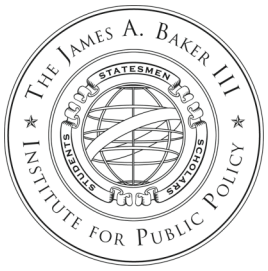


James A. Baker III Institute for Public Policy
Rice University

Who Is In the Oil Futures Market and How Has It Changed?

By

Kenneth B. Medlock III

James A. Baker, III, and Susan G. Baker Fellow in Energy and Resource Economics
James A. Baker III Institute for Public Policy
Rice University

and

Amy Myers Jaffe

Wallace S. Wilson Fellow in Energy Economics
James A. Baker III Institute for Public Policy
Rice University

August 26, 2009

I. Introduction

Leading up to 2008, oil prices experienced a steady, upward trend. Then, in 2008 oil prices climbed to unprecedented highs of $147 per barrel in July, only to fall dramatically in a very short period of time to a low of $30 per barrel in December 2008 (see Figure 1). Since the end of 2008, oil prices have risen in 2009 and are now near $70 per barrel. The relatively recent dramatic movement in oil price has caused everyone from U.S. congressmen to ministers from the Organization of the Petroleum Exporting Countries (OPEC) to call into question the role of speculative traders in the crude oil market. The Commodity Futures Trading Commission (CFTC), the main regulator of U.S. oil futures markets, recently announced that a new review of the role of speculators in oil futures markets trading would be forthcoming in late August. Early reports indicate that the CFTC, in its new study, is likely to pin oil price swings more squarely on speculative index trading. The Obama administration has already indicated that it will pursue greater regulation of the market and is negotiating with the United Kingdom about possible coordination.

While the question of what has produced sharp swings in oil prices since 2005 is a complex one that requires further and deeper study, there are inescapable facts that need to be part of the debate about regulating the activities of institutions betting on movements in oil price purely for financial gain.[1] Specifically, noncommercial traders—who the CFTC designates as any reportable trader who is *not* using futures contracts to hedge—have increased their footprint in the marketplace dramatically since the late 1990s. Hedgers are typically producers and consumers of the physical commodity who use futures markets to offset price risk. By contrast, noncommercial traders seek profits by taking market positions to gain from changes in the commodity price, but are not involved in the physical receipt/delivery of the commodity. These financial players—generally referred to as "speculators"—have come to account for a significantly greater proportion of activity in the U.S. oil futures markets than physical players in the oil industry in recent years. In addition, trading strategies of some financial players in oil appear to be influencing the correlation between the value of the U.S. dollar and the price of oil.

[1] The Baker Institute will be releasing a longer, broader study of this topic in autumn 2009 that includes more comprehensive analysis of the impact on historical oil price movements.

Moreover, we contend that the observed trading behaviors were supported during the 2000s by the policies surrounding the way governments approached the use of strategic government oil stocks.

This brief paper investigates the composition of traders in the oil futures market and how this composition has changed in recent years. We also elucidate new trends in financial currency and commodity price movements and quantify dramatic changes in dollar-oil correlations. Specifically, we address the core questions of whether speculative trading in oil has increased and whether the link between dollar and oil-related financial contracts has strengthened in the last several years. Finally, we discuss the interaction between these observed market trends and policies regarding the use of strategic government-held oil stocks.

Figure 1: Crude Oil Price (WTI, Daily – 01/02/90 through 08/19/09)

