Wake-Up Call for Risk Management Professionals

By Carlos Blanco

TWO OF THE most active hedge funds engaged in energy derivatives trading have recently been forced to liquidate their holdings after experiencing large losses in natural gas prices and volatility spread trades. Despite several warning signals pointing at their high 'blow-up' risk potential, the speed and magnitude of the losses caught many of the fund investors by surprise. Here, we outline a series of risk management lessons that could assist investors, as well as hedge fund managers, in avoiding future disasters.

First, the due diligence process should focus on the quality of risk management at the fund

Nowadays, it is unusual to come across a hedge fund manager that does not claim to have a superior risk management process in place. However, the reality is that many hedge fund managers are reluctant to set up a formal risk infrastructure due to the potential loss of autonomy in managing the fund.

Due diligence teams should be expected to evaluate the ability and willingness of the risk managers in protecting the fund's capital, and develop the ability to spot funds with weak risk management processes before committing to invest in the fund. A comprehensive framework to evaluate the market, credit and operational risk management process based on policies, methodologies, and infrastructure (PIM) can assist fund managers at funds as well as investors conducting due diligence on those funds. For example, a critical component of the framework is the authority, stature, and independence of risk managers as well as the incentives structure and capital allocation processes at the firm.

Leverage and liquidity risk management are critical for hedge fund investments

A forensic analysis performed on failed hedge funds would show that many of them had good track records, and their managers consistently sold the funds as low risk/high return investment vehicles profiting from market inefficiencies. Traders and hedge fund managers are notorious for attributing large gains to their superior analysis and investment skills and large losses to bad luck.

In 2005, Amaranth's energy portfolio made over US$800 million in profits based on highly leveraged bets that benefited from the extreme natural gas market moves that followed hurricanes Katrina and Rita. Brian Hunter, the fund's 'start trader' received a bonus in the US$75-100 million range and also persuaded the CEO to move his trading operation to Calgary, several thousand miles away from Amaranth's risk group in Connecticut.

One of the oldest investment adages states that, *'Bulls make money, bears make money, pigs get slaughtered'*. Just two months before the fund lost over US$6 billion in little over a week, Amaranth's CEO told investors that the fund would maintain their large natural gas spread positions and said that, "what Brian is really, really good at is taking controlled and measured risk".

> *'Bulls make money, bears make money, pigs get slaughtered'*

A clearly articulated funding and trading liquidity risk strategy – including leverage and concentration risk guidelines and a contingency plan in place – is critical for survival in extreme market conditions. If you have a significant position and market liquidity dries up, traditional risk and stop-loss limits will have very limited effectiveness to control the damage. Concentration and leverage limits should also be in place to avoid liquidity crises.

Structural market dynamics in energy markets have shifted in recent years

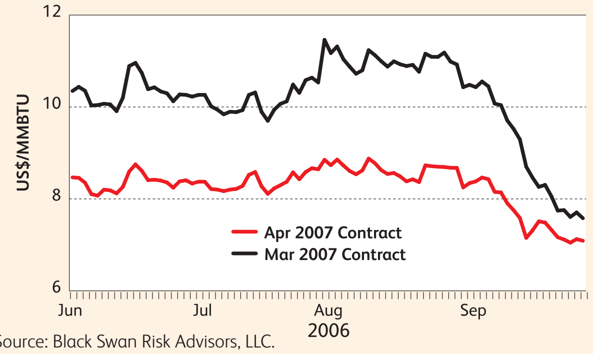
Traders and hedge fund managers with a purely physical view of the world have been consistently shocked by the magnitude and volatility of the energy price shocks experienced in recent months.

When Amaranth and MotherRock's managers found themselves at the wrong side of large trading bets, they blamed their losses on the market's irrationality. For example, Nick Maounis, Amaranth's CEO, wrote a letter to investors saying, "Sometimes, even the highly improbable happens. That is what happened in September."

Markets behave in 'very strange' ways, if we consider 'strange' a departure from past behaviour. It is an established fact that markets experience extreme moves with *higher frequencies* and *larger magnitudes* than standard models predict.

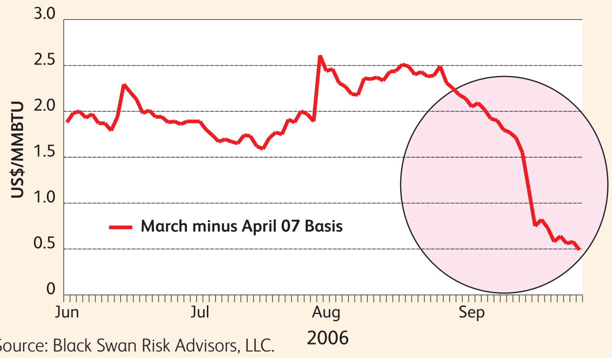
Financial markets do not operate like casinos, where the probabilities of various bets are known in advance. The fact that markets experienced a move beyond X standard deviations or that they did not follow historical patterns can no longer be an acceptable excuse given by fund managers to justify losing large amounts of capital. Risk managers should also be held accountable to higher standards than the historical analysis of price movements.

Figure 1: Daily March-April 2007 [Natural Gas Basis Changes]



Source: Black Swan Risk Advisors, LLC.

Figure 2: March 2007 minus April 2007 Basis



Source: Black Swan Risk Advisors, LLC.

Amaranth's Demise *(in Brief)**

Amaranth's US$6 bn or more losses during September 2006, which represented 70% of its Net Asset Value (NAV), have been attributed to the collapse of NYMEX inter-month natural gas contract spreads, in particular the March-April spread.

Amaranth's head energy trader, Brian Hunter, was allowed to 'bet the farm' based on the assumption that the March-April spread would not fall below certain levels. If he was right, the strategy had limited downside and a large upside potential and the fund would make large profits as spreads widened. Natural gas spread distributions are highly skewed and have the potential of upside blow-ups due to supply disruptions (such as those experienced after Katrina and Rita in 2005) or a higher anticipated consumption in the winter because of expectations of a harsh winter.

The fund's NAV experienced high volatility during 2006 due to the large fluctuations in the natural gas calendar spread. The contract spread hit a high on July 31st of US$2.61 and by the end of August, Amaranth's fund Net Asset Value (NAV) was up US$2.4 bn.

But the weather turned against the position. A benign hurricane season caused prices to fall and a new NOAA prediction of an El Nino winter (warming trend) pressured the position.The spread dropped below US$2 on September 7th and sharply decreased for several days. On September 14th the fund lost US$565 million.

On Monday September 18th , Amaranth's remaining energy holdings were sold to JP Morgan and Citadel. The fund was forced into liquidation as investors lost trust in the fund's managers.

[*For those interested in more details, we recommend Davis (2006), Davis *et al* (2006). For a comprehensive review of the risk strategies based on published information as well as the risk of the positions, we recommend Till (2006) – see end References]

The backbone of the risk process should move from risk models to risk managers

Even though MotherRock and Amaranth claimed to have 'best practice' risk management processes and teams in place, ultimately risk management failed. It is not clear whether the failure resulted mainly from modelling failures, lack of courage to confront a trader who was out of line, ill-defined policies and authorities or a combination of those factors.

A key lesson from the funds' debacles is that the backbone of the risk process should move from risk models to risk managers. *When a fund blows-up, risk managers tend to hide behind the assumption of traditional mathematical models rather than taking responsibility for the modelling errors.*

Many energy derivatives market participants still rely on models riddled with assumptions that are clearly unrealistic and whose use would be extremely difficult to justify in any other field besides finance.

After the losses, Maounis said to investors that, "although the size of our natural gas exposures was large, we believed, based on input from both our trading desk and the stress-testing performed by our energy risk team that the amount of risk capital ascribed to the natural gas portfolio was sufficient."

However, it is important to point out that *even* if the risk models used by the funds were able to capture the magnitude of one-day moves that took place (and I stress the word 'even' as it appears that the one-day market moves also surprised the fund managers), the common assumption that returns are independent through time meant that the cumulative collapse in the spread would have not been predicted by those same risk models. The problem was that the spread consistently shrunk for several days and market liquidity dried up. Traditional one-day VaR or any short-term measures would have badly underestimated the probability of cumulative losses that actually took place.

To minimise the chance of future hedge fund debacles, it's time to make risk managers accountable for protecting the firm's capital in extreme market conditions. Accountability should be linked to increased risk manager authority to adapt the model to incorporate the firm's collective knowledge related to future market dynamics beyond pure historical analysis, as well as to take action to reduce the risk of the fund when it is perceived as a survival-type of decision.

One of the key inputs of risk managers is their ability to produce a realistic range of future outcomes. The only thing we can predict about the future is that it is unpredictable. But even though the future is unpredictable, it is not unimaginable •

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