

Refining Margins To Stay Strong

Perhaps the most famous one-word advice given to anyone in the movies was delivered to Dustin Hoffman's Benjamin Braddock character in the 1967 classic *The Graduate*, "plastics." Times change, of course, and over the years that advice could have been updated to "software," or "computers," but a modern sage might be tempted to say, "Refining." And why not; you always want to own something in short supply with a relatively price-inelastic demand for its output.

As a trader, the shortage of refining capacity is the one constant you can plan on in the petroleum complex. The constant shortage affects refining margins, the trans-Atlantic spread between the West Texas Intermediate low-sulfur (sweet) crude oil traded in the U.S. and the Brent Blend sweet crude from the North Sea, the spread between sweet and high-sulfur (sour) crude oil and the levels of crude oil inventories and hence the intermonth spreads in crude oil in the U.S. In short, the refining story affects anything and everything associated with the crude oil markets. We will deal with refining margins alone in this column; next month we will extend the analysis to the other petroleum spreads mentioned.

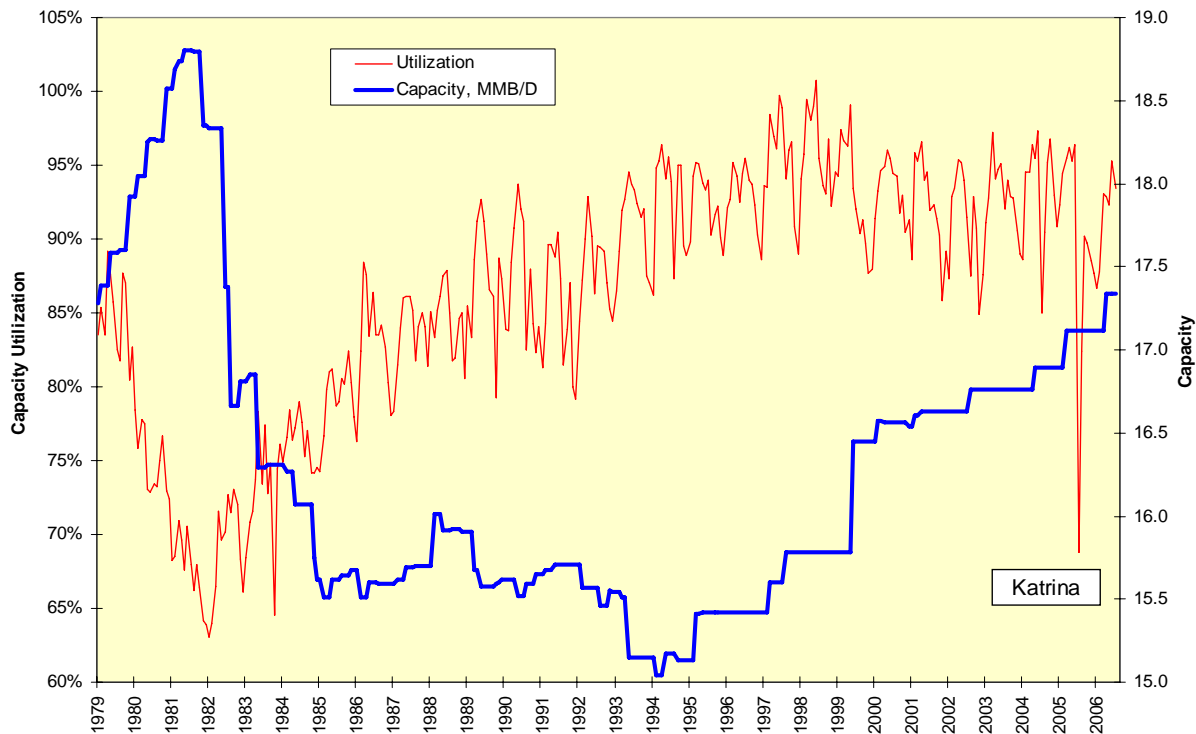
A Little History

The scarce-capacity story was not always the case, of course. Turn the clock back a quarter-century and you will see massive closures of U.S. refining capacity; between 1981 and 1994, operable capacity fell from 18.8 million barrels per day (MMB/D) to just over 15 MMB/D. Much of the capacity closed during this period was older and less-efficient plant unable to handle increasingly heavier and sourer crude oil streams. Many of these refining units were built during the 1960s and early 1970s to capture various government entitlements for smaller refiners and were uneconomic once President Reagan ended the 1970s price controls on crude oil.