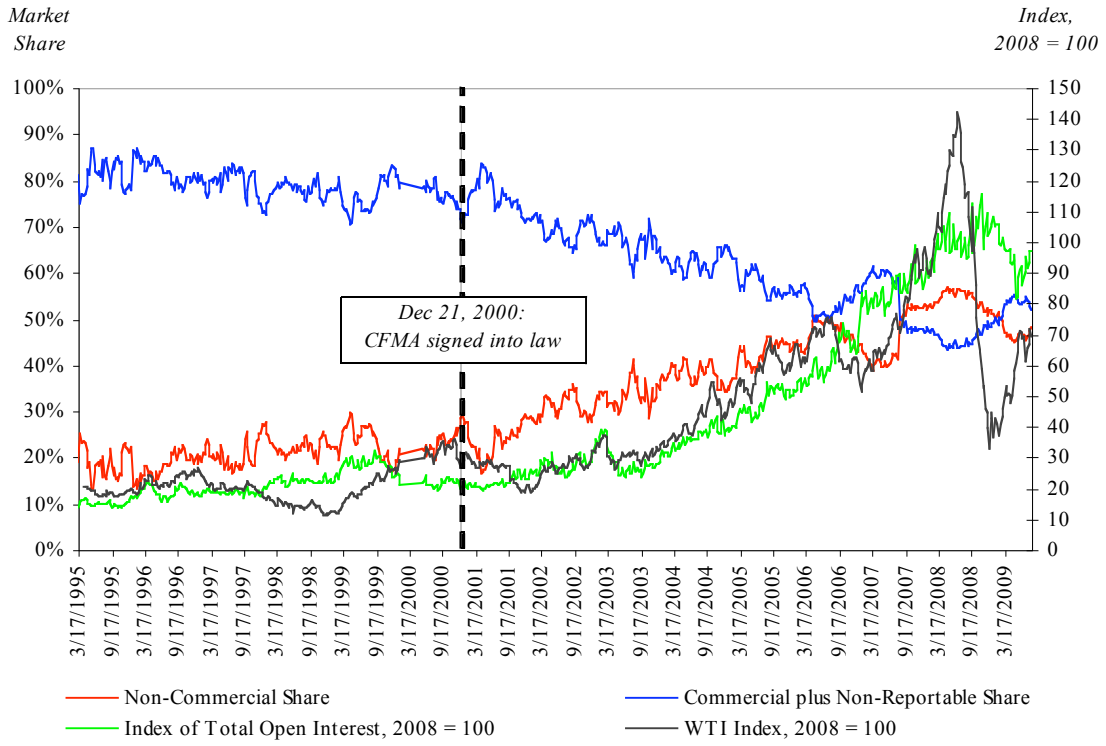
Source: Energy Information Administration

A study of the changing composition of oil market participants and dollar-oil links is important in understanding the role of oil in U.S. economic and national security. It has been postulated that oil-linked index funds became an asset class for investors wanting to escape the falling

dollar and weakening stock market, adding to the speculative fervor in oil and causing even more damage to the U.S. economy. In 2008, U.S. oil imports totaled more than $331 billion. This represents an increase of 300 percent from 2002. Moreover, the U.S. oil import bill accounted for as much as 47 percent of the overall U.S. trade deficit in 2008, compared to only 19 percent in 2002. This rising financial burden contributed to the ongoing challenges for the U.S. economy from 2006 through 2008, and has put pressure on the U.S. dollar.

In the review of data in this brief paper, we find that noncommercial players now constitute about 50 percent of those holding outstanding positions in the U.S. oil futures market, compared to an average of about 20 percent prior to 2002 (see Figure 2). The change in market composition was driven by the rapid entry of noncommercial participants and was the principle factor behind the increase in total open interest. It is also highly correlated with the run-up in oil prices. Moreover, as will be expounded below, there appears to have been a substantial change following the passage of the Commodity Future Modernization Act (CFMA) in December 2000.

Figure 2: Market Composition, Open Interest, and the Price of Oil



Source: Energy Information Administration, CFTC Commitment of Traders Reports

We also find that the correlation between movements in oil prices and the value of the dollar against the trade-weighted index of the currencies of foreign countries has increased to 0.82 (a significant measure) for the period between 2001 and the present day, compared to a previously insignificant correlation of only 0.08 between 1986 and 2000.

