



Commodity Derivatives Risk Management: The Differing Priorities among Commercial and Speculative Enterprises

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This digest article discusses how risk management in commodity futures trading takes two different forms, depending on whether trading is done for a commercial or a purely speculative enterprise.

In a commercial enterprise, the rationale for trading activity is usually to “optimize the value of physical assets;” and the returns and risks from this activity would be expected to be a fraction of the enterprise’s overall profits and losses. One would include BP’s trading activity in this category, for example.

Commercial and investment banks also engage in commodity derivatives trading, historically to facilitate their overall business in financing natural-resource producers. This is the case with Canadian commercial banks.

For commercial enterprises, the most important aspects of risk management are arguably in adhering to regulatory rules and laws, and in establishing strict operational policies and procedures over every facet of risk-taking activity.

For a purely speculative participant, the emphasis is almost entirely on market risk-management. The barriers-to-entry in futures trading are remarkably low: strictly speaking, a participant solely needs a quote device to track the markets and a Futures Commission Merchant (FCM) to execute and clear one’s trades. The tail risk on a futures trading position is ultimately the responsibility of an FCM.

It has become ingrained in the minds of financial-market participants that should fixed-income or equity markets ever have extreme dislocations, they could ultimately rely on a “central-bank put” underwritten by either the Federal Reserve Board (Fed) or the European Central Bank. In contrast, commodity speculators are forced to rely on disciplined risk management. The financial writer, Ralph Vince, goes so far as to recommend that before studying the mathematics of money management, one should consider what would happen if the prospective trader suffered a cataclysmic loss:

“Take some time and try to imagine how you are going to feel in such a situation. Next, try to determine what you will do in such an instance. Now write down on a sheet of paper exactly what you will do, who you can call for legal help ... Do it now ... ” [Vince (1992).]

Many experienced traders have noted how ephemeral trading strategies are, or at least, how all strategies have life-cycles: “Just when you think you found the key to the market, they change the locks,” declared the late Gerald Loeb, who was a highly successful financier and founding partner of E.F. Hutton, as quoted in Cashin (2008).



As a matter of fact, Weisman *et al.* (2007) have quantified one of the consequences of Loeb's observation. The expected drawdown for a strategy is positively related to how consistently profitable a strategy is, *if a threshold of returns is constantly demanded*. In the words of Weisman *et al.*, the markets have "periodic market efficiency," which is another way of saying all strategies have a limited lifespan. The "tail loss," when a strategy finally (and inevitably) outlives its usefulness, can be found to be:

$$\text{Loss} = [(\text{Demanded Returns}) * \text{Probability of the Strategy Succeeding} / \text{Probability of the Strategy Failing}].$$

For strategies that target an absolute level of return, the natural consequences of this demand are that (1) losses are proportional to wins; and (2) losses are inversely proportional to their probability of occurrence, as explained by Weisman and his colleagues.

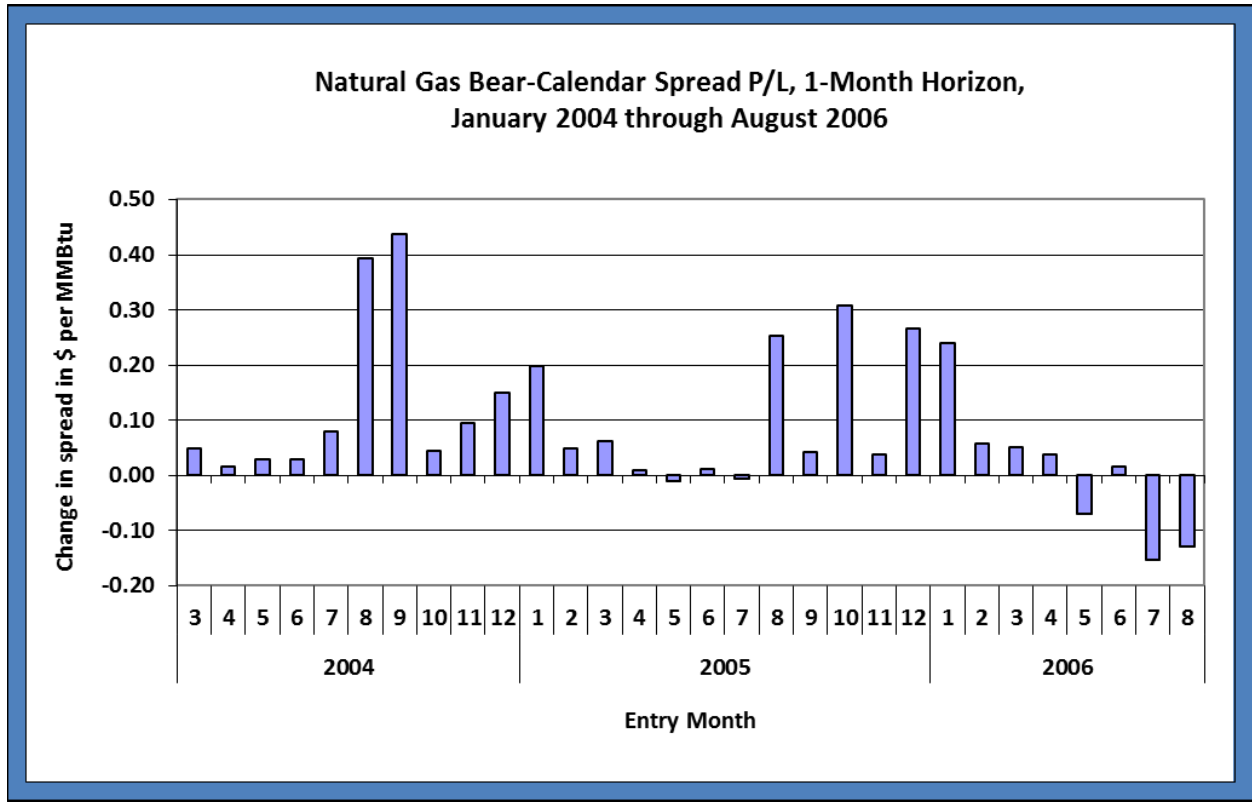
Ethical issues do not arise when Weisman *et al.*'s analysis is applied to proprietary trading firms since in this case it is the partners' capital at risk. The partners accept that drawdowns are endogenous to the trading strategy. As a result, they may not target absolute returns, knowing that trading strategies are fleeting. As Eagleeye (2007) wrote, "One can manage risk ... [but] one can't demand a threshold return from the market." Enduring proprietary trading firms instead typically target risk.

Now, there are severe consequences to Weisman's analysis for investors in hedge funds, who historically have based their investment decisions on past historical track records, which may not be predictive of future results, and who pay hedge-fund traders based on short-term results, with no claw-backs of fees if the strategy suffers disastrous results.

We can take an example from the natural gas futures markets to illustrate the negative consequences to Weisman's observation of the "dangerous attraction" to absolute-return targeting.



Figure 1



Source of Data: The Bloomberg.

Figure 1 illustrates how consistent a strategy of trading natural gas bear calendar spreads was in the spring of 2004 through the spring of 2006. A “calendar spread” consists of taking offsetting positions during the different delivery months of a particular futures contract. A “bear calendar spread” consists of taking a short position in a nearer-month futures contract while simultaneously taking a long position in a later-delivery contract of the same futures market.

By early summer 2006, the profitability of this strategy had declined by about half of the performance of the previous two years. If the commodity futures trader had responded by doubling up his or her position size (to try to maintain an absolute-return target), then in July and August of 2006, that trader would have sustained losses about twice the size of the trader’s year-to-date profits. The significance of such a loss is that when a trader’s risk-and-return results differ dramatically from client and/or prime-broker expectations, this can set off a “critical liquidation cycle.” In such an unfortunate cycle, client redemptions and/or additional demands for collateral from creditors cause a trader to liquidate positions in a distressed manner, which can then cause further losses that imperil a fund’s survival, as both the fund’s investors and creditors lose faith in the manager. This process is mathematically modeled in De Souza and Smirnov (2004) as being like a short barrier put option.



Keeping Weisman's and De Souza and Smirnov's analyses in mind, perhaps one should accept that individual trading strategies may not be enduring. But perhaps a trader's risk-management methodology can be enduring, instead.

A number of studies have indirectly verified this latter point. The fund-of-hedge-funds investor, David Gordon, found that while pre-investment returns for managers had *no* predictive value, as discussed in Gordon (2003a), it was different for risk:

"Historical standard deviation tends to be somewhat helpful in predicting future risk. The correlation between pre-investment standard deviation ... [versus] downside deviation and maximum drawdown during the subsequent period of investment *is* [statistically] significant." (Italics added.) [Gordon (2003b).]

Further Kat and Menexe (2003) found that the historical value of a hedge-fund manager's track record is precisely in its risk characteristics; they found that the standard deviation of a manager's returns (and the manager's correlation to the stock market) was what persisted across time, but *not* manager performance itself.

Interestingly, for institutionally-scaled hedge funds, the publicly available information on these funds is precisely in the quality of their risk-management-and-monitoring infrastructure. In the past, this has been the message from the extensive Moody's operational reports on Chicago-based Citadel Investments and London-based Brevan Howard, both of which are multi-billion dollar hedge funds.

So perhaps it is not controversial, after all, to state that risk management is the most important aspect of a derivatives trading operation. Till (2016a) briefly discusses the apparent risk-management lapses at three large institutions involved in commodity derivatives trading; these lapses were mainly operational in nature rather than market-risk problems *per se*.

In contrast with a proprietary trading firm, one is not dealing with the complex external world of clients, distribution agents, and enhanced regulatory scrutiny, so complexity in the trading process is much more acceptable (and possible.) In addition, there is no agency-versus-principal problem of struggling to come up with the right incentives so that agents handle client or shareholder obligations responsibly. At a proprietary trading firm, the principals have their own capital at risk so a complex system of controls and incentives becomes a moot point: the possibility of facing personal bankruptcy is usually a sufficient disciplining mechanism in carrying out business operations responsibly. Accordingly, Till (2016b) discusses the practical issues involved in applying a disciplined risk management methodology to proprietary commodity futures trading.

Quite simply, a proprietary trading firm exploits some empirical regularity in the futures markets. There are two main risks to this business model. A strategy might have arisen because there was enormous commercial demand for some exposure, and there was not sufficient speculative capital to offset this demand, creating abnormal economic profits for speculators. The risk is then that what had once been one-sided flow becomes two-sided flow as more speculators enter a "too-good-to-be-true" strategy.



Another risk for proprietary traders is that there are structural breaks. A signature example is how *in the past*, the U.S. could safely be said to be the dominant participant in a number of commodity markets, especially on the demand side. This created numerous empirical regularities, particularly in the energy and grain futures markets. This is now a questionable proposition in the face of the historic Chinese industrial revolution. Another way of saying this is that numerous trading strategies, which relied on the continuation of the U.S. as the dominant factor in commodity demand, no longer work.

These two risks can best be explained by understanding that the fundamental nature of speculative commodity futures trading is “flow trading.” As discussed in previous work:

- “Many traders in sizeable organizations benefit from extensive information flow, and many of these traders do not even realize the degree of their dependence on such information.
- Once removed from the deep information channels, many formerly successful traders may become incapable of trading profitably.
- In other instances, the ... effects of reduced information flow are more difficult to detect. In these scenarios, it appears at first that a trader is unaffected by his or her new situation and is able to perform as well as he or she had historically.
- After a period of time, [however,] ... the trader’s performance dissipates dramatically.
- This phenomenon is often caused by the fact that when an individual leaves an institution, they may be able to maintain several key relationships with former colleagues, clients, or counterparties who are still in a position to provide valuable information flow for some while. As time passes, however, this information flow ... often ... dwindle[s], ... thereby leaving these traders unable to perform as they had historically.
- In order to avoid such a situation, flow traders either need to find new return drivers or become large enough so that they can obtain similar information themselves before their relationships expire.”

These observations help us understand how temporary any individual trader’s capacity to be profitable can be, once they leave the employment of institutionally-sized firms.

Conclusion

This article takes the position that for institutionally-scaled firms, operational issues are of paramount importance in commodity risk management. For proprietary trading firms, the top priority is different: it is to manage the risk of decaying information flow.



References

Cashin, A., 2008, "Market Commentary," UBS Financial Services, March 18.

De Souza, C. and M. Smirnov, 2004, "Dynamic Leverage," *Journal of Portfolio Management*, Fall, pp. 25-39.

Eagleeye, J., 2007, "Risk Management, Strategy Development, and Portfolio Construction in a Commodity Futures Programme," a chapter in *Intelligent Commodity Investing* (Edited by H. Till and J. Eagleeye), London: Risk Books, pp. 491-497. [J. Eagleeye is a member of the GCARD's [Editorial Advisory Board](#).]

Gordon, D., 2003a, "Risk By Any Other Name," Glenwood Capital Investments, LLC, Presentation to Chicago QWAFEFW, October 16.

Gordon, D., 2003b, "Risk by Any Other Name," *Journal of Alternative Investments*, Fall, pp. 83-86.

Kat, H. and F. Menexe, 2003, "Persistence in Hedge Fund Performance: The True Value of a Track Record," *Journal of Alternative Investments*, Spring, pp. 66-72.

Till, H., 2016a, "Case Studies from Commodity Derivatives Debacles," Contributing Editor's Collection, *Global Commodities Applied Research Digest*, Spring, pp. 59-61. Available at: http://www.jpmmc-gcard.com/wp-content/uploads/2016/12/Spring-Contributing-Editor-111516_Case-Studies.pdf

Till, H., 2016b, "A Brief Primer on Commodity Risk Management," Contributing Editor's Collection, *Global Commodities Applied Research Digest*, Fall, pp. 32-40. Available at: <http://www.jpmmc-gcard.com/wp-content/uploads/2016/12/GCARD-CEC-Brief-Primer-Fall-2016.pdf>

Vince, R., 1992, *The Mathematics of Money Management*, New York: Wiley Finance.

Weisman, A., Patel, S., and A. Suri, 2007, "Chasing Your Tail," Merrill Lynch Draft Paper, March 29; a version of which was presented to the Spring 2007 Seminar of the Institute for Quantitative Research in Finance (Q-Group) in Sea Island, Georgia, March 25-28.

Keywords

Risk management, commodity derivatives, trading, natural gas.