

**How the Oil Market Prices Work-A Brief Explanation**

This report tries to explain how the oil market works in a simple and brief manner. However the reader should be aware that the oil market is quite complex, no one statement can cover all the cases and instances of oil trading. With crude oil and gasoline prices rising to record levels in 2008 and the potential for new records to be set in the future, it is reasonable to assume that questions arise as to how crude and product prices are ultimately established.

**Crude Oil Market**

Worldwide crude oil production is approximately 85 million barrels per day with just over 30 million barrels per day produced by OPEC member countries. Crude oil production in the United States is approximately 5.8 million barrels per day.

The US, with a population of 313 million, consumes about 19 million barrels per day of oil products. China, with a population of 1.33 billion, consumes about one-half of that amount; roughly 9.5 million barrels per day. A 2.5% growth rate in US demand is currently equivalent to about a 5.0% growth rate in Chinese oil demand. Total world oil demand is over 89 million barrels per day.

Crude oil quality varies significantly. There are hundreds of different types of crudes produced around the world. West Texas Intermediate (WTI) crude is low sulfur, approximately 0.4 weight percent. Crudes from Nigeria have even lower sulfur of around 0.1 weight percent or less. Meanwhile crude produced from Saudi Arabia has sulfur levels in excess of 2% while crude out of Iraq has a sulfur level of nearly 3%. This is but one aspect of quality.

Another aspect of quality is whether it is light or heavy. Light crude is easier to refine because it contains more material such as naphtha that can be refined into gasoline while also containing significant amounts of jet fuel and diesel fuel. Heavier crudes contain what is know as vacuum gas oil and residual fuel which must be further processed into lighter transportation fuels in several refining process units.

Refiners then value each of these different crudes based on the yields of those products mentioned in the previous paragraph, the cost of refining into a finished product, and the ultimate value of those products. The value of each is different to every refiner and the cost of these different types of crude varies.

This naturally leads to the question “How is the price of crude oil determined?”

There are three benchmark crudes in the world. Dubai is the benchmark for crude in the Middle East, Brent crude is the North Sea crude marker, and West Texas Intermediate (WTI) is the marker crude for Western Hemisphere crude oils. WTI, or light sweet crude is the crude one hears about daily. When you hear a crude oil price of \$100 per barrel, or

\$70 per barrel, this is the crude that is being referred to. What is not so clear is what this \$100 per barrel means to the rest of the crude oil market.

Light Sweet crude oil contracts, also known as WTI is traded on the New York Mercantile Exchange Futures Market. When one hears a price, it refers to a specific quality—WTI, for a specific timing, say March Delivery, at a specific location—namely Cushing Oklahoma. Clearly one can see that this means nothing to a refiner in Philadelphia, Los Angeles, Brazil or Canada. Over the years, the NYMEX has allowed foreign crudes to be delivered against the contracts with a deemed quality differential. This increases the liquidity of the contract.

Every day hundreds of millions of barrels of WTI are traded, and at the end of the day a settlement price is announced. As mentioned before, each crude oil has distinctive qualities, and therefore it has a market value higher or lower than that of WTI. The different types of crude oil bought and sold around the world are priced at discounts or premiums to the benchmark crudes. For example, Arab Heavy crude from Saudi Arabia, which is heavier and higher sulfur than WTI, is being offered by Aramco at a price of WTI minus about \$3 per barrel loading in February 2012 at a port in Saudi Arabia. Specifically, when you load your oil tanker, you create a bill of lading date, and the price is calculated based on the average of five trading days where one would take the NYMEX settlement price and subtract 3 dollars. The price of WTI can fluctuate on a daily basis, but in this example, the buyer would always pay 3 dollars less.

This type of process is repeated throughout the trading world, although some Asian crudes price a bit differently. In addition, some domestic crude oils are priced on a posting basis, but these postings fluctuate daily with the NYMEX. To reiterate: **Crude oil is priced on a differential basis to the benchmark crudes.** When the benchmark moves, the final purchase price moves. OPEC sets production rates that impact supply which in turn affects the price determined by the market.

That leads to the question, “Who is setting the benchmark crude price?” The answer is oil traders, refiners, producers, hedge funds, pension funds, speculators, doctors, lawyers and individuals who all are taking a position on NYMEX Crude. (A similar parallel can be drawn with Brent and to a lesser extent Dubai). If the market hears a story about a supply interruption in Nigerian oil supply, the market is bid up. If the market hears about potential sanctions on Iran, price is bid up. When inventories of crude oil and oil products rise, or demand goes down, the price falls. These moves affect the price of crude oil that has been purchased or sold by oil companies on a differential basis.

When crude oil prices rise, oil producers around the world benefit. OPEC, state owned oil companies, and large integrated oil companies with oil reserves are the winners. (Note that Indonesia, an OPEC member, is actually a loser in this scenario as they import more finished products than their crude oil exports.) The consumer is not. The supply/demand balance throughout the world is much tighter, so the market has been bid up accordingly. The spare production capacity that OPEC has is virtually gone, while refineries are

operating at nearly full capacity limiting product supply. Add to that the geopolitical issues, and we have a volatile market with an upside bias.

### **Products Markets**

After purchasing crude, refiners make all sorts of transportation fuels as well as chemical plant feedstocks. The following discussion will be limited to gasoline in the United States.

Like crude oil, not all gasoline is created equal. When the consumer pulls up to the gasoline pump, he or she only decides whether to buy regular, mid grade or premium. But the refiner must meet additional quality specifications for different geographic regions in the country. Simply put, gasoline specifications in Los Angeles are different than those in New York, which again are different than those in Florida. The octane rating is just one of the many quality specifications that refiners must meet.

Gasoline futures are traded on the New York Mercantile Exchange, and this gasoline contract is for a specific quality, with a specified timing, for example March, and at a specific location—namely New York Harbor. Again this does not do much good for a buyer in Bismarck, North Dakota or Seattle, Washington who may need product of a different quality sooner. **However like crude, each of these locations can and do trade at a differential to the NYMEX gasoline futures contract.** It is that differential that is negotiated. The final price can then be invoiced against the NYMEX price on a particular settlement date. These prices are then passed down to the wholesale level at the terminal racks and then on to the consumer at the retail outlet.

Again like crude oil, the price of gasoline on the NYMEX is influenced by refiners, traders, importers, blenders, wholesalers, retailers, consumers, hedge funds, pension funds, doctors, lawyers and individuals all buying and selling. When the market hears of a refining problem or supply interruption, prices are bid up. If demand goes down or inventories rise, prices fall.

When gasoline prices rise faster than crude oil prices, refiners are the beneficiary, since refiners make money based on the difference of their raw material cost namely crude oil and their finished products namely gasoline and diesel fuel. When demand falls, product prices fall, the consumer benefits, and the refiners often see their margins shrink.

The hurricanes of 2005 and 2008 severely impacted supply and resulted in a market where the price of gasoline was bid up substantially. With the loss of approximately 15% of the US refining capacity the effect was felt nationwide. Those refiners whose operations were NOT impacted made a lot of money. Refiners in Europe and Asia who were able to supply imports also reaped the rewards of higher prices in US markets. The market redirected supply into the highest priced geographic locations.

One can debate whether the market treated everyone fairly or not, but prices rose to the point where demand was reduced and the remaining supply was distributed throughout

the country with a limited amount of shortages. The market, in effect, rationed the gasoline supply. Many refiners saw increased profits. Note that during the course of these price increases, some marketers did not pass on the increased wholesale price to their customers, since they either would not or could not increase the price at the pump due to other competition.

The old adage, “A rising tide lifts all boats” applies. A problem in one part of the world affects prices throughout, consequently oil producers and refiners may benefit during periods of supply shortages.

### **Looking to the Future**

Geopolitical factors such as Nigeria, Iran and other Middle East politics still weigh heavily on the minds of traders. Increasing demand from China and India also puts upward pressure on oil prices.

The United States has implemented new sulfur limits on gasoline and diesel fuel over the past few years. New York State will require low sulfur heating oil beginning July 2012. This means more refining units must properly operate to ensure that the final product meets specifications. Tighter specifications will also limit some of the imports that previously had entered the US market.

We can look forward to another year of price volatility.