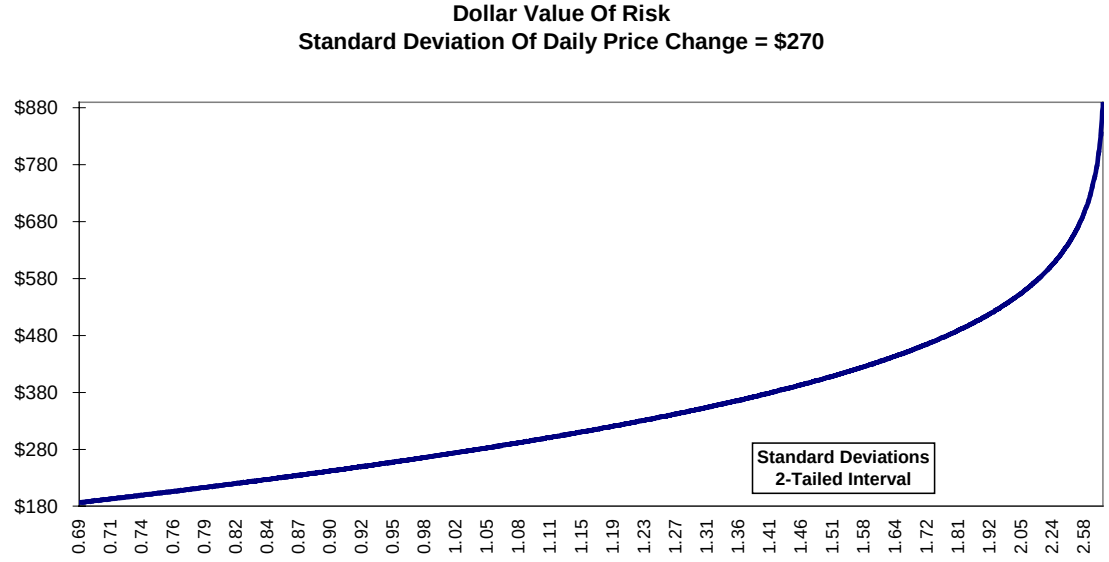
Friends Don't Let Friends Use Stops

Trading, like ancient Gaul, is divided into three parts: Signal generation, money management, and psychology. These are listed both in direct order of resources devoted thereto and in inverse order of their actual importance. Given our collective difficulties in purging psychological factors from our trading, why don't we just eliminate them from the equation altogether by subsuming them into our money management scheme?

The key to this endeavor is strictly defined risk for each and every position. This is categorically impossible in futures for several reasons. First, futures prices are discontinuous; we are subject to gaps, fast markets, and similar unpleasantness. Second, statistical relationships across a portfolio of risks are not stable over time, and are likely to fail when stability is desired most. The derivative debacles of 1994 and 1998 should have served to quiet the promoters of various value-at-risk (VAR) schemes, but of course this did not happen. Finally, and more subtly, is the requirement of positive gamma for any defined risk or ownership of insurance: All futures positions have a gamma of zero, and no combination of zeroes can produce a positive number.

Manage This

Here is a typical money management scheme: A trader has $100,000 in initial equity, and decides his risk tolerance for a given trade is 1%, or $1,000. If, for example, the standard deviation (σ) of daily price changes for crude oil over the past four years is $0.27, we can measure the change in equity, both higher and lower, produced by a $\pm N\ \sigma$ to be N*$270. Each incremental expansion of our confidence interval produces an ever-greater and unlimited dollar risk.



Since probabilities of 0% and 100% are limits to be approached, and thus do not correspond to a finite σ, we cannot have an actual limit to risk on a given day for any product without imposing a trading limit. Trading limits, as we all know, do not so much limit risk as prolong agony. Our trader may limit himself to three crude oil contracts in the above example with the comfortable notion he has limited his adverse outcome to ($695/2 * 3), or $1043 at a 99% confidence level, but he has not in fact limited his risk, only constructed a favorable bet. And let's face it, the soldier who avoids 99 mines in a field of 100 has not had a good day.

The illusion of risk control gets greater as portfolios of positions increase in complexity. We can construct variance/covariance matrices of returns and run quadratic programming optimizations designed to produce maximum mean-variance portfolios, but we return to the dependence of

these programs on stable covariance between various risks over time. Moreover, no VAR program can account for the systemic risk of multiple large portfolios engaged in the same general trade; such an example occurred this September when "everyone" was caught short in the gold market as European central banks renounced their gold sale plans. Markets only move spectacularly when economic value changes abruptly, (see "Making A Commitment," *Futures*, June 1998) and this *should* trap the majority of rational traders in an untenuous position.

