

If The Sky's Not The Limit, What Is?

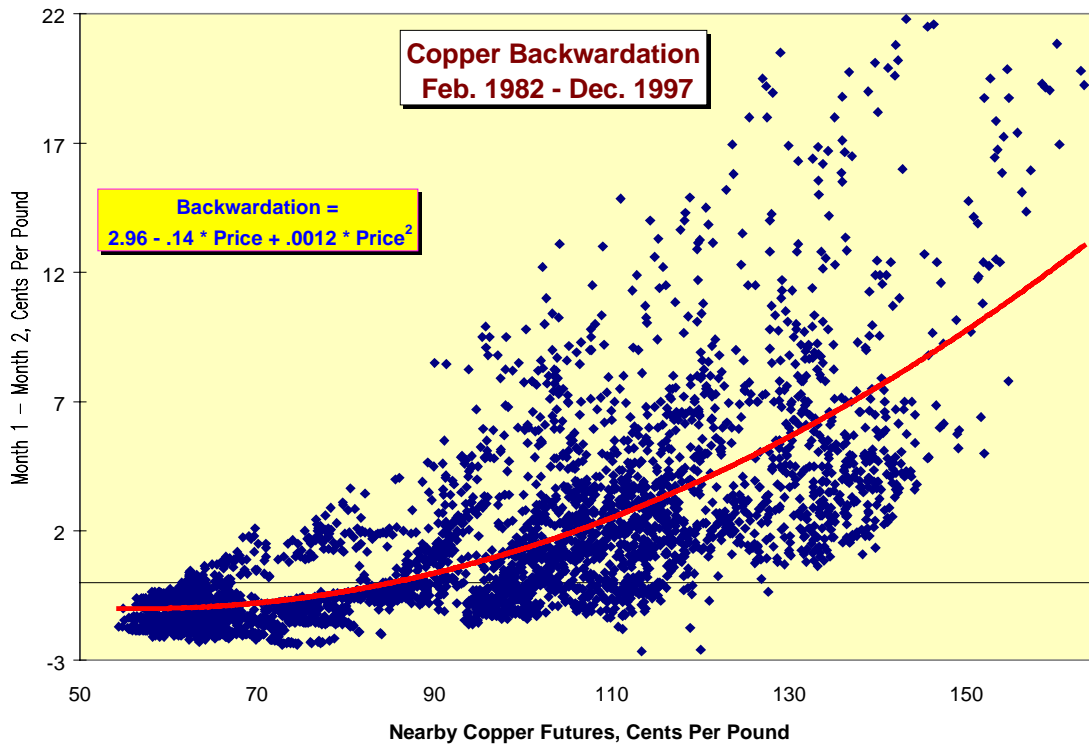
It's a defining moment in every old Western: a compliance officer with a tin star tacks up a "Wanted – Dead Or Alive" poster. Markets produce similar moments; a commodity becomes so scarce, so desired, so lusted after that traders will pay any price, bear any burden to have it and hold it for their own. One consequence of this last-chance-to-get-long mentality is surging backwardation. Can any force on earth cool this raging passion?

Only quantitative analysis, the ultimate bucket of cold water.

Backwardation, or inversion as it's called in the grain markets, is produced under a defined set of circumstances. These include a spot shortage, the ability of consumers to shift the costs of storage back to producers, a desire by producers to sell forward to capture perceived high prices, and a desire by consumers to adopt a just-in-time inventory policy in the often-vain hopes of lower prices to come. Since the shortage in the spot market is highly time-dependent, the spread between the prompt and nearby futures contracts can explode into a call option-like profit profile (see "All In All, Another Trick With A Call," *Futures*, May 1996, or "Backwardation Has Its Price," *Futures*, June 1994).

