

Oil Industry Spreads: Where Fundamentals Meet Technicals

One of the staples of old Westerns was some old coot, preferably a reprise of Walter Huston in *The Treasure of the Sierra Madre*, searching for water with a divining rod. You can recreate this quest in a manner of speaking by searching for the easily distracted. How? Simply walk into any trading room and start a discussion on the relative merits of technical versus fundamental analysis.

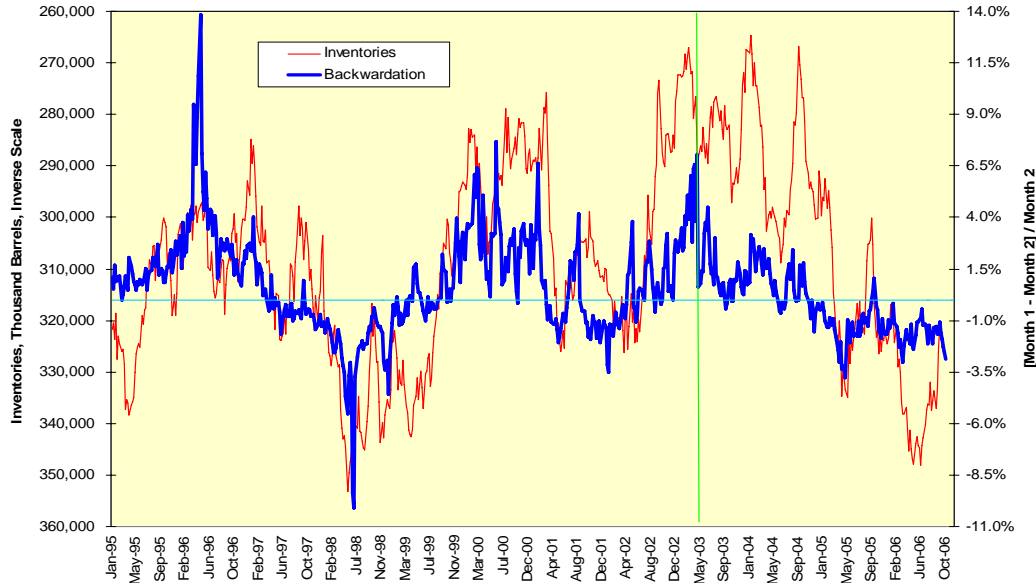
Here's one answer to the Great Pointless Debate sure to please no one: Over the short-term trading horizon, the one in which most of us live, markets are dominated by noise and must be traded technically. Over a long-term trading horizon, markets are dominated by powerful economic signals and must be traded fundamentally.

Occasionally we get lucky and find markets whose powerful fundamental indicators look and act as if they can and should be traded technically. Such is the case with petroleum market spreads. We looked at refining margins last month with a promise we would look at other spreads this month. These include 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 and the spread between sweet and high-sulfur (sour) crude oil. These spreads in turn are affected by and affect the key intermonth or calendar spreads in the crude oil markets and those very same refining spreads we addressed last month.

Two Looks At Inventories

As long as we are on the subject of intermonth spreads in crude oil and their relationship to market fundamentals, let's take a look at the most widely reported – and misunderstood – datum in this market, the weekly crude oil inventory figures. If we plot this number inversely against the intermonth spread in crude oil futures as measured by the difference between $Month_1$ and $Month_2$, divided by $Month_2$, we find a reasonably tight relationship between rising levels of backwardation and declining inventories prior to the end of active fighting in Iraq in May 2003, the vertical green line in Chart 1.

Chart 1: The Inventory / Backwardation Relationship



This is exactly what we should have expected. Futures markets are priced on the principle of equivalence. If the forward curve of crude oil was balanced perfectly in a situation known as full carry, you should be indifferent between buying a physical commodity now and storing it yourself for later consumption and buying it for future delivery and letting someone else pay for the storage costs.

This situation seldom applies in practice. Refiners cannot afford to run out of inventories and therefore pay for the convenience of having excess supplies available to avoid hearing that dreaded slurp at the end of the pipeline. They are willing to pay a little bit more for prompt supplies, and that pushes the front month futures higher. Producers cannot sell all they might wish to into these higher prices due to physical capacity constraints, but they can sell into

the back month futures to hedge their operations. Those futures are pushed lower and the entire curve of crude oil tips into backwardation.

The opposite situation occurs when the market is well-supplied with crude oil. Refiners who do not need it for current operations must be induced into putting it into storage. This is done by the prompt price falling into a discount relative to the deferred prices; the refiner then can hold crude oil in storage and cover both the physical and financial costs thereof by selling the high-priced deferred futures in what is known as cash-and-carry arbitrage.