Recent shifts in the composition of oil market participation and dollar-oil correlations also correspond to changes in the manner of regulation of commodity markets such as those implemented with the CFMA. As noted in a 2007 U.S. Government Accountability Office report, the new legislation made it easier for financial players to obviate speculative limits and made it more difficult for the CFTC to regulate oil futures markets.[2] Changes at the London International Petroleum Exchange (IPE), which is now the Intercontinental Commodities Exchange (ICE), regarding U.S. delivery-based contracts also created problems with monitoring and limiting speculative activity since these contracts were outside the jurisdiction of the CFTC.

II. Oil Futures Markets: Who Trades and Why?

In the aftermath of the 1973 oil crisis, a wide array of financial tools were employed to allow industry players to manage and diversify price risk and to help raise capital in innovative ways. The widespread adoption of these risk management products, which were fashioned after similar products that had been used successfully in foreign exchange and agricultural commodity markets, helped promote market transparency and greater liquidity in oil trading.

Formal exchanges—where contracts for delivery of oil in future months can be bought and sold—serve as "clearing houses" that ensure the integrity of financial transactions of all participants through daily margin requirements on open positions and other mechanisms. In point of fact, only a small volume of oil contracts traded in these exchanges result in physical delivery. Rather, most traders who open positions will typically close them prior to expiry with the goal of profiting in the transaction. Growth in the use of financial instruments explicitly linked to oil has aided in price discovery by bringing openly accessible, readily available information about

[2] U.S. Government Accountability Office, Trends in Energy Derivatives Markets Raise Questions about CFTC Oversight, *GAO* 08-25, October 2007. Available at: http://www.gao.gov/products/GAO-08-174T.

current and expected future market conditions into the market price. This has, in turn, helped establish more transparency in the global crude oil market. These financial instruments have allowed market participants to hedge, or shed risk, against unexpected price movements, which can be a very important function for firms engaged in exploration and production or the refining and marketing of oil products. But, for the function of risk shedding to be facilitated, there must be participants willing to accept risk. These participants are the so-called "speculators," who despite being much maligned recently, serve an important role in the proper functioning of these financial markets.

The first widely traded oil financial contract to be sold through an organized, regulated exchange was a heating oil futures contract offered on the New York Mercantile Exchange (NYMEX) in 1978. The heating oil contract gained in popularity and was followed by other successful oil futures contracts, including the introduction of U.S. West Texas Intermediate crude oil futures in 1983. By 1990, there were 10 active oil futures contracts trading worldwide, with a combined daily volume equivalent to 150 million barrels a day, or 130 percent more than oil demand at the time. Today, total NYMEX oil futures trading activity represents the equivalent of 600 million barrels, which is about seven times the daily volume of current oil demand.

Trading participants on the NYMEX are categorized into two basic categories: (1) commercial traders, including both producers and consumers, who trade in futures to offset the risk of price moving unfavorably for their ongoing business activities and (2) noncommercial traders, including speculators and financial institutions, who seek profit on paper positions from short-term changes in price. Both types are needed for the exchange to function well. For example, an oil producer can hedge against declines in oil price by selling oil futures contracts (taking a short position) on the exchange in light of its physical oil position, which is naturally short. If oil prices fall over time, the producer can offset losses in its physical business by taking profits on his short financial position in the futures market. If the oil price rises instead, the profits from the physical sale of oil are offset by losses from holding the futures contract. In either case, the producer is neutral to price changes. In order to facilitate such moves in a more efficient manner, there must be a willing counterparty in a liquid market. Speculators serve this role by acting not only as potential counterparties, but also as market participants who trade frequently, thus

increasing liquidity. But recently, there have been questions about how large the market presence of speculators should be to facilitate the smooth operation of markets.

Rules for speculative position limits were historically much stricter than they are today. Moreover, despite rhetoric that imposing stricter limits would harm market liquidity, there is no evidence to support such claims, especially in light of the fact that the market was functioning very well prior to 2000, when speculative limits were tighter.