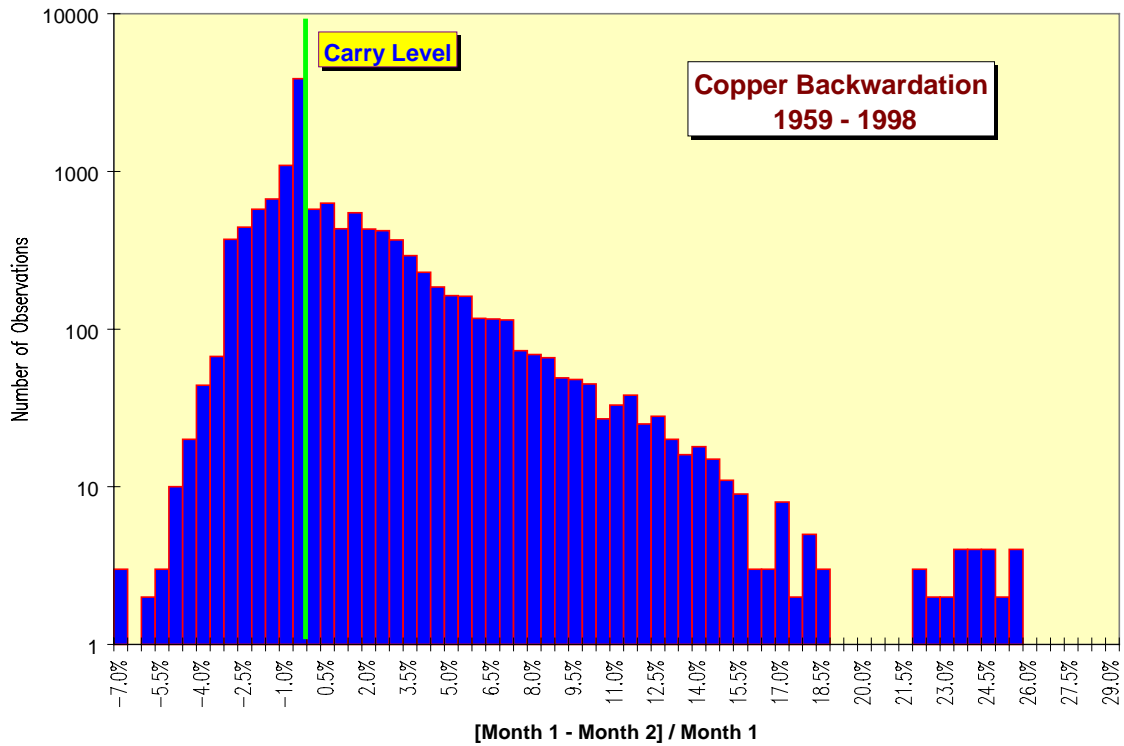
Just as a call option theoretically can go to infinity, we all know that it won't (but think of the back-office hysteria such an event would create). At some point, buyers will have to back away from spot purchases. An extreme example can be constructed in petroleum refining, which uses platinum-based catalysts; the price of platinum would have to rise to inconceivable levels for a refiner to shut down operations and sell platinum into the open market. A more practical example can be found in the copper market.

Copper is a natural for backwardation. Marginal mines need to guarantee a minimum price level for forward production and thus are eager to sell forward, while consumers such as brass mills have every incentive to adopt a just-in-time inventory policy. The cheapest place to "store" copper is right in the ground where it has been for millions of years, and if a surge in demand develops, there is no way for mines to quickly bring additional supply to market. Given these conditions, we should expect to see a definite correlation between price and backwardation in copper, and we do. In fact, backwardation increases as the square of the price of the prompt future, as shown below.



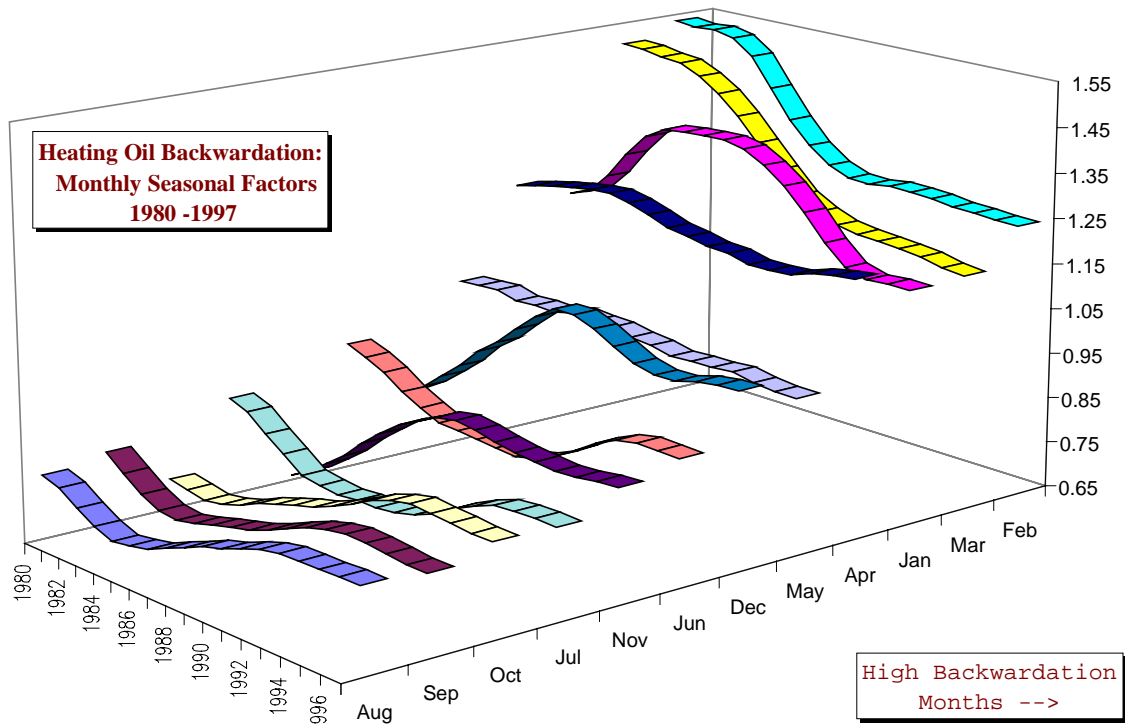
More important, we can observe two constraints on copper's intermonth spreads. The first is at carry levels; in the data sample shown, the discount of the prompt future to the nearby never goes below \$0.03 per pound. We can surmise this to be the level at which sellers at the margin sell copper forward into the futures market rather than into the cash market. The second constraint appears at backwardation levels; here, the level does not exceed \$0.22 per pound. We can surmise this to be the level at which copper buyers sell previously-acquired supplies back into the cash market. Restated, a brass miller or cathode producer can make more money selling raw copper than in producing a finished product containing copper. This is a graphic representation of the limits of backwardation.

The limits are visible on a relative basis as well as on an absolute basis. The chart below looks at the intermonth spread in copper as a percentage of the prompt future's price; its histogram structure allows us to sidestep the 4,000 data point limit for an Excel™ chart and consider a larger data sample. Viewed in this manner, the practical limit to backwardation is 18.5% of the prompt month future's price. On only 31 trading days since the second Eisenhower administration, .25% of the time, has backwardation ever exceeded this level. The carry level is just below 5% of the prompt month future's price.



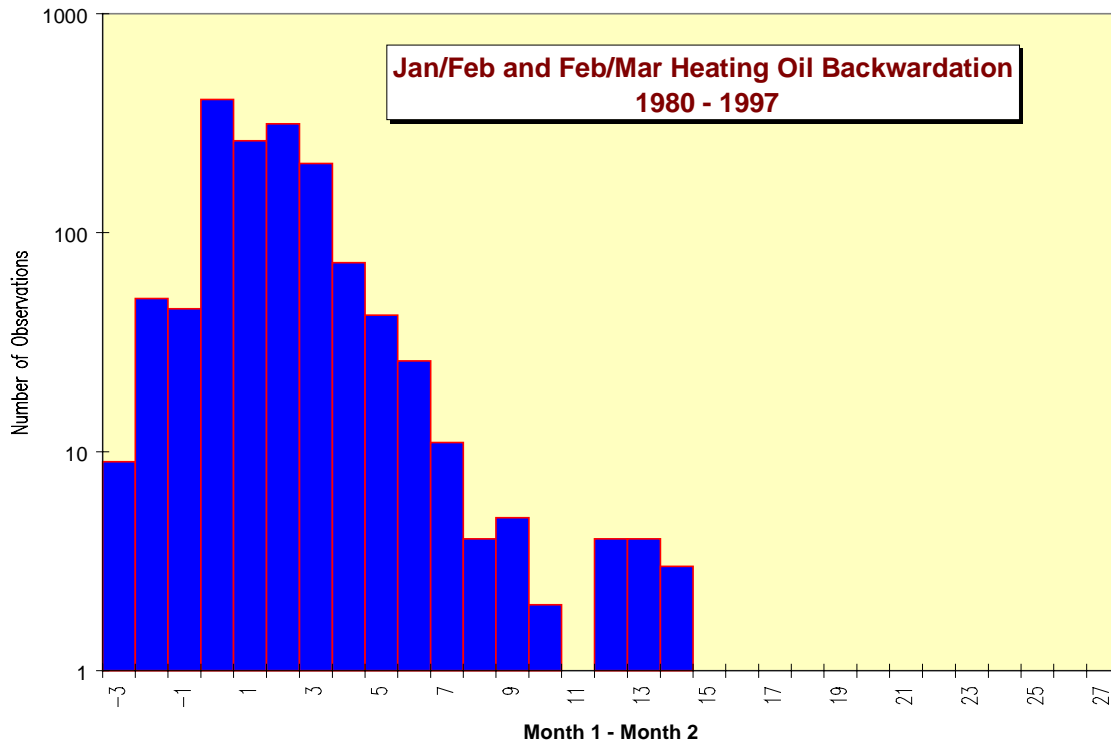
A Spread For One Season

We can extend this analysis to a highly seasonal commodity often in backwardation, heating oil. Unsurprisingly, heating oil is in its largest carry during the late summer as stocks are built, and is at its largest backwardation in late winter, as stocks have been depleted. Surprisingly, the seasonal factors have dampened over the 1980 - 1997 time period, especially for the high backwardation months, as shown in the graph below. Heating oil buyers, hurt by price and backwardation spikes several times during the 1980s and during the Persian Gulf War, have abandoned their just-in-time purchasing policies in favor of cost-capping strategies in the derivatives market and inventory building. This admirable change in behavior stands in stark contrast to the natural gas market, which always acts surprised by the advent of cold weather in the winter (see "It's A Gas," *Futures*, June 1997).



Should there be an economic limit to heating oil backwardation, just as there has been to copper backwardation? Put another way, will heating oil buyers ever turn their supplies back into the market and go without in the face of a prolonged freeze?

The data available since the advent of heating oil futures may be insufficient to answer this question completely, but there appears to be a limit to backwardation even in the two intermonth spreads with the highest seasonal backwardation, Jan/Feb and Feb/Mar. We can pool these data over the two most active trading months for each spread, November and December for the Jan/Feb spread, and December and January for the Feb/Mar. The histogram looks remarkably like the one for copper.



The right-hand tail of the distribution is confined to single observations for levels over \$0.14 per gallon, and they all occurred during the thin trading week between Christmas and New Year's in December 1989, when an Exxon refinery problem in New Jersey combined with an ongoing cold snap to produce an extreme delivery premium of the expiring January 1990 contract over February.

Anatomy Of A Surge:

Jan/Feb HO Backwardation

December, 1989

13-Dec	\$0.0416
14-Dec	\$0.0432
15-Dec	\$0.0546
18-Dec	\$0.0717
19-Dec	\$0.0846
20-Dec	\$0.0945
21-Dec	\$0.1150
22-Dec	\$0.1285
26-Dec	\$0.2159
27-Dec	\$0.2582
28-Dec	\$0.2223
29-Dec	\$0.2662

Unique Markets

There can be no universal rules regarding backwardation spikes, but there are several principles we should obey. First, understand the market fundamentals behind the backwardation; principally, whether the supply disruption is enduring or ephemeral. Technical analysis alone will

not suffice. Second, study the past limits to backwardation in each market to see whether there is a point where buyers will return physical supplies back to the market. Third, be careful of margin requirements during delivery periods; the December 1989 heating oil surge took place under a 100% margin regime. Fourth and finally, study whether there are seasonal patterns to intermonth spreads.

All of these rules demand homework and preclude the sort of one-size-fits-all trading rules we all seek. The return on effort, both in terms of profits captured and losses avoided, will justify the efforts.