And many of these units had to be shut down as they could not be retrofit economically to comply with the Clean Air Act Amendments of 1990. A refinery – and this is written by an oil industry veteran, not an outsider – is an inherently dirty system. The first step in the distillation of crude oil is heating it to about 900° Fahrenheit in a vacuum tower. Over time, you will release sufficient vapors to ensure non-compliance with any environmental regulations.

Later additions to U.S. refining capacity came as the result of expansions within existing complexes. No new greenfield refineries have been added to the U.S. system since the late 1970s. As a result, the U.S. now imports about 3.5 MMB/D of refined products in addition to importing 10.8 MMB/D of crude oil.

Chart 1: The U.S. Refining Picture



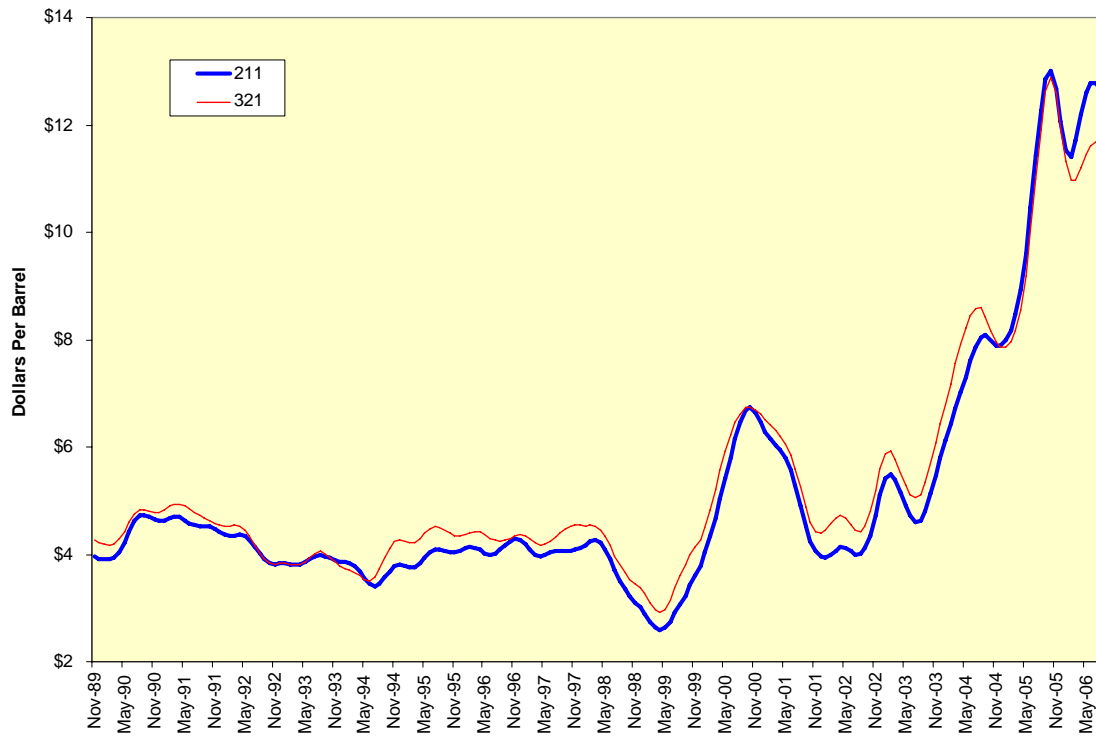
The net result of these closures was refinery capacity utilization rose steadily, and in some months was pushed beyond 100% of nameplate capacity. Whenever any system is pushed this hard for this long, the results can be predicted from a box of Rice Krispies: Snap, crackle, pop. The impact of hurricanes Katrina and Rita in 2005 was the most obvious event in the history of refinery capacity, but how many of us remember a string of refinery fires and accidents in the months prior to the storms? The refinery capacity issue was so critical after Katrina that it precluded widespread release of crude oil from the Strategic Petroleum Reserve: Had the oil been released, it would have had to have been exported to be processed. What footage that would have made on the evening news!

The Crack Spread

All of the above creates the fundamental backdrop behind the real reason we are gathered here today, and that is to trade the refining margins, AKA the “crack spread,” in the futures market. Cracking actually refers to the process by which long, heavy carbon chains in the heavy components of crude oil, such as residual fuel, are split in the presence of a catalyst and hydrogenated to create lighter products such as straight-run gasoline. Common crack spreads, quoted as the dollars per barrel margin against crude oil, are the 3-2-1 and the 2-1-1. The former is three barrels of crude oil, two of gasoline and one of heating oil, the latter is two barrels of crude oil and one each of heating oil and gasoline. The gasoline component of these spreads is changing from unleaded regular to reformulated blending stock (RBOB), which like tonic water is designed to be blended with ethanol before final consumption.

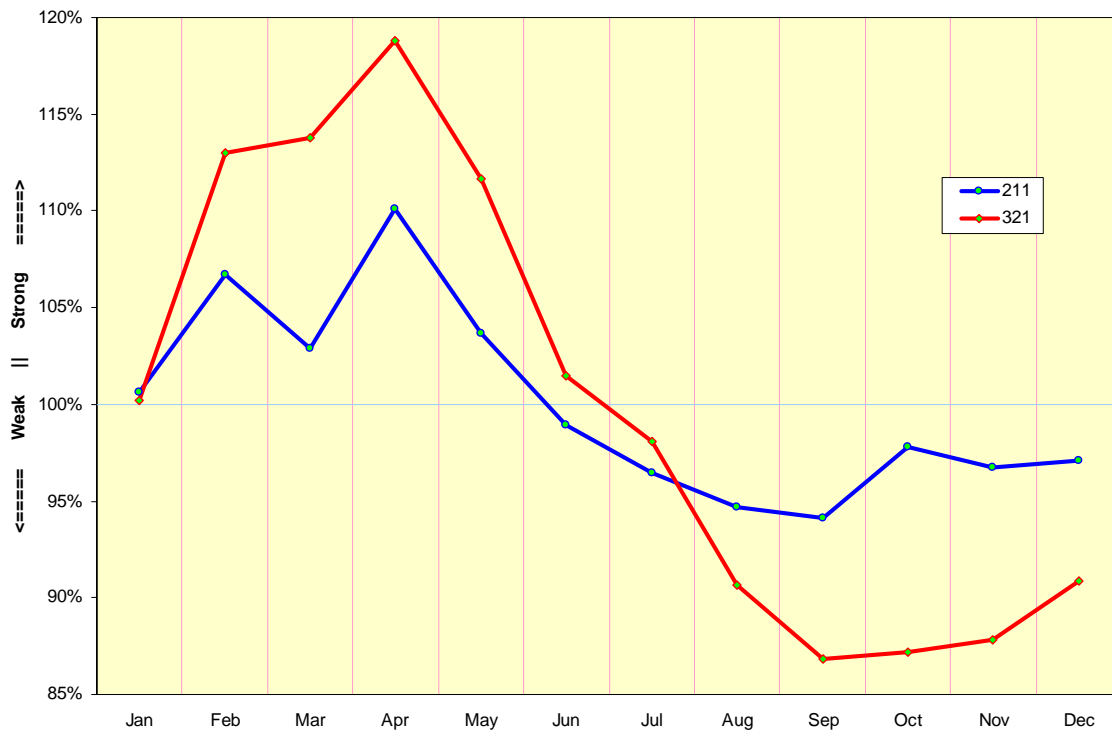
Crack spreads have had two overwhelming characteristics in recent years. The first and most obvious, seen in Chart 2, is a price trend. If we seasonally adjust both the 3-2-1 and 2-1-1 spreads for the second month of futures – refineries have to plan ahead, and while traders may like to focus on the front month, those contracts are economically irrelevant – we see a nearly continuous four-year uptrend. The temptation of such a straight-line move always is to fight the obvious, to pick a top. Resist it: Until and unless someone can add refinery capacity, the trend in crack spreads will be higher. Sometimes it really is that simple.

Chart 2: Seasonally Adjusted Trend In Month 2 Cracks



As long as we mentioned seasonal adjustment for crack spreads, we should demonstrate their annual cycle. They differ between the 2-1-1 and 3-2-1 cracks for obvious reasons of greater winter demand for heating oil. Both cracks are at their seasonal peak in the late winter and early spring; not only does this reflect the annual switchover from maximum heating oil production to maximum gasoline production, but it reflects the annual refinery maintenance schedule of late-winter shutdowns, or “turnarounds,” as they are known in the industry. The crack spreads are at their seasonal lows in late summer.

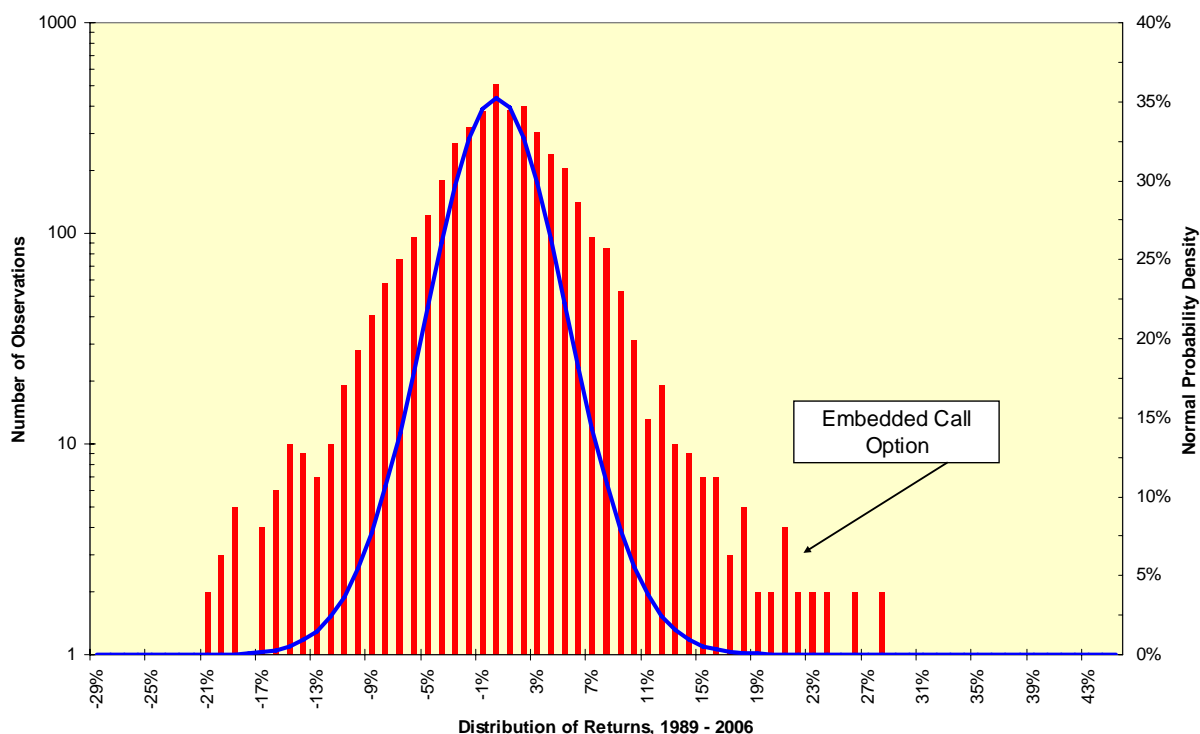
Chart 3: Seasonal Adjustment Factors For Month 2 Crack Spreads



The second characteristic is the distribution of returns. Unlike the returns on a stock, which are more or less symmetrically distributed about a mean, the returns on a crack spread are highly asymmetric, and with good reason. We can sit down and write a list of events that can take a refinery off-stream tomorrow; creating a list of surprise refinery openings is a tougher task.

In addition, if refinery economics deteriorate, which they have not done since 1999, refiners will be happy to close their least efficient and highest-cost units. That action puts a floor underneath crack spread values. This combination of factors makes crack spreads skewed toward higher values. The distribution of returns, seen in Chart 4, is that of an asset with an embedded long call option. The implication, of course, is this distribution should define your trading strategy: Buy when the crack spread is low and quiet, sell when it shoots higher and resist the temptation to go short.

Chart 4: Distribution Of Returns: 2/1/1 Crack, Month 2

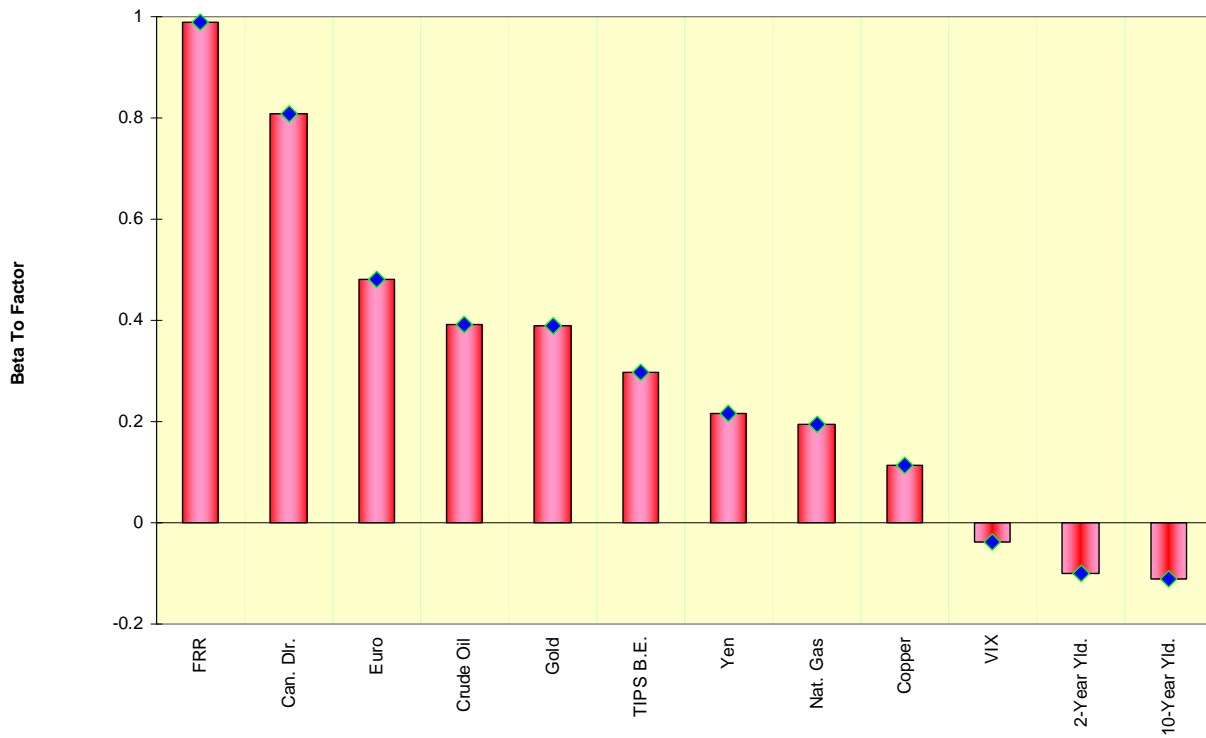


Refining Stocks

While commodity-linked equities and commodities themselves are two very different things (see “Ain’t Nothing Like The Real Thing,” June 2006) and should not be linked carelessly, we have witnessed a case wherein the stocks of petroleum refiners have been a good proxy for the long-term uptrend in crack spreads. Since the second quarter of 1999, the S&P 500 Oil Refiners index, a group now consisting of Valero and Sunoco, has returned 405.4% against a total return for the S&P 500 itself of -2.60%. It has been the top-ranked industry group in the S&P 500 over this period.

If we track the relative performance of refining stocks to the S&P 500 as a function of selected primal market factors, (see “Tracking Macro Factors’ Impact On Stocks,” October 2005) we find the refining issues are remarkably insensitive to external factors. Their only negative performance betas are the VIX and both two- and ten-year note yields. The sensitivity of refining issues to interest rates is seen as well in the near-1.00 beta to the forward rate ratio between 2 and 10 years. The FRR is the rate at which you can lock in borrowing for an eight-year period starting two years from now, divided by the ten-year rate itself. As the yield curve gets steeper, refiners outperform the market.

Chart 5: Relative Performance of Oil Refiners By Market Factor



What could break the uptrends in both refining margins and refining stocks? Either a global economic downturn of significance or a political decision to waive environmental regulations and allow for new refinery construction in the United States would derail the trends. Suffice to say most people do not wish to see the first outcome, and for better or worse we have thirty years of political consensus in the U.S. arguing against the latter. You are free to make your own trading conclusions.