In practice, speculative position limits have been widely used in commodity markets for more than 50 years. These limits are set in order to avoid excessive speculation and market manipulation. According to CFTC regulations, only positions which are "bona-fide hedges" are exempt from limits. The Commodity Exchange Act (CEA) stipulated that futures contracts must be traded on a CFTC-regulated exchange, unless a statutory exclusion or regulatory exemption was legislated.[3] The philosophy of exemptions for hedging is grounded in the notion that a physical market position gives hedgers less incentive to manipulate financial market prices due to their natural offsetting position in the physical market.

The Commodity Futures Modernization Act (CFMA) of 2000 effectively cleared the way for more lax regulation of new oil risk management products, including index funds and price swaps, setting the stage for a rapid increase in financial players' participation in over-the-counter (OTC) markets. The CFMA was approved by Congress on December 15, 2000, and signed into law by President Clinton six days later. It is particularly important because it designated certain OTC derivatives transactions (including those involving oil) to be outside of the jurisdiction of the CFTC. Thus, the CFMA made it easier for financial players to obviate speculative limits by creating a "loophole" that exempted certain participants from speculative position limits and other regulations due to their involvement in OTC markets or electronic trading platforms—such as ICE or the now- extinct Enron Online.[4] These exchanges are managed chiefly by financial institutions and companies who provide "risk management services" but are not primarily oil producers or consumers in the physical oil market. Additional problems with monitoring and

[3] Dean Kolner, "The Commodity Futures Modernization Act of 2000," *Commodity Futures*, 29 (2001).
[4] U.S. Government Accountability Office, Trends in Energy Derivatives Markets Raise Questions about CFTC Oversight, *GAO* 08-25, October 2007. Available at: http://www.gao.gov/products/GAO-08-174T.

limiting speculative activity subsequently emerged with the formation of foreign exchanges that allowed contracts that could be settled by physical delivery within the United States but are outside the jurisdiction of the CFTC because they are offered on foreign exchanges (the so-called "London Loophole").

Importantly, the CFMA also removed swap transactions from the reach of the CEA, thus making them exempt from speculative position limits established by the CFTC.[5] This so-called "swaps loophole" has allowed institutional investors to take larger positions than if they were just buying futures contracts directly on the exchange, where they would have been constrained by speculative position limits. In a swap, a floating price is exchanged for a fixed price, with financial settlement that only requires the payment of the net transaction difference between the two (the so-called "contract for differences").

Composition of Market Players Following Regulatory Changes

An analysis of trends in open interest in the U.S. crude oil futures contract—as detailed in the commitment of traders reports obtained from the CFTC—shows that the proportion of open contracts held by noncommercial players increased sharply in the last few years (see Figure 3). Notably, this also means that the percentage share of open contracts held by commercial entities decreased. While market share is a notable feature, the absolute trends behind the shares are also important. In particular, although the market position of commercial traders did increase in absolute size (approximately double), noncommercial traders increased their market presence over 15-fold, largely due to increased use of spread trading (see Figure 4).

---

[5] Interestingly, the CFMA also stipulated that the CEA not apply to any "excluded commodity," which is defined to include, among other things,

