



## THE PECULIAR ALCHEMY OF HEDGE FUNDS

For nearly as long as traders have exchanged goods, they have exchanged securities — instruments representing promises concerning those goods. Common market mythology credits Aristotle with reporting the earliest use of an option contract. In his *Politics*, he recounts the story of Thales of Miletus (624-547 BCE), who in winter secured an option to rent all the olive presses in Miletus and Chios the following summer, profiting when a bountiful harvest created a sudden demand for the presses.<sup>1</sup> While the myth makes clear that such financial contracts are of ancient origin, in fact they seem to go back far beyond ancient Greece. Some argue that archaeological evidence indicates the use of instruments much like futures and options — derivatives, if you will — as far back as the Sumerians of 3000 BCE.<sup>2</sup>

Modern markets give traders the opportunity to deal in standardized securities representing commodities of all kinds — grains, of course, but also livestock, precious and base metals, and energy, among many others. The futures exchanges in particular allow producers and users of commodities — farmers and millers; ranchers and meat packers; oil drillers and refiners and big fuel users like airlines — to hedge major business risks by locking in contracts that offset future movements in the price of their key commodities. By reducing their risk, these enterprises lower their cost of capital, decrease the likelihood of disaster, and increase the value of their businesses.

If hedgers can gain value by hedging their risks through the futures markets, where do those gains come from? To some extent, hedgers on opposite sides of the market — the farmer selling grain and the miller buying it, for instance — can trade with one another, in effect locking in today a price at which they will buy and sell after the harvest.<sup>3</sup> But hedgers aren't the only participants in commodities markets. A second class of traders, the speculators, buy and sell futures contracts without having a natural interest in the underlying commodity. They trade these markets hoping to profit from favorable movements in prices or in price relationships. Speculators provide necessary liquidity and capital to the markets. They are also willing to take

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<sup>1</sup> See, for example, Vasiliki Makropoulou and Raphael N. Markellos, "What is the Fair Rent Thales Should Have Paid?" Athens University of Economics and Business, <http://www.aueb.gr/pympe/hercma/proceedings2005/H05-FULL-PAPERS-1/MAKROPOULOU-MARKELLOS-1.pdf>

<sup>2</sup> See, for instance, Leo Melamed, "The Metamorphosis of Futures and Options," Essay presented at the Chicago Mercantile Exchange Symposium on Financial Futures, London, England, November 10, 1985, <http://www.leomelamed.com/Speeches/85-lndn.htm>. Mr. Melamed goes so far as to claim that Joseph's advice to Pharaoh was to buy grain forward for the seven lean years.

<sup>3</sup> This isn't exactly how futures contracts work, but they should have a similar effect.

on some of the risk the hedgers are trying to shed. Since speculators provide the markets some of the elements necessary to create value for the hedgers, it's reasonable to expect that speculators should be able to earn a portion of that value.<sup>4</sup> In essence, if the function of the futures market is to transfer risk among participants, then those that voluntarily accept that risk (speculators) should reasonably hope for some compensation from those that want to lay off the risk (hedgers).

In recent years, some of the most active participants in commodities markets have been hedge funds. In an odd inversion of nomenclature, hedge funds act in the commodities markets not as hedgers (those with a natural economic interest in the commodities), but as speculators, hoping to profit from movements of prices or price relationships. As speculators, they have reason to hope for a return on their activity, as compensation for relieving hedgers of risk.

### **TROUBLE IN HEDGE FUND LAND**

In recent weeks, the financial press has suddenly been full of stories about hedge funds. Many of these stories concerned Amaranth Advisors, a hedge fund that traded heavily in energy futures and suffered startling losses during September, and now seems to be on its way to liquidation. Most of the trouble seems to have taken place during the first half of September, when the price of natural gas fell by nearly 20%. According to published reports, Amaranth, a fund that started the month at a value of around \$9.5 billion, lost some \$6 billion during September, largely on its energy position. As the reported amounts of the losses grew larger, Amaranth's public statements and investor communications grew increasingly guarded. After the initial reports of losses, Amaranth expressed its intention to stay in business, but by the end of September, the firm had announced that it planned to dispose of its remaining assets, and make periodic cash distributions to its investors.<sup>5</sup>

Prior to announcing its plans to liquidate its investments, Amaranth had been at pains to point out that most of its trades were relatively low-risk, "spread" trades in the natural gas markets, positions that sought to benefit not from the outright movement of the price of gas, but from the behavior of price relationships within the markets. Spread positions, properly constructed, can have lower risk than direct positions, but as a friend of mine likes to say, "Laws of physics still apply" — a position with lower risk can also offer more modest returns. Yet Amaranth had reported large gains earlier in 2006, including a gain of 12% during April, most of which, according to the *Wall Street Journal*, the firm attributed to energy trades.<sup>6</sup>

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<sup>4</sup> There is a whole literature on how this is supposed to work, starting with what Keynes, in uncharacteristically inelegant fashion, called the Theory of Normal Backwardation. See Keynes, J.M., *A Treatise on Money* – Volume II, Macmillan, 1930.

<sup>5</sup> See, for example, "Amaranth to sell all remaining positions," Alistair Barr, Marketwatch, Sept. 29, 2006. Available at <http://www.marketwatch.com/News/Story/Story.aspx?guid={59B167B2-2D4D-4C80-9BFC-996F997C20DD}>

<sup>6</sup> See Ann Davis, Henny Sender, and Gregor Zuckerman, "What went wrong with Amaranth Advisors," Sept. 20, 2006. Originally in the *Wall Street Journal*, available at <http://www.post-gazette.com/pg/06263/723449-28.stm>

So how can we reconcile the large swings in value with Amaranth's purported use of low-risk strategies? The most likely explanation is leverage. Amaranth had several forms of leverage available to it. Futures trading is a leveraged business to begin with. Most futures contracts permit trading on thin margins — to buy (or sell short) futures contracts representing \$100,000 of a commodity, speculative traders generally only have to post around 10% of that notional value in cash. So a natural gas trader with \$1 billion in capital could, in principle, control \$10 billion worth of natural gas contracts. Many hedge funds also have access to substantial bank credit lines. The *Wall Street Journal* story reports that funds like Amaranth often have the ability to borrow three to eight times their initial capital.

### **LEVERAGE ON LEVERAGE**

If Amaranth could borrow, say, four dollars for every dollar of investor capital, and then trade futures contracts on 10% margin (creating an additional 10-to-1 leverage), then \$1 billion in investor capital could conceivably give Amaranth the ability to trade futures contracts representing \$50 billion worth of underlying commodities. The fund's ability to borrow creates one layer of leverage, and the margin structure of the futures contracts creates a second. But there's also a third. \$50 billion is an awful lot of buying power in any market. Various observers have attempted to estimate the size of the positions that went wrong for Amaranth, but at minimum it's clear that they were large. Most press reports about Amaranth concentrate on a particular spread position, in which, they say, Amaranth bought (went long) contracts for natural gas for delivery in March 2007, and sold (went short) the April 2007 contract. Gas being a seasonal commodity, March gas is usually a little more expensive, and Amaranth's position was essentially a bet that as the delivery dates on these contracts approached, the normal price relationship would widen. In his blog, Brad DeLong works backward from press reports of energy price movements and Amaranth's losses to posit that Amaranth could have held open positions in excess of 250,000 natural gas contracts for each of the two delivery dates.<sup>7</sup> A commenter on Mr. DeLong's blog entry claims, however, that the peak open interest in the April 2006 natural gas contract at the New York Mercantile Exchange (the NYMEX) was 26,000 contracts. At any rate, Amaranth's position was a large fraction of the total in these contracts.

Whatever the real numbers are (and we'll probably never know them), building a large position in any market is bound to move it. If the press reports are correct, Amaranth's strategy was to buy the more expensive contract and sell the cheaper one, hoping that the spread would widen further. If so, and if the volumes involved are even approximately correct, then the trade was bound to succeed — at first. The heavy buying volume would push the March contract up, and the heavy selling volume would hold the April contract down. The trading would itself cause the spread to widen. This type of action has the potential to develop into kind of a legal Ponzi scheme, in which the first round of trading creates strong initial performance, which, in turn,

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<sup>7</sup> Brad DeLong, "Annals of Financial Legerdemain: Natural Gas Futures and the Mystical Power Grain of the Aztecs," Brad DeLong's Semi-Daily Journal, Sept. 19, 2006 at [http://delong.typepad.com/sdj/2006/09/annals\\_of\\_finan.html](http://delong.typepad.com/sdj/2006/09/annals_of_finan.html)

allows the fund to gather more assets and perhaps borrow more aggressively from satisfied lenders. The fund can then add to its position, and the cycle begins again. Interestingly, the cycle works the same way (for a while) whether the fund manager is intentionally running a scheme, or sincerely believes in the trade.

A trading strategy that drives its own pricing can show stellar returns for a while, but it must ultimately return to reality. The fund may run out of ability to gather new assets, it may tighten its risk controls, constraining itself from adding to the position, or the market may simply catch up with the trade. Whatever the reason, in Amaranth's case the pricing spread between the March 2007 and April 2007 natural gas contracts collapsed during September. At the end of August, the March 2007 contract settled at \$10.483 (we usually quote natural gas prices in both spot and futures markets in dollars per million BTUs), and the April contract settled at \$8.343. The spread was \$2.14. At the end of September, the March contract had fallen to \$7.733, and the April contract to \$7.223.<sup>8</sup> The spread was down to \$0.51. Amaranth had bet that the spread would widen, but instead it decreased by enough to cost investors most of their assets, and the firm its fund. One downside of leverage is that it takes away the flexibility to wait out an adverse market move, in hope of a recovery. And as the fund unwinds its position, the price pressure works against them, potentially exacerbating the losses.

