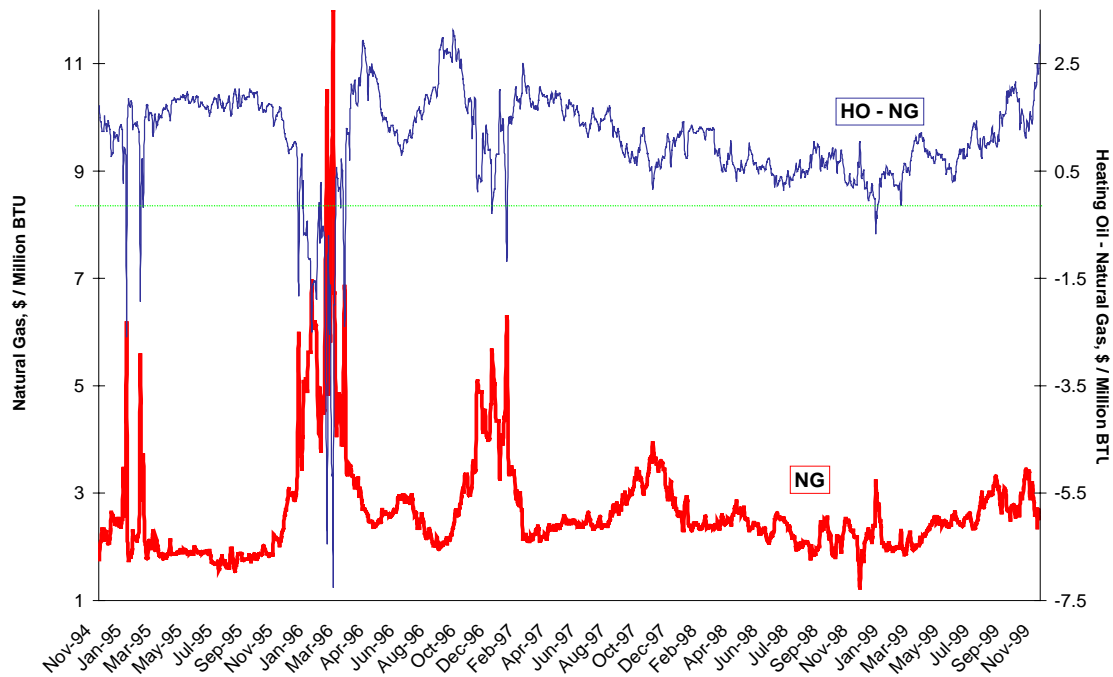


The Heat Is On

What weighs more, a pound of feathers or a pound of lead? Simple, right? OK, let's ratchet things up a notch, George W., and try this one on for size: What costs more, raising the temperature of something by burning natural gas or by burning heating oil? For those of you who answered, "the same, for we are obtaining British Thermal Unit (BTU) equivalence at the burner tip, and therefore should only be willing to pay the same for each," please go sit in the corner. The answer is it costs much more to deliver a BTU in the form of heating oil than in the form of natural gas to New York harbor or city gate, respectively, except during the winter heating season. Since we are approaching the heating season faster than most of us would like, let's take a look at an interesting trading opportunity.

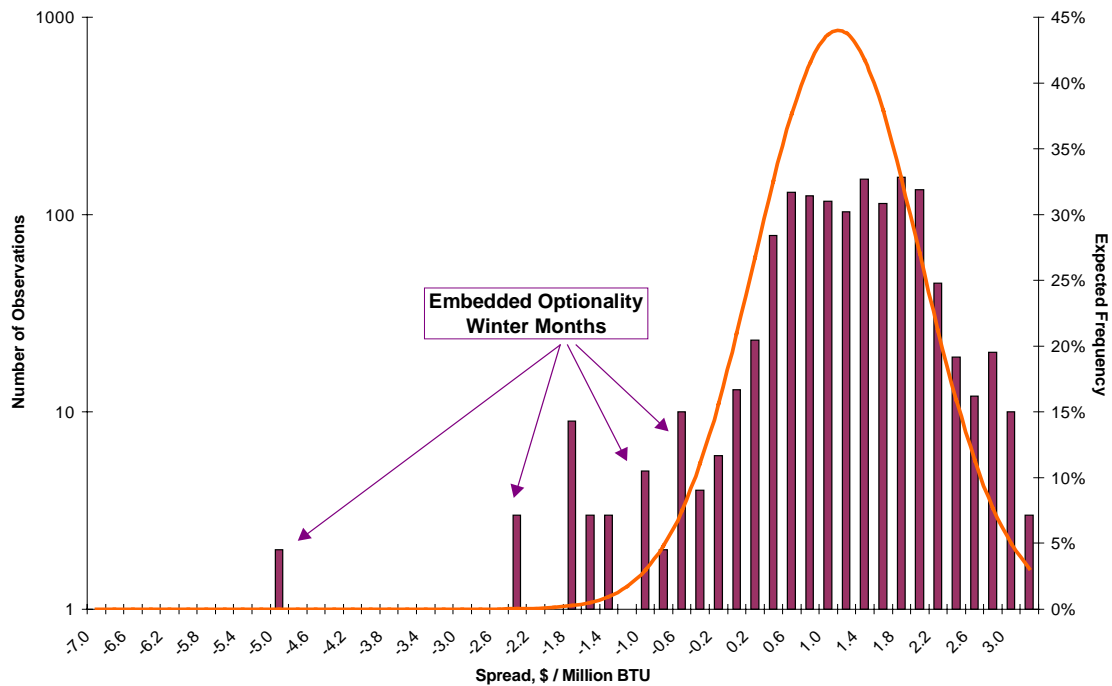
New York Natural Gas Price And Heating Oil Premium To Natural Gas



Natural gas, unsurprisingly, tends to spike in price during times of peak demand. These spikes vary in magnitude depending on the length and severity of a winter cold snap; the winter of 1995-96 saw prices jump as high as \$12 per million BTU, a whopping \$7 more than the equivalent price for heating oil.

The spread between heating oil and natural gas is a natural weather derivative, a bet whose outcome will be determined by the weather. Going long natural gas futures and short heating oil futures is a call option on cold weather in the winter, which should not strike anyone as an outlandish bet even in this era of global warming. We can view the spread's optionality by constructing a histogram of its distribution and comparing it to statistically normal values.

Distribution of Heating Oil - Natural Gas Spread



The columns lying outside of the normal distribution curve are confined to the winter months; while there are several observations of heating oil dominating the spread -- the columns on the right hand side of the curve -- they are fewer, less extreme, and more prone to lie in the summer months. The spread's distribution, for you statistics fans out there, is skewed at -2.47, and is leptokurtotic, with a fourth moment of 15.07.

How can you trade this? With each NYMEX natural gas contract containing 10,000 million BTU and each NYMEX heating oil contract containing 5,880 million BTU, you could buy 1 natural gas and sell 1.7 heating oil, or buy 4 natural gas and sell 7 heating oil, for either January or February delivery.

Oil Prices And Oil Stocks

Most of us have noticed the rapid rise in crude oil prices by now; NYMEX crude oil futures are now at their highest level since the Persian Gulf War. This is not necessarily bad news for equities in general, (see "Hey Crude, Don't Make It Bad," October 27, 1999 on this site) but are they especially good for oil stocks, and, if so, for which group?

Standard & Poor's maintains a number of specialized energy market indices, including ones for international oils, domestic oils, drilling companies, and well service companies, as well as a oil composite market index. A table of correlation for these sub-indices as well as for the S&P 500 over the past five years is presented below:

Correlation Against West Texas Intermediate Crude Oil
November 1994 - November 1999

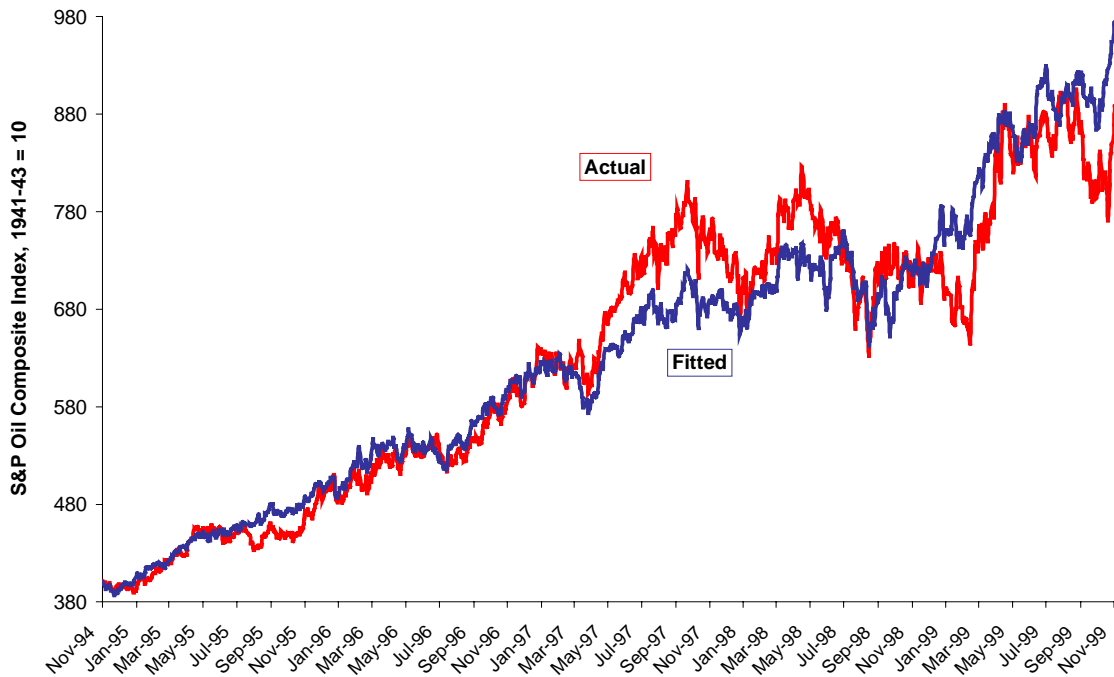
S&P Sub-Index

Drillers	0.215
Domestic	0.093
Well service	-0.018
Oil composite	-0.149
Internationals	-0.210
S&P 500	-0.316

At present, the S&P oil & gas drilling index consists of just two companies, Rowan and Helmerich & Payne, so diversification is difficult. A more meaningful comparison might be the excess return on these indices compared to the S&P 500 as a whole. The excess return pattern of the 15-member composite index is virtually identical to that of the drilling index, and we can construct the following portfolio comparison:

$$\text{Log(oil composite)} = .971 + .724 * \text{log(S\&P 500)} + .201 * \text{log(WTI)}, r^2 = .949$$

S&P Energy Composite: Actual & Fitted Values



The model indicates oil issues are somewhat undervalued at present, which is even more surprising considering the dividend yield on this index, 2.37%, is twice that of the S&P 500's 1.19%. A good buy? So long as OPEC maintains its production discipline, which they have done so far in 1999 against all of their history, the price of crude oil could continue to surprise on the upside.
 [November 19, 1999]