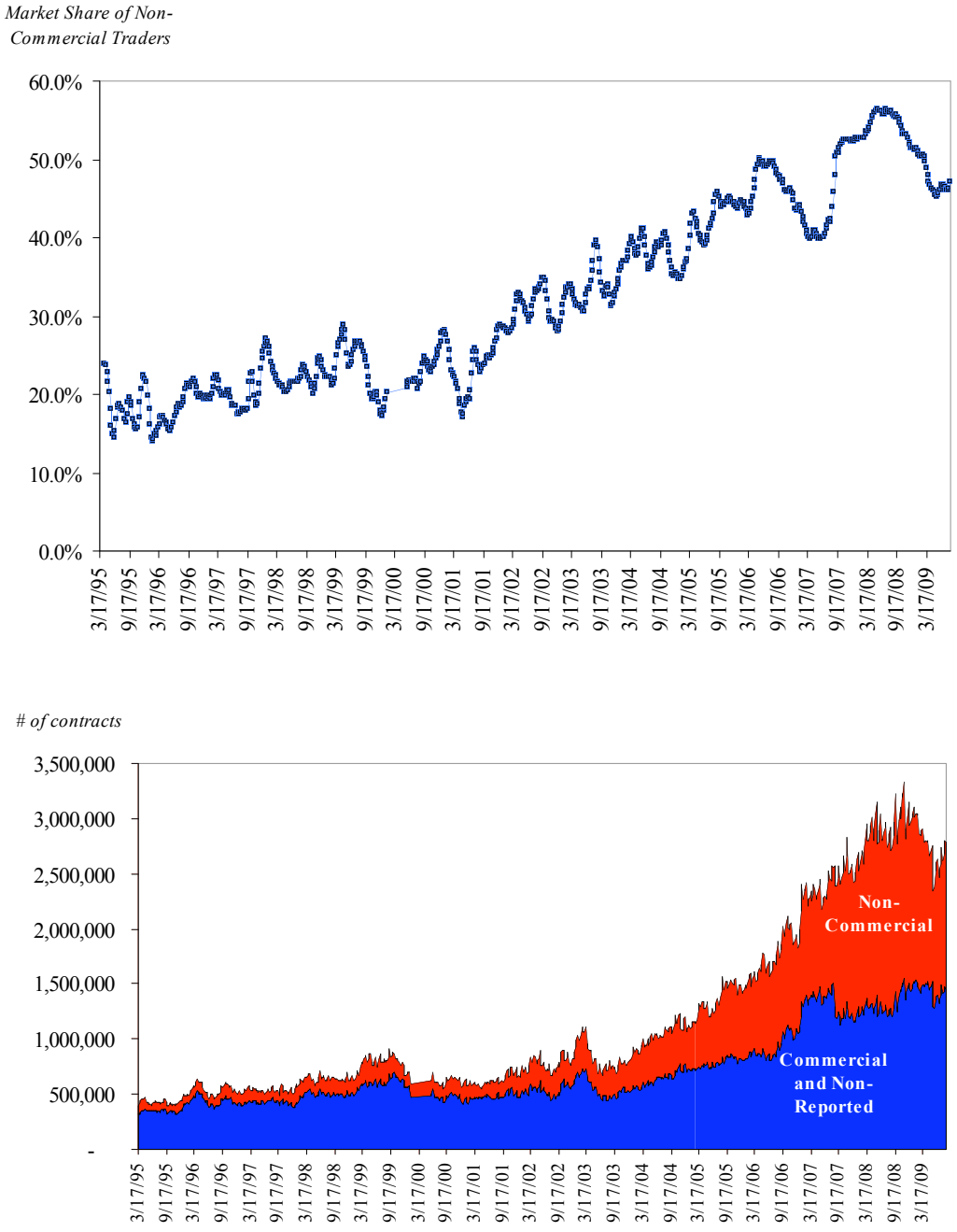
1. an interest rate, exchange rate, currency, security, security index, credit risk or measure, debt or equity instrument, index or measure of inflation, or other macroeconomic index or measure;
2. any other rate, differential, index, or measure of economic or commercial risk, return, or value that is either (A) not based in substantial part on the value of the narrow group of commodities not described in clause 1 above or (B) based solely on one or more commodities that have no cash market;
3. any economic or commercial index based on prices, rates, values, or levels that are not within the control of any party to the relevant transaction; or
4. an occurrence, extent of an occurrence, or contingency (other than a change in the price, rate, value, or level of a commodity not described in clause 1), that is (A) beyond the control of the parties to the relevant transaction and (B) associated with a financial, commercial, or economic consequence.