### **BUT WHAT ABOUT RISK?**

When a hedge fund suffers out-sized losses, questions about the firm's risk control discipline inevitably arise. In some sense, the large loss stands as evidence of large — probably too large — risk. These events are all the more striking because many hedge funds claim as a selling point that because they have the ability to use a wide variety of instruments and trading strategies, they insulate investors from the risks of the ups and downs of the markets. So it's important to understand how a key structural characteristic of most hedge funds, the manager's compensation scheme, tends to encourage them to take risk.

Most hedge funds charge their investors a two-part fee, which includes an advisory fee (often 1% of assets, but sometimes more) and an incentive fee (often 20% of any gain in the fund's value). Hedge fund managers sometimes argue that the incentive fee structure aligns their interests with their investors', but that isn't necessarily so. The incentive fee structures do usually provide that if the fund loses money, it has to make up the lost ground before the manager can earn any further incentive (they often refer to this feature as a "high water mark" provision), but generally speaking, the manager never has to rebate fees, or pay any money back to the investors, if the fund suffers losses. So the manager shares in the fund's gains, but not in its losses. This increases the manager's incentive to take risk.

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<sup>8</sup> NYMEX data via [barchart.com](http://barchart.com).

To see why incentive fees encourage risk, let's look at an example. Suppose that a manager has a choice between two investments, A and B. Investment A has a fifty-fifty chance of either gaining +20%, or losing -15%. Investment B has a fifty-fifty chance of either gaining +40%, or losing -30%. Here are the payoffs to the investor and the manager, assuming the manager receives 20% of the investment gain, but none of the loss:

Outcome	Investment A		Investment B	
	Gain	Loss	Gain	Loss
Investor	+16%	-15%	+32%	-30%
Manager	+4%	0	+8%	0
Total	+20%	-15%	+40%	-30%

From the manager's point of view, Investment B is clearly better than Investment A, even if B is too risky for the client. You might argue that the prospect of losing business would deter managers from taking on too much risk. But once prospective losses in a current position have grown so large that the business is at risk anyway, the manager's incentive to roll the dice, taking on increasingly risky (or even desperate) positions, increases until the game is completely over.

**CONCLUSION: KNOW THE SOURCE OF RETURN**

As I mentioned, some hedge fund managers are fond of pointing out their ability to insulate their investors from the risks of the ups and downs of the market. But in shielding investors from the risk of owning the market, they also close their investors to the principal source of investment return in the market — providing capital for the use of the productive economy. A broadly diversified portfolio of stocks will go up and down in value, but the point of holding such a portfolio is that over time the users of capital must share the fruits of their enterprise with their investors — in the end, business pays to use your capital. While an efficiently structured portfolio can minimize the level of risk necessary to earn that payoff, the only way to avoid the risk of investing in the market completely is to sacrifice its benefit, too.

In evaluating hedge funds, understanding the true source of their return is essential. Some hedge funds are little more than mutual funds dressed up in high-end garb, and sporting incentive fees. In these funds, it's the incentive fee that's inappropriate. The incentive fee pays the manager for return that comes from the market. A traditional portfolio or fund is likely to be more suitable. Other hedge fund managers argue that they have identified a way to exploit a persistent mis-pricing in the market, or a segment of the market that persistently creates opportunities for trades that are likely gainers. For these funds, a key issue is whether the fund's own activity creates an artificial (and temporary) appearance of gain, as may have happened with Amaranth. If not, then simply remember that all markets that provide opportunities for such gains eventually attract enough traders either to dilute the gains to minimal levels, or to correct the pricing and eliminate the opportunity.



Some hedge fund managers will simply argue that they are smarter than the average bull or bear, and earn their investors money by dint of sheer brainpower. This is perhaps the easiest claim for a manager to make, but the most difficult to sustain. In making it, the manager says that the engine of return is not the productive economy, nor is it some persistent arbitrage opportunity available through diligent analysis and prudent trading. The manager expects to profit just by being the best player at a zero-sum game. Traders in commodities rarely say that they will earn compensation for performing the economically useful function of taking risk off the hands of hedgers. They are more likely to cite their experience and expertise at playing their particular markets. Too often, however, the histories of these funds are not so much stories of genius and grit, but of leverage and risk. And too often, they come to grief.

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