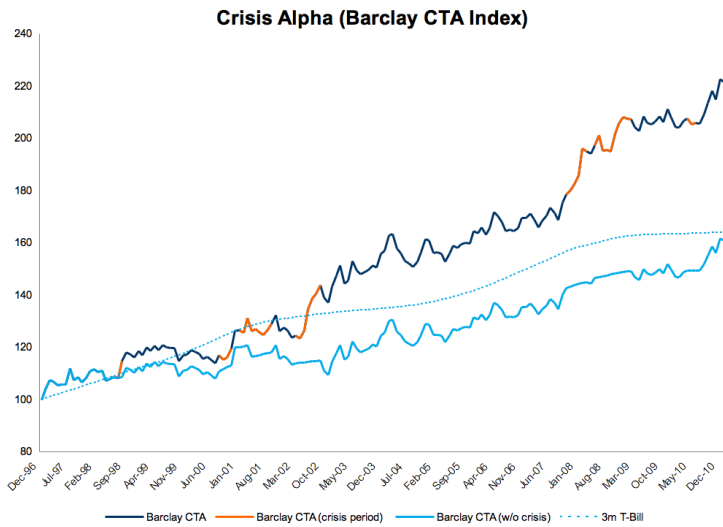


Figure 2: Performance Decomposition Barclay CTA Index, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

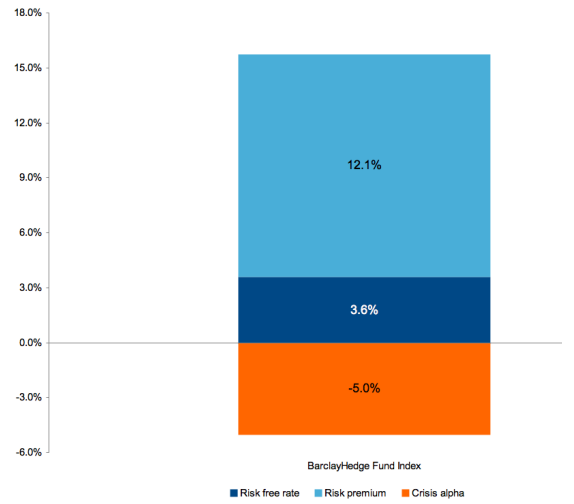
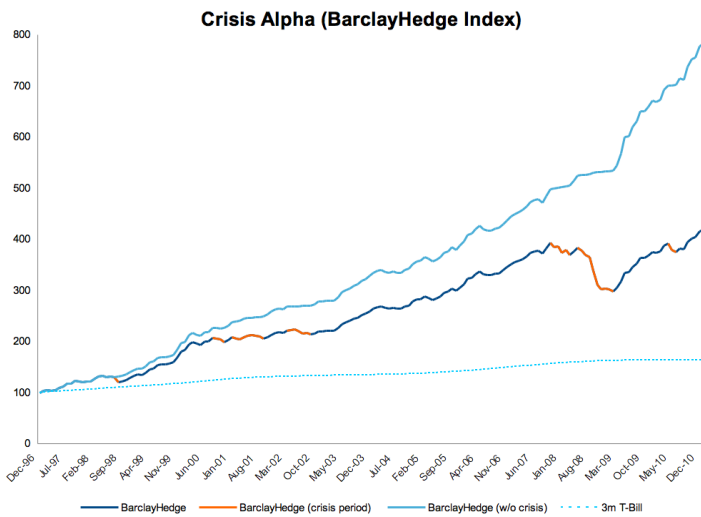


Figure 3: Performance Decomposition BarclayHedge Index, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

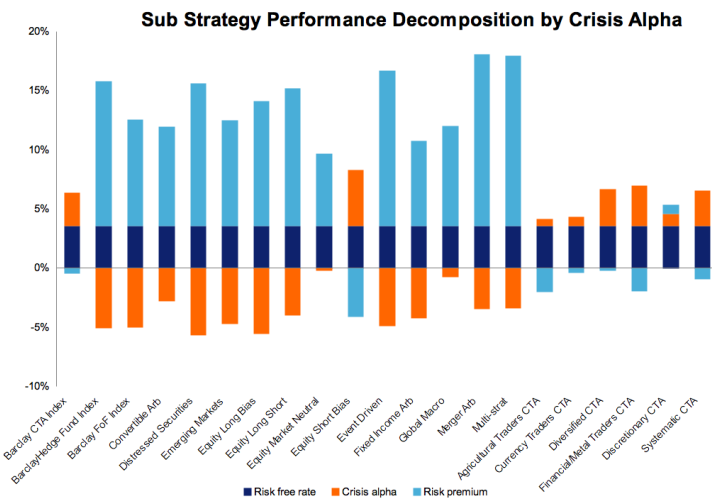


Figure 4: Sub strategy performance decomposition (volatility adjusted), monthly data (Jan-97 to Jan-11). Source: BarclayHedge

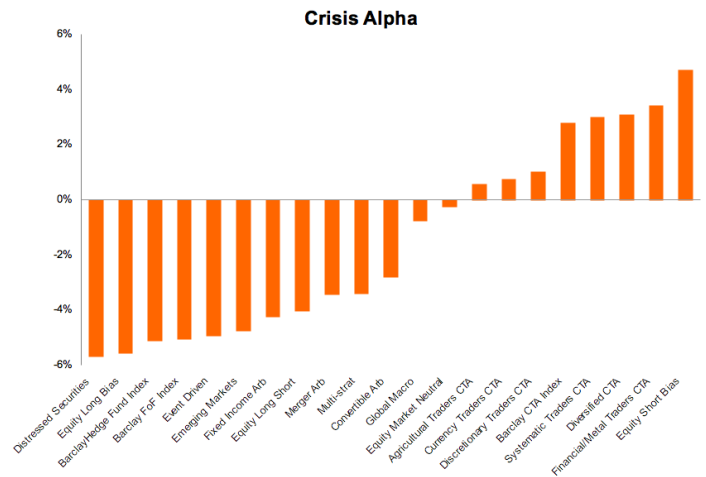


Figure 5: Crisis alpha per sub strategy, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

### A CLOSER LOOK AT RISK IN ALTERNATIVE INVESTMENTS

The performance decomposition of several different Alternative Investment strategies can help to divide the risk exposure into price risk, liquidity risk, and credit risk. Each of these risks will be explained in further detail and their impact on different sub strategies can help demonstrate how they are connected to crisis alpha. In each of the following sections, the type of risk is explained and a simple proxy for that type of risk is used to demonstrate how this risk relates to crisis alpha performance. In each case, the S&P500 Total Return Index is also plotted for comparison.

#### PRICE RISK

Price risk, often called market risk, is defined as the risk that the price of a security or portfolio will move in an unfavorable direction in the future. In practice, price risk is often proxied by volatility and it is a risk that is well understood in traditional investments as well. Price risk will be most relevant for directional strategies which focus on long or short exposures. Strategies which are exposed mostly or primarily to price risk will behave similar to security

markets over time and exhibit mean reversion in their return properties similar to security markets over the long run. Price risk is a concept which, although it can vary over time, is pervasive in all investments and it is observable over time in performance (i.e. it is not a hidden risk). In Figure 6, the level of mean reversion in several Alternative Investment strategies is plotted (inverted) vs. crisis alpha. Directional strategies take on positions similar to traditional investments with price risk which should result in higher mean reversion in their returns over time. Despite those with long equity bias, these strategies seem to be more likely to avoid losses during crisis and in some cases they can obtain crisis alpha. For non-directional strategies, mean reversion in returns is less pronounced showing how they take on less price risk than traditional assets classes and directional strategies.

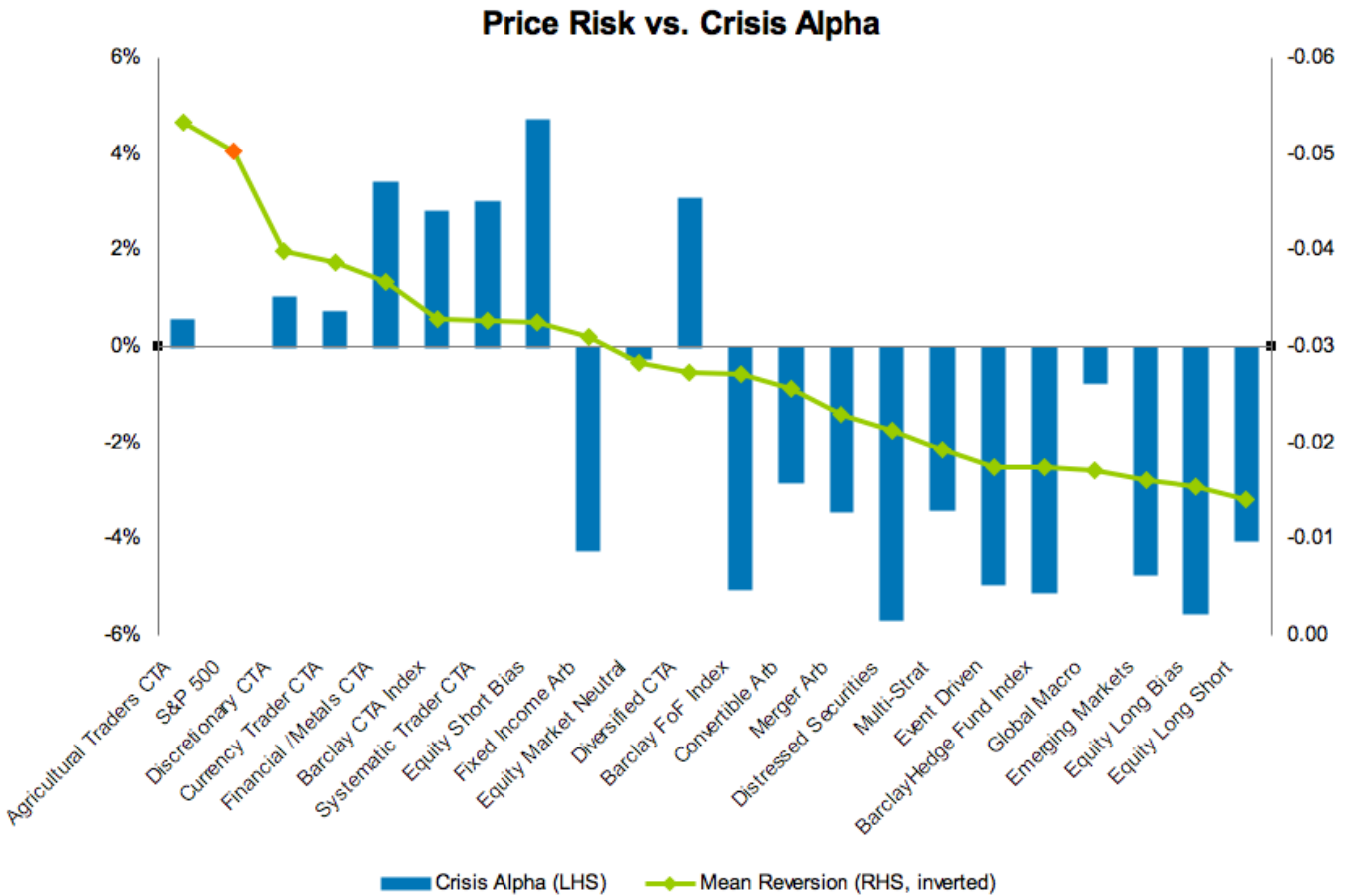


Figure 6: Price risk measured with mean reversion level in returns as a proxy for price risk for various Alternative Investment strategies, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

## LIQUIDITY RISK

Liquidity risk stems from a lack of marketability or that an investment cannot be bought or sold quickly enough to prevent or minimize a loss. Non-directional Alternative Investment strategies, often called relative value strategies, focus on buying cheaper assets which seem to be undervalued according to market prices and selling expensive assets which may be overvalued according to market prices. In this interpretation, these non-directional market strategies are providing liquidity to the market by buying the assets which investors do not value as highly and selling the assets which investors seem to want to buy. Non-directional strategies or relative value strategies become similar to a classic market maker who earns the bid-ask spread in a security. In the case of these Alternative Investment strategies, the relative spread between these two investments is their bid-ask spread and in this sense a Hedge Fund strategy is analogous to a “liquidity provider”.<sup>2</sup> If non-directional strategies earn spreads similar to a market maker, their performance will also be similar. Market makers earn

small seemingly “arbitrage-like” opportunities over time but the risk they carry comes when liquidity disappears as prices move drastically in one direction. Equity market crisis represents one of the few times when the majority of investors are forced and/or driven into action and this is one of the times when liquidity providers, or market makers, can get caught holding the wrong side of a highly levered trade resulting in large potential losses. A market making strategy will have high serial autocorrelation in returns over time since liquidity providers earn a rather positive arbitrage-like spread. Given this fact, serial autocorrelation in returns can be a good proxy for liquidity risk in an investment. In the following figure, the level of serial autocorrelation in returns for several Alternative Investment strategies is plotted vs. crisis alpha. Non-directional strategies and those strategies with higher serial autocorrelation are associated with losses during crisis. Those strategies with insignificant serial autocorrelation seem to carry less liquidity and credit risk and as a result they are less impacted during crisis.

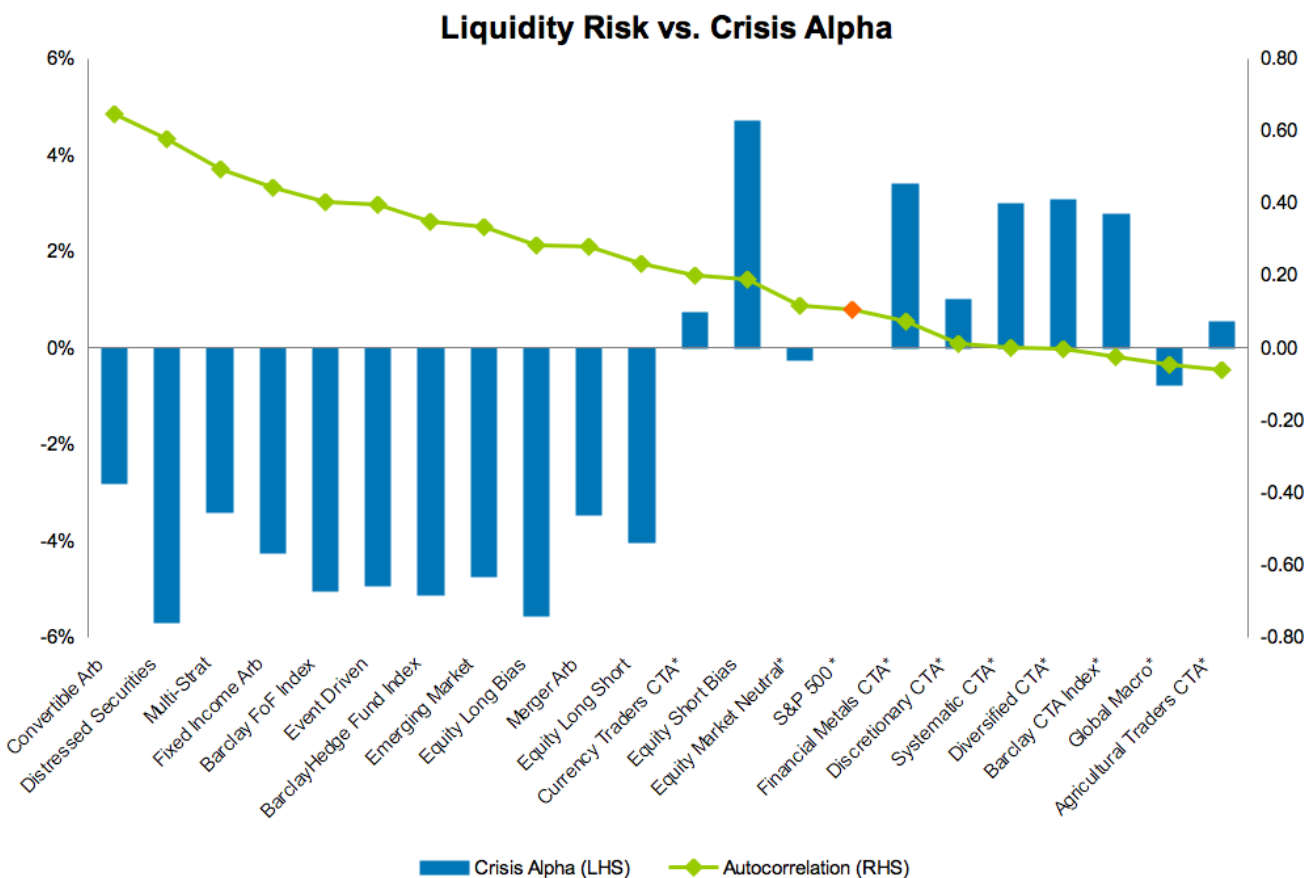


Figure 7: Liquidity risk measured by serial autocorrelation for various Alternative Investment strategies. Stars indicate statistically insignificant autocorrelation coefficients, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

<sup>2</sup> Khandani and Lo (2010) discuss the existence of an illiquidity premium. The use of autocorrelation as a proxy for liquidity risk is also discussed in Getmansky, Lo, and Makarov (2004) in regards to systemic risk in hedge funds.

**CREDIT RISK**

Credit risk is the risk associated with a counterparty not being able to repay their obligation or fulfill their side of a contract or position. Credit risk is often measured using the spread between low risk investments and their corresponding less credit worthy counterparties, for example the TED spread which is the spread between LIBOR and 3-month Treasury bill. Non-directional strategies buy undervalued, cheaper investments and sell expensive, overvalued investments according to market prices. This mispricing, in addition to a lack of liquidity, can also be due to differences in credit and counterparty risk between these two relative assets. By buying the higher yielding investment and selling the lower yielding investment, a non-directional strategy can also be described as providing credit to the market and earning a credit premium. A simple example of a “*credit provider*” strategy would be a long position in corporate bonds coupled with short positions in lower risk government debt. Strategies which provide credit in markets will earn credit premiums over time and

they will suffer in situations when credit becomes an issue. Credit issues generally come in shocks and most of these shocks occur during moments of market stress. In the following graph, several Alternative Investment strategies’ level of correlation with the TED spread, which is a proxy for credit risk exposure, is plotted (inverted) vs. crisis alpha. Non-directional strategies with high correlation to credit spreads perform worse during market crisis and directional strategies and those with lower correlation with credit spreads perform better during crisis periods. (Please note that the order of the strategies’ sensitivity to credit risk is similar but not identical to their sensitivity to liquidity risk.)

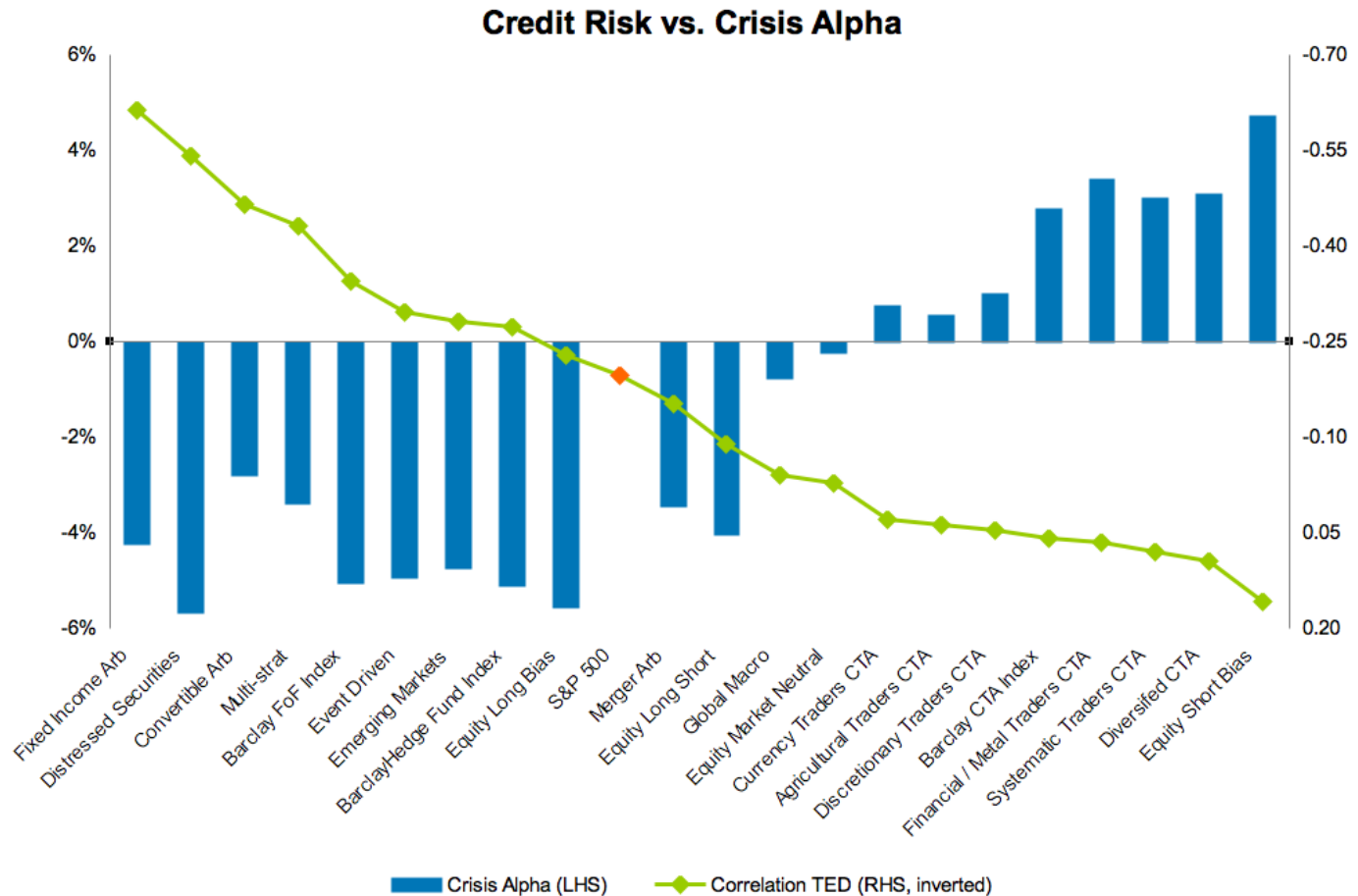


Figure 8: Credit risk measured as correlation with TED spread for various Alternative Investment strategies, monthly data (Jan-97 to Jan-11). Source: BarclayHedge

## SUMMARIZING RISK AND CRISIS ALPHA

A closer look into the performance of Alternative Investment strategies and their contribution to crisis alpha suggests that risk in Alternative Investments can be divided into three main types of risk: price risk, credit risk, and liquidity risk. Strategies which take on price risk seem more likely to provide crisis alpha whereas those which take on credit risk and liquidity risk suffer losses during equity market crisis. Table 1 summarizes the three basic types of risk in Alternative Investments and their relationship with crisis alpha. Table 2 lists the different risks in various sub-strategies of Alternative Investments and their relationship with crisis alpha.

Type of Risk	Mechanism	Crisis Alpha
Price Risk	Engage in Directional Speculation	Positive
Credit Risk	Function as "Credit Providers" for markets	Negative
Liquidity Risk	Function as "Liquidity Providers" for markets	Negative

**Table 1: Three basic types of risk in Alternative Investments, the mechanisms which create these risks, and their relationship to crisis alpha**

Strategy	Price Risk	Liquidity Risk	Credit Risk	Crisis Alpha
Equity Short Bias	++	+	-	Positive
Financial/Metal Traders CTA	++	-	-	Positive
Diversified CTA	+	-	-	Positive
Systematic CTA	+	-	-	Positive
Barclay CTA Index	++	-	-	Positive
Discretionary CTA	++	-	-	Positive
Currency Traders CTA	++	-	-	Positive
Agricultural Traders CTA	++	-	-	Positive
Equity Market Neutral	+	-	-	Neutral
Global Macro	-	-	-	Neutral
Convertible Arb	+	++	++	Negative
Multi-strategy	-	++	++	Negative
Merger Arb	+	+	+	Negative
Equity Long Short	-	+	+	Negative
Fixed Income Arb	+	++	++	Negative
Emerging Markets	-	++	++	Negative
Event Driven	-	++	++	Negative
Barclay FoF Index	+	++	++	Negative
BarclayHedge Fund Index	-	++	++	Negative
Equity Long Bias	-	+	+	Negative
Distressed Securities	+	++	++	Negative

**Table 2: Summary of risk decomposition by sub-strategies in Alternative Investments and crisis alpha**

## PORTFOLIO IMPLICATIONS OF CRISIS ALPHA AND RISKS IN ALTERNATIVE INVESTMENTS

An understanding of crisis alpha and its relation to underlying risks in Alternative Investment strategies can help to clarify and simplify risk management and the use of these investments as part of a larger investment portfolio strategy.

### **Sharpe Ratios can hide Risks in Alternative Investments –**

Alternative Investment strategies are exposed to three main risk profiles: price risk, credit risk, and liquidity risk. The Sharpe ratio is a performance measure which focuses on risk as measured by volatility and is, thus, focused mostly on price risk especially over shorter time intervals. Directional strategies, such as CTAs which take more daily price risk, can be evaluated using this measure. Other Alternative Investment strategies which function more similarly to credit or liquidity providers will not disclose their risks until there are shocks in credit or liquidity. This means that strategies which take on price risk will have relatively stable, yet lower, Sharpe ratios over time and strategies which take on credit and liquidity risk will have inflated Sharpe ratios over short time intervals. A simple graph of annualized Sharpe ratios over different frequencies for the Barclay CTA Index and Barclay Hedge Index demonstrates this effect.

**Manager Skill in Alternative Investments** – A decomposition of Alternative Investment strategies into directional speculators in prices and credit and/or liquidity providers allows for a simple interpretation of their performance. For price risk takers, manager

skill in these strategies can come from two sources: their ability to generate a risk premium in excess of the risk free rate during non-crisis periods when markets are relative efficient and their ability to generate crisis alpha by adapting quicker during crisis. For credit/liquidity providers, manager skill also comes from two sources: their ability to generate a risk premium by selecting spread-like positions with better risk reward tradeoffs during non-crisis periods and the extent they are able to evade the credit and liquidity traps which accompany crisis.

**Navigating Tail Risk Management** – Tail risk management strategies have been all the rage in a post credit crisis world. Investments which provide crisis alpha can provide diversification in portfolios when they need it the most. Most Alternative Investments strategies which provide losses during crisis will not be able to provide this type of diversification since the risks they bear in credit and liquidity will be more likely to be stressed at these times.

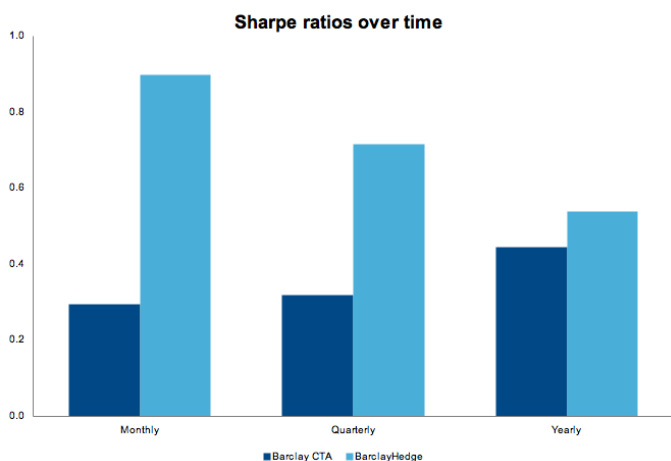
## A GLIMPSE INTO THE FUTURE OF CRISIS ALPHA AND RISK IN ALTERNATIVE INVESTMENTS

The trend towards Alternative Investments is one that is here to stay. As an investment vehicle, Alternative Investment strategies offer new and often seductive performance profiles which can be an excellent addition to any portfolio strategy. With this new performance profile comes a set of different risk exposures than most traditional investors are used to dealing with. In the modern financial environment, Alternative Investment strategies can function as directional speculators on prices and credit and/or liquidity providers. When you take a closer look at what happens during equity market crisis, some Alternative Investments, especially CTAs and/or those which are less exposed to credit and liquidity risks and focused on directional positions in prices can provide “crisis alpha” for their investors. Other Alternative Investment strategies earn consistent credit and liquidity risk premiums outside of crisis periods while delivering losses during crisis.

The increased globalization, integration, and synchronization of financial markets coupled with an industry-wide long bias to equity markets and further push for institutionalized regulation should keep financial markets susceptible to further equity market crisis events. If this is the case, although it is uncertain when equity market crisis will strike again, an understanding of which strategies provide crisis alpha and which do not, coupled with an understanding of where those risks come from, can help to clarify what to expect in future market crisis scenarios as well.

### **Contact information :**

[katy.kaminski@rpm.se](mailto:katy.kaminski@rpm.se), [alexander.mende@rpm.se](mailto:alexander.mende@rpm.se), [www.rpm.se](http://www.rpm.se)  
For additional related content, visit [www.cmegroup.com/kaminski](http://www.cmegroup.com/kaminski)



**Figure 9: Annualized Sharpe ratios over different frequencies, period Jan-97 to Jan-11. Source: BarclayHedge**

## References

- Getmansky, M., A., Lo, and I., Makarov, 2004, “An Econometric Model of Serial Correlation and Illiquidity in Hedge-Fund Returns,” *Journal of Financial Economics* 74 (2004), 529–609.
- Kaminski, K., 2011, “Diversify with Crisis Alpha,” *Futures Magazine*, (February 2011).
- Kaminski, K., 2011, “In Search of Crisis Alpha: A Short Guide to Investing in Managed Futures,” CME Group Education.
- Kaminski, K., 2011, “Offensive or Defensive?: Crisis Alpha vs. Tail Risk Insurance,” working paper under review, RPM Risk & Portfolio Management.
- Kaminski, K., and A., Lo, 2011, “Managed Futures, Tail Events, and Adaptive Markets,” Working Paper.
- Khandani, A., and A., Lo, 2010, “Illiquidity Premia in Asset Returns: An Empirical Analysis of Hedge Funds, Mutual Funds, and U.S. Equity Portfolios,” Working Paper.
- Lo, A., 2004, “The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective,” *Journal of Portfolio Management* 30(2004), 15–29.
- Lo, A., 2006, “Survival of the Richest,” *Harvard Business Review*, March 2006.
- Lo, A., 2005, “Reconciling Efficient Markets with Behavioral Finance: The Adaptive Markets Hypothesis”, *Journal of Investment Consulting* 7, 21–44.