- Excerpt taken from Kloner, *Commodity Futures*, Vol. 29, 2001

Note, it can be argued that the CFMA set the stage for the credit default swap fiasco that has been tied to the current economic and financial crisis.

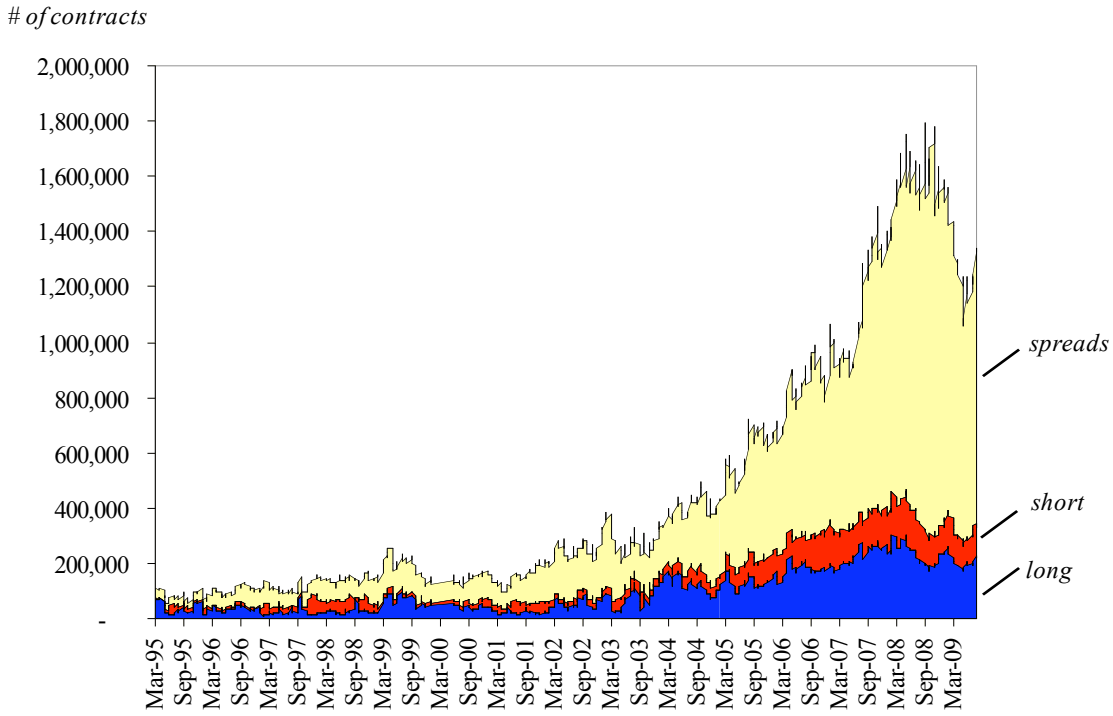
Open interest is the number of open contracts held active at any given time. As can be seen in Figure 3, the share of open contracts held by noncommercial players averaged approximately 20 percent of total open interest through the early part of this decade. However, this dramatically increased to more than 55 percent of total open interest at its maximum in 2008, which coincided with the peak in crude oil price.

Figure 3: Market Composition



Source: CFTC Commitment of Traders Reports
Note: These data include all open interest, inclusive of future, options and spreads. The data also account for nonreported positions. Exclusion of the non-reportable positions pushes the noncommercial market share into the low 60-percent range at its peak.

Figure 4: Noncommercial Open Interest by Type of Contract



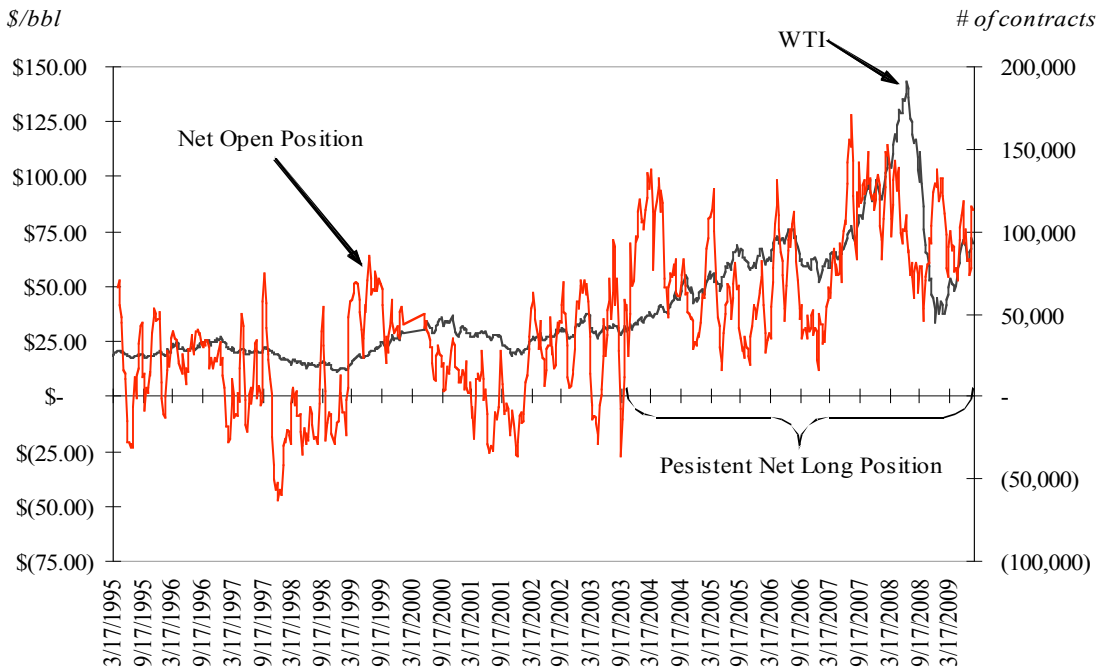
Source: CFTC Commitment of Traders Reports

Furthermore, and perhaps even more striking, the open interest of noncommercial players moves from a lagging indicator of price to a leading indicator of price around January 2006. An explanation for this can be tied to the market presence of noncommercials. If, for example, noncommercial players are more apt to expect prices to move up, then, as they become a greater share of the market, the weighted-average market expectation will preponderantly become more optimistic about a price rise since a larger percentage of players believe that prices will rise in the future. This can, in turn, lead to a self-fulfilling prophecy, at least for short periods of time. Only when high prices cause demand to wane and supplies to grow, leading to inventory buildup, will physical market realities reassert themselves.[6]

[6] This, in fact, can be a problem. Supplies are typically slow to materialize as there is a lead time involved in finding and developing new resources. So, to the extent that excess production capacity is not held, it may appear to those without a real stake in the physical market that supplies are indeed not increasing. Or, in a case where paper prices are rising but physical oil holders cannot find actual buyers, inventory may not accumulate quickly on land, but may emerge as a rising number of slow-steaming, floating cargoes at sea, the presence of which is less transparent to financial market players than to physical oil traders. A rise in the number of floating cargoes was apparent in the spring of 2008, but was generally not well understood by financial players. Such disconnects between perceptions

In Figure 5, the net position of noncommercial traders is plotted along with the oil price. For the series labeled "net open position," positive numbers indicate a net long position. Generally, movements in price over the last few years have coincided with trends in open interest by noncommercial traders. We can see that during periods where speculators have been net short, prices typically declined, even if only slightly. When speculators are net long, the general shift in the market has been upward, in some cases to a dramatic extent. Some exceptions have occurred when speculators were generally in a net long position but were moving to liquidate positions. In this case, such as the late spring/early summer of 2008, prices responded by moving sharply lower.

Figure 5: Oil Price and Net Position of Noncommercials



Source: