

Speedy digestion of amaranth flakes shows the industry's emerging maturity

The industry's response to the Amaranth debacle is a heartening endorsement of the capital markets' ability to absorb such shocks to the system, says Edhec's Hilary Till

The Amaranth case is surprising in many ways. It is definitely a surprise that a well-respected multi-strategy hedge fund could lose about \$6bn in little over a week. It is perhaps an even greater surprise that such a loss would have little knock-on effect on the hedge fund industry and the wider capital markets.

On 2 October, the Edhec Risk and Asset Management Research Centre released a report on the early lessons from the Amaranth debacle. This column will summarise this report. Given that there are no new material facts on this case as of 30 November, this column will focus on providing new inferences on the riskiness of Amaranth's trading strategies.

Given that we have the benefit of observing the past two months of stability in the hedge fund industry, we can draw new conclusions about the emerging maturity of the industry.

In Edhec-Risk (2006), we discussed how Amaranth, a respected, diversified multi-strategy hedge fund, could have lost 65% of its \$6.2bn in assets in a little over a week. To do so, we took the publicly reported information on the fund's natural gas positions as well as its recent gains and losses to infer the sizing of the fund's energy strategies. As of 31 August, the fund's likely daily volatility due to energy trading was about 2%. The fund's losses on 9 September were massive compared to the fund's recent daily volatility.

One should not conclude that large standard-deviation moves such as occurred with Amaranth are as unlikely as, say, a catastrophic meteor strike. Instead, these large moves in portfolio performance illustrate the impact of an extreme liquidation scenario once a highly leveraged fund becomes distressed. We discussed how Amaranth's strategies were economically defensible in providing liquidity to physical natural-gas producers and merchants. However, we concluded that the magnitude of Amaranth's energy position-taking had clearly been inappropriate relative to its capital base.

Our report does not cover the operational issues, which obviously arise from this case. We would recommend the Fauchier Partners' essay on their due-diligence insights for specific lessons on this topic, as covered, for example, in Hosking (2006).

REVERSE ENGINEERING THE BOOK

One would expect that the exact natural gas positions that were held by the Amaranth multi-strategy funds will be confidential for an extended period of time.

Nonetheless, a substantial amount of information has thus far been made public regarding this debacle. Two of Amaranth's natural-gas spread strategies have been frequently mentioned in press reports. The size and timing of the fund's



gains and losses in energy trading have also been exhaustively detailed in the public domain. We therefore have enough information to perform a simple returns-based analysis on the fund's energy strategy.

Returns-based analysis is a well-known technique in the hedge-fund industry since investors and risk managers frequently are not provided with position-level transparency. Instead, investors usually have to infer the exposures of a hedge fund from the fund's return data.

One of the key insights in the Weisman and Abernathy (2000) approach to returns-based analysis is to use inflection points in a fund's profits and losses (P&L) to infer a fund's underlying exposures. It is mainly when there are inflection points in a fund's P&L that the fund's exposures reveal themselves, as confirmed by Joseph Eagleeye of Premia Capital Management.

We note that Amaranth apparently held short

summer/long winter natural gas spreads as well as long March/short April natural gas spreads, including in deferred-delivery years, possibly through 2011.

We can create two spreads: (1) a natural-gas spread combination in the March-April contracts for delivery in 2007, 2008, 2009, 2010, and 2011; and (2) a natural-gas spread combination of long winter (December, January, February, and March) and short summer (June, July, August, and September) contracts for delivery in 2007 through 2011.

We can infer the size of Amaranth's positions in spreads (1) and (2) based on the publicly reported gains and losses for the fund's energy book.

It appears that the fund held positions that were highly correlated to holding about 86,000 March-April spreads and 11,000 winter-summer spreads throughout the natural gas curve.

We can double-check this inferred sizing against other publicly known facts on Amaranth. These positions provide approximately the same P&L as the publicly stated P&L for Amaranth from June through the end of August.

Note that we are not representing that the positions derived in this analysis are Amaranth's actual positions. Instead, the strongest point that we can make is that these positions were highly correlated to the ones that produced Amaranth's publicly reported losses.

Natural gas participants will note that the magnitude of the inferred positions is greater than what would be expected from an examination of the futures open interest on the New York Mercantile Exchange.

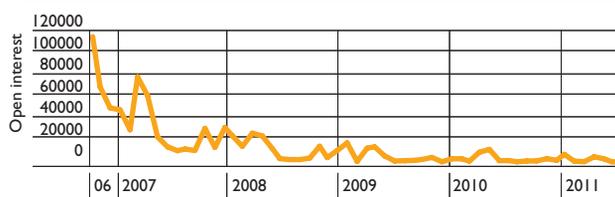
Therefore, one would expect that a substantial fraction of the positions were accumulated through the over-the-counter swap market. Further details on our returns-based analysis are covered in Edhec-Risk (2006).

Figure 1 shows the open interest of Nymex Natural Gas contracts throughout the curve as of 31 August. Figure 2 shows the daily trading volume for each natural gas contract, also on 31 August. Based on our inferred sizing of Amaranth's positions and from inspecting the open-interest and trading volumes of the exchange-traded futures contracts, we can immediately conclude that Amaranth's position sizes were quite massive.

Assume that one wanted to exit the inferred positions of Amaranth without creating a price-pressure effect on the natural gas markets. Let's say we would therefore restrict our daily trading to 5% of the open interest in the back-end of the Nymex-curve. Under this strategy, it would have taken about 410 business days to exit the Amaranth positions quietly. This clearly did not happen.

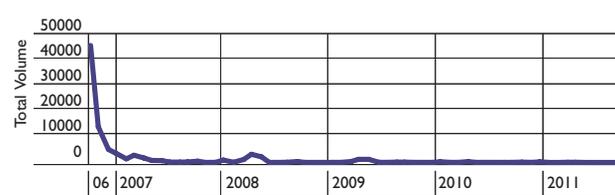
An obvious question in retrospect is to ask:

FIG 1: NYMEX NATURAL GAS FUTURES CONTRACT OPEN INTEREST



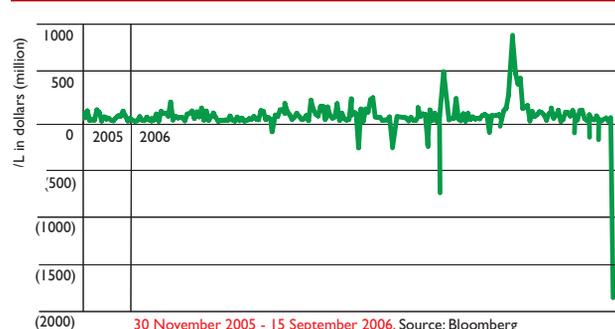
As at 26 Sep 2006. Source: Edhec

FIG 2: NYMEX NATURAL GAS FUTURES CONTRACT TRADING VOLUME



As at 31 August 2006. Source: Bloomberg

FIG 3: DAILY CHANGE IN P/L FROM INFERRED NAT GAS POSITIONS



30 November 2005 - 15 September 2006. Source: Bloomberg

FIGURE 4

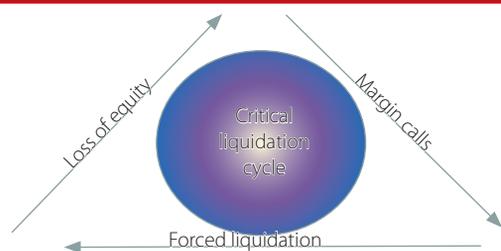
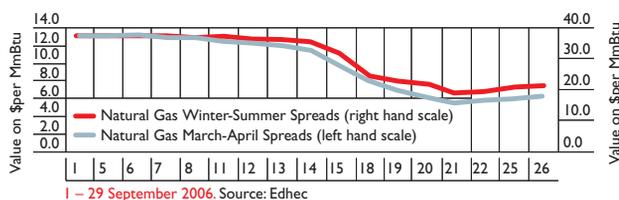


FIG 5: NATURAL GAS SPREADS



how did Amaranth's risk managers become so wrong-footed in evaluating the risk of the firm's natural gas strategy?

Risk metrics using recent historical data would not have been helpful in understanding the magnitude of the fund's moves during an extreme liquidation-pressure event (see figure 3).

As of the end of August, the daily volatility of Amaranth's inferred natural gas positions was about 2% based on the previous three months of trading experience.

The fund's loss on 15 September may then have been a nine-standard-deviation event based on the recent daily volatility of the fund. As will be discussed, the interpretation of this mathematical fact should not be that such events are as rare as a catastrophic meteor strike. Instead, this debacle provides an example of a severe liquidation cycle that can happen to a highly leveraged fund, which has large illiquid positions.

CRITICAL LIQUIDATION CYCLE

De Sa'Pinto (2006) summarised the dynamic behavior of Amaranth as it attempted to preserve capital as its losses mounted during the second week of September.

A strongly adverse market movement, which in turn may have been triggered by the fund's initial attempts to reduce its exposure to the natural gas market, appears to have forced Amaranth to liquidate more and more of its positions during the middle of September. In the absence of natural financial counterparties to take on the other side of Amaranth's massive positions, the value of these positions rapidly fell, triggering even more liquidations.

Such scenarios have been documented and formally modelled in the past for highly leveraged funds. Once a fund crosses a threshold of losses,



Amaranth left its mark in many ways

a cycle of investor redemptions occur (and/or the fund's prime brokers demand the reduction of leverage), and the fund's net asset value thereby declines precipitously as the fund sells off holdings in a distressed fashion. Thus, a 'critical liquidation cycle' begins, which, in turn, has been modelled as being short a barrier-put option. This was done specifically by de Souza and Smirnov (2004). Figure 4 illustrates this cycle.

It appears that a sizeable fraction of Amaranth's natural gas spread trading was in the relatively illiquid deferred part of the natural gas curve. Here, no matter how long one's dataset is, value-at-risk (VaR) will be of little help. There is an appearance of stability in the back-end, illiquid part of the curve, so VaR will show relatively low risk, even with very large positions. However, if one then tried to transact in size, then this is another matter.

Unfortunately, prices really should be 'parameterised', rather than be represented as a single point. The 'fair-value' price for any investment is actually a function of the size of a transaction, how quickly the transaction needs to occur, and the risk preferences of the trader, as discussed Weinstein and Abdulali (2002).

The Weinstein and Abdulali framework is very appropriate for the commodity markets since these markets do not have natural two-sided flow. For experienced traders in the fixed income, equity, and currency markets, this point may not be obvious.

The commodity markets have 'nodal liquidity'. If a commercial market participant needs to initiate or lift hedges, there will be flow, but such transactions do not occur on demand.

For experienced commodity traders, a key part of one's strategy development is a plan for how to exit a strategy. What flow or catalyst will allow the trader out of a position? In the case of Amaranth, there was no natural (financial) counterparty who could take on their positions in under a week (or specifically during a weekend when the fund initially tried to transfer positions to a third party).

The natural counterparties to Amaranth's trades are the physical-market participants who had either locked in the value of forward production or storage, as further discussed in Edhec-Risk (2006). The physical-market participants would have had physical assets against their derivatives positions so would have had little need to unwind trades at Amaranth's convenience.

SCENARIO ANALYSES

Veteran commodity traders do use measures such as value-at-risk calculated from recent data to evaluate risk. However, they also employ scenario analyses to evaluate worst-case outcomes. A natural scenario analysis for Amaranth would have been to examine what the range of natural gas spread relationships had been in the past. One

would then have found how very risky the fund's structural position-taking was in its magnitude.

Why did a 'multi-strategy' fund such as Amaranth effectively become one large bet on US natural gas spreads? Was this because of capacity constraints in the hedge fund industry?

The decline in returns in established hedge fund strategies may have led Amaranth to pursue a very non-traditional strategy, but the decline in established strategy returns is not necessarily because of capacity constraints in the overall hedge fund industry.

A likely explanation for diminishing returns in some hedge fund strategies is the cyclical changes in the values of the risk premia (or 'alternative betas') to which hedge fund strategies are generally exposed. As Géhin and Vaissié (2006) show, "hedge fund returns are *primarily* drawn from exposures to a variety of risk factors." (Italics added.) And traditional betas and alternative betas are indeed quite scalable, as discussed by both Géhin and Vaissié (2006) and Jaeger and Wagner (2005).

AN INDUSTRY MATURES

The assumed Amaranth spreads stabilised one day after the fund's positions were transferred to JP Morgan and Citadel during the third week of September (See figure 5). These two financial institutions took on Amaranth's distressed positions at a substantial discount to the positions' mark-to-market value.

That JP Morgan and Citadel took on Amaranth's energy book en-masse is a preview of how the markets will handle future hedge-fund liquidations.

Apparently, an investment bank is now packaging up the assets of various hedge funds in distress to sell on to investors.

This is preferable to an individually distressed hedge fund trying to quickly sell its assets on the open market. Such a mechanism means that investors in hedge funds in distress will receive much more of their money back, and with less of an adverse impact on whatever asset class or investment the hedge fund is specialising in.

Further, a JP Morgan official was quoted in Reuters (2006), noting how there would likely be "more Amaranths," and that provided there were not conflicts of interest, his institution was prepared to play the same role as it did during the Amaranth crisis.

In conclusion, the final lesson from the Amaranth debacle is that this may be an early sign of the hedge fund industry maturing. If the capital markets can develop smooth mechanisms for transferring whole portfolios of hedge funds in distress, then one will not expect to see the continuation of large-scale distressed liquidations as with Amaranth (and Long Term Capital Management.)

In the long-only world, the transferring of portfolios from one active manager to another by pension funds and other institutional investors is already very well-developed to minimise price-pressure effects. The development of similar mechanisms is and will be a very positive development for the hedge fund industry.

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