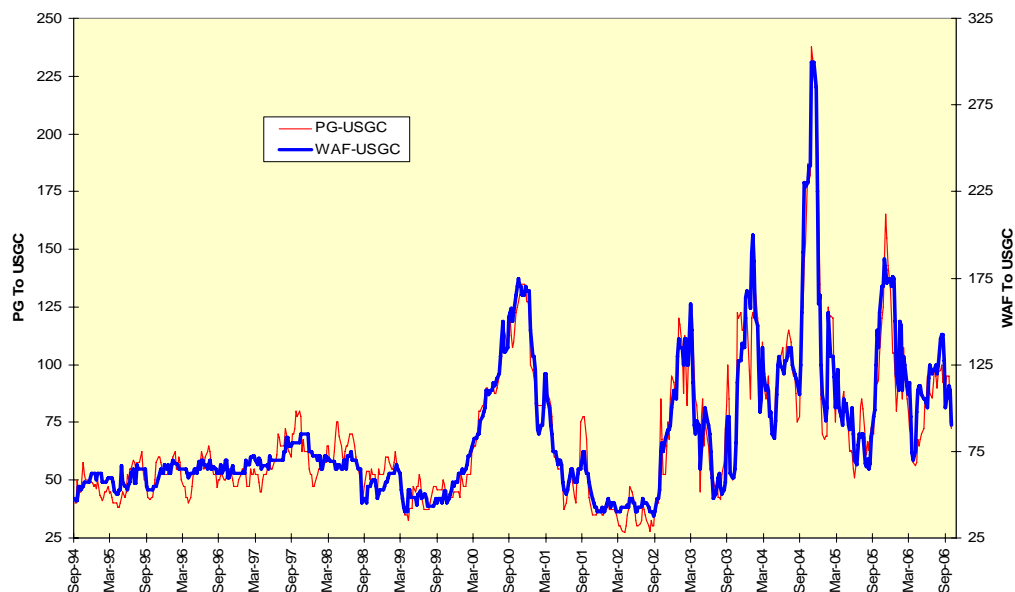
What happened after May 2003? Crude oil producers (correctly) lost their fear of declining prices and ceased selling aggressively into the deferred months as a hedge. The new long-only commodity index funds exacerbated this development by continuously buying front-month futures and then rolling their positions forward on a monthly cycle, a strategy that invited front-running by traders taking the opposite position (see “Long Only Falls Short,” August 2005). As a result, crude oil inventories ballooned and the forward curve of crude oil fell into contango during the most aggressive rally in crude oil’s history; prior to May 2003, both developments would have been seen as likely as falling upwards. The drawdown of crude oil inventories since June 2006 did not push crude oil into backwardation. As those inventories need to be replaced eventually in the open market, we should interpret this as supportive of crude oil prices.

This rather persistent contango in the crude oil market affects refining margins, our subject last month. All else held equal, we should expect a contango market to “trade down the curve;” that is, prices should decline as expiration approaches. This has the effect of expanding refining margins, the difference between refined product prices and crude oil costs. And to top things off, higher refining margins encourage refiners to build and maintain high levels of crude oil in inventory... and often to hedge these inventories by selling refined product futures instead of crude oil futures.

A second look at inventories can be obtained from tanker shipment rates. Crude oil loaded onto vessels and headed for the United States is nothing more than floating inventory. As vessels are nominated for various routes, their tariffs, expressed here as Worldscale or percentage of a normal tariff on that route, rises. Rising tanker rates signal additional inventories headed our way; falling tanker rates signal the exact opposite.

As we can see in Chart 2, two key tanker rates, one from the Persian Gulf to the U.S. Gulf Coast and one from West Africa to the U.S. Gulf Coast respond to price signals. They rose during the 2000 rally, fell into early 2002, and have remained high ever since. The peak response came during the fall and winter of 2004 when prices first entered the mid-\$50 range. An increase from the spring of 2006 into late summer was consistent with more tankers being nominated to bring additional inventories into the U.S. market. The decline in tanker rates after August is consistent with low shipments and therefore a near-term decline in inventories. That, too, should be supportive of crude oil prices.

Chart 2: Tanker Rates Expressed In Worldscale

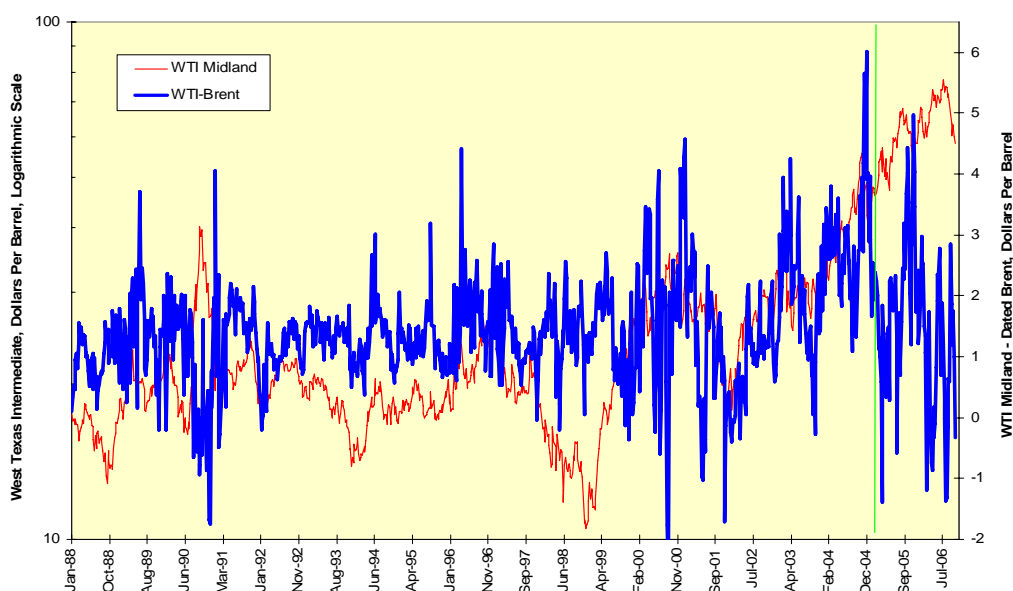


The Atlantic Basin

As crude oil trades in a global market, the U.S. is only able to bid away additional cargoes of sweet crude oil from other buyers if the price gap between the U.S. and those markets is sufficiently high. As most Asian and Pacific Rim markets are supplied from the Middle East and very little crude oil crosses the Pacific to the U.S. West Coast, we can focus on the Atlantic Basin. Here the key spread is the one between Brent Blend, produced in the North Sea and which also serves as the pricing basis for key African sweet crude oils, and West Texas Intermediate, which underlies U.S. crude oil futures.

Prior to 2005, the highly seasonal Brent-WTI spread – it rises in the early summer and falls during the winter to reflect the movement of crude oil from the U.S. Mid-Continent region to refining centers in the Midwest – tended to rise along with WTI prices. As demand for crude oil increased in the U.S., WTI prices rose and increased the spread, which in turn pulled additional cargoes of crude oil across the Atlantic. This ceased to be true after early 2005, marked with a green vertical line in Chart 3: Higher prices in the U.S. were met with even stronger bids from European refiners, which pushed the spread negative. This implies upward pressure for U.S. crude oil prices in the future as the marginal price in the Atlantic Basin is being set in Europe, not in the U.S.

Chart 3: The Brent-WTI Spread And WTI Prices

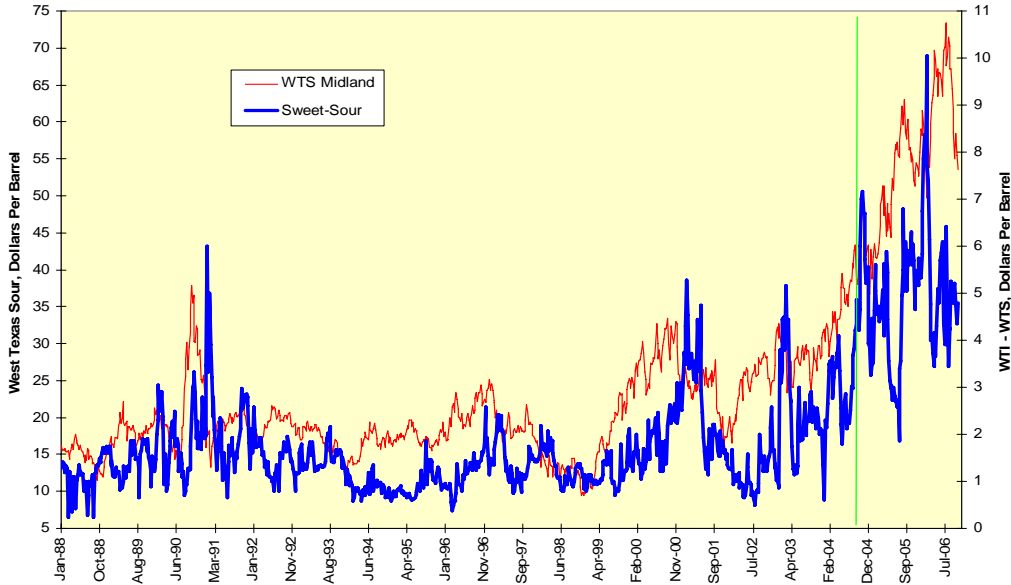


A Sour Taste

The spread between sweet and sour crude oil reflects the stress on the U.S. refining system. The more sophisticated refineries have the special equipment and configurations needed to process the cheaper sour crude oil. As capacity utilization rises, the incremental refining units brought on stream can process only the more expensive sweet crude oil. This puts upward pressure on sweet crude oil prices – both grades underlying the major futures contracts, Brent and WTI, are sweet crude oil – and increases the sweet-sour spread.

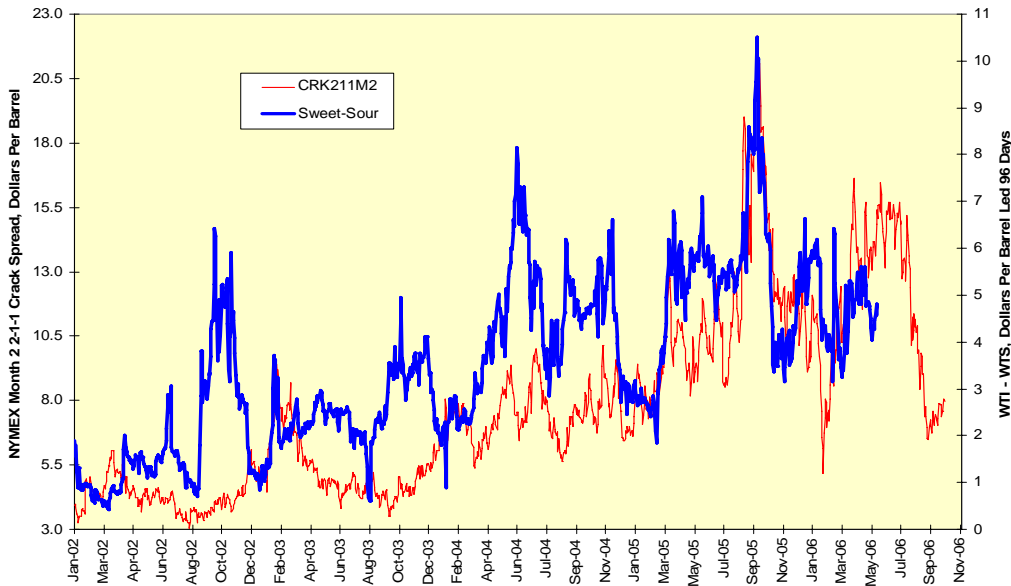
Once again, this spread used to correlate closely to the prices of West Texas Sour crude oil very closely. But as we have seen in other cases, the pattern changed as prices advanced and the bull market in crude oil took on the look of permanence. After the winter of 2004, marked on Chart 4 with a green vertical line, the only surge in the sweet-sour spread was a short-lived one coincident with Hurricanes Katrina and Rita. This, too, is bullish for crude oil prices as it indicates a lack of spare sour crude oil production capacity. Restated, sour crude oil can now rise in price as fast as sweet crude oil can.

Chart 4: The Sweet-Sour Spread And Sour Prices



We can now complete the analyses of this month and last by linking refining margins to the sweet-sour spread. Refiners have to plan their run schedules in advance; while futures traders focus on the front-month contracts, refiners must look out at least two months and as far as five months. If we map, as in Chart 5, the second-month 2-1-1 crack spread (two barrels of crude oil, one each of heating oil and gasoline) against the sweet-sour spread, we find that crack spreads have led the sweet-sour spread, on average, by 96 trading days since the start of 2002. Just as we should expect, the profitability of refining crude oil ultimately determines the demand for it, all of the distortions from long-only commodity index funds and other speculators notwithstanding.

**Chart 5: The Sweet-Sour Spread And NYMEX Month 2 Crack Spread
A 96 Trading Day Leading Relationship**



This is the link between industry fundamentals and the readily observable technical trading patterns of individual petroleum market futures and spreads. The great debate between fundamental and technical analysis is closed: Everyone is right, and if that does not make everyone unhappy, nothing will.