Odds And Ends

If we truly wish to limit risk and mechanize our trading regimen, we can do so in options with positive net gamma. Let's say we are bullish still on crude oil, but are understandably nervous given the market's strong performance already in 1999 and its vulnerability to a breakdown in OPEC discipline. Given the experiences of crude oil market's sharp declines at various times this year, we know any sort of sell stop might get violated very quickly in a fast market to the downside, giving us a fill that in no way corresponds to our desires.

We first need to quantify the risk in a market, in this case the December 1999 crude oil contract that closed at $20.92 on October 8, 1999, with an at-the-money volatility of 37.43%. Implied volatility is a forward-looking consensus of risk as opposed to the backward-looking measure of historic price changes in the classic money management example. The December options have 39 days of time remaining to expiration. We can use the range formula to calculate the number of standard deviations, Z, a move to which any bounding price would correspond:

$$Z = \frac{\ln(Bound / \$20.92)}{37.43\% * \sqrt{39/365}}$$

We can use this formula to calculate the probabilities of December crude oil settling over various strikes by the November 16 option expiration date:

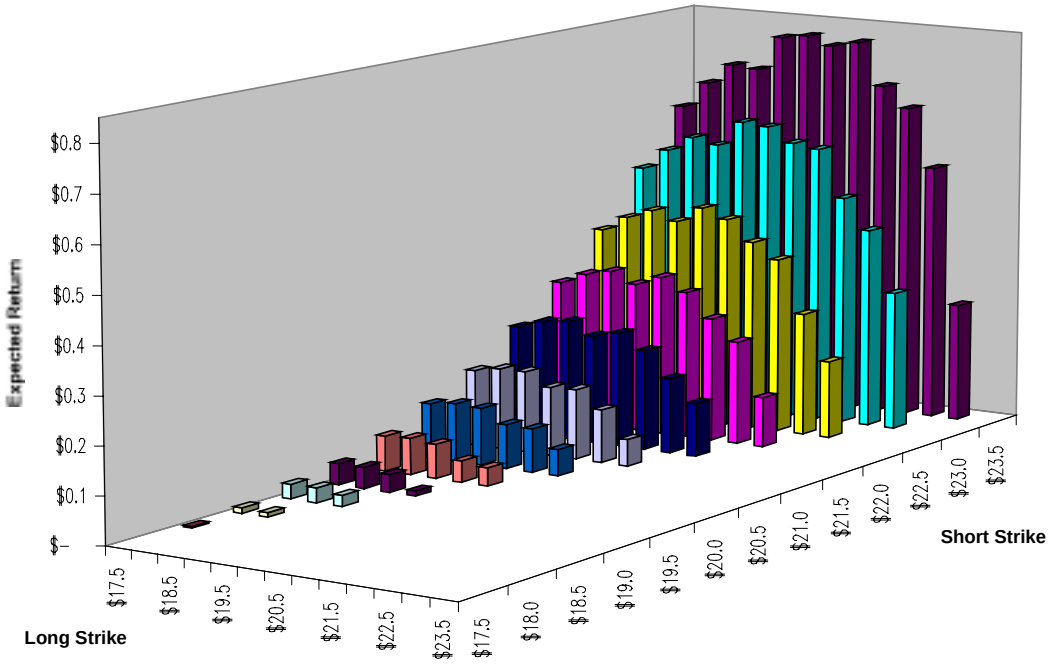
Bound	Z	Probability Price > Bound
$ 17.50	(1.46)	92.77%
$ 18.00	(1.23)	89.04%
$ 18.50	(1.00)	84.25%
$ 19.00	(0.79)	78.43%
$ 19.50	(0.57)	71.72%
$ 20.00	(0.37)	64.34%
$ 20.50	(0.17)	56.58%
$ 21.00	0.03	48.76%
$ 21.50	0.22	41.16%
$ 22.00	0.41	34.04%
$ 22.50	0.60	27.59%
$ 23.00	0.77	21.92%
$ 23.50	0.95	17.09%

We can use these prices and probabilities to generate a maximum expected return/minimum cost position via the following formula, where π represents probabilities:

$$(\pi_{Long} - \pi_{Short}) * \frac{((ShortStrike - LongStrike) - (LongCall - ShortCall))}{(LongCall - ShortCall)}$$

While this selection is made automatically in the Dynamic Option Selection System, or DOSS (see “In The Library,” p. xx), we can visualize the outcome and acquire an intuitive feel for the selection process.

Expected Returns On Bull Call Matrix



The resulting position choice given by DOSS is:

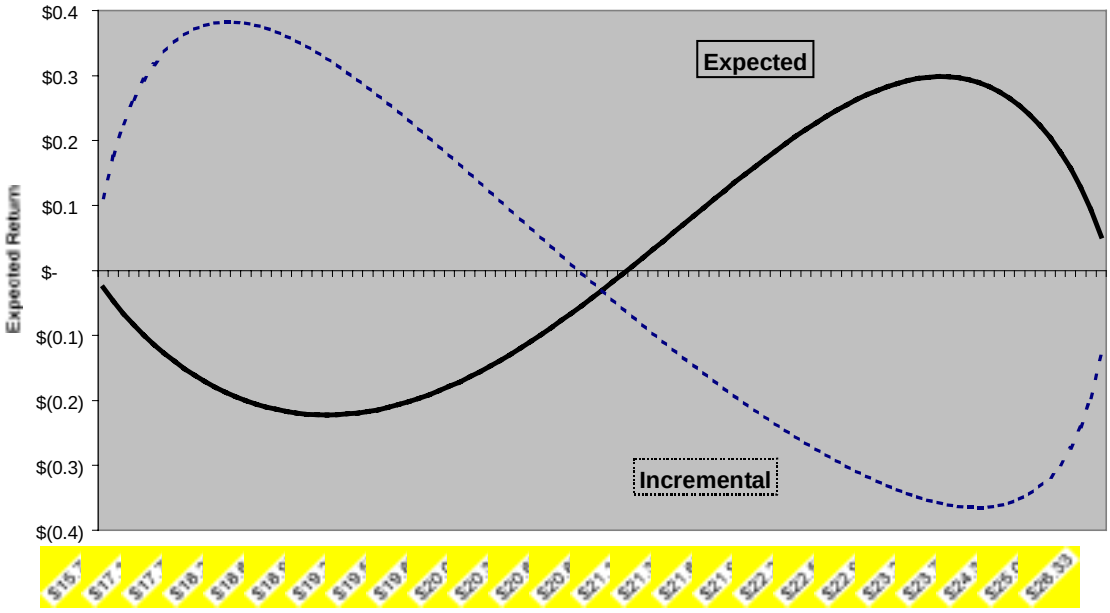
Buy the December $20.50 call at $1.23 and sell the December $23.50 call at $0.24

The downside risk on this bull call position is the net premium exposed, ($1.23 - $0.24), or $0.99. Its maximum profit is the difference between the strikes, $3.00, less the $0.99 net premium, or $2.01, which places its potential profit at twice its maximum loss. The question of how many spreads to trade is solved by definition as 1, since this is the only way to ensure a maximum loss of less than $1,000.

The probability of December crude oil settling at $20.50 or higher is 56.58%, which places the odds of the long $20.50 call settling in the money at .5658/(1-.5658), or 1.30 : 1 in our favor. The odds of the short $23.50 call expiring worthless are (1-.1709)/.1709, or 4.85 : 1, in our favor. We can restate this as a 43.42% chance of realizing our maximum loss of $0.99 and a 17.09% chance of realizing our maximum gain of $2.01.

We can produce a map of the expected returns on our bull call spread. Each data point corresponds to the net value of the call spread evaluated with 25 days of time remaining at prices corresponding to each 1% probability increment, multiplied by the probability of that price being reached. We can compare the incremental advantage of the bull call trade to the expected base case of simply buying the December future as well. Please note the price scale is not symmetric from the $20.92 starting point due to the lognormal nature of price changes.

Expected And Incremental Returns On $20.5/$23.5 Bull Call Spread Two Weeks After Emplacement



December 1999 Crude Oil

These expected return maps confirm the “no free lunch” principle of trading with a vengeance. The price we must pay for risk limitation is a lower expected return when we are right. Returning to our opening discussion of the need to integrate trading psychology and money management, we must decide for ourselves whether we are running a marathon or a sprint. Our position is clear: Take care of the downside, and the upside will take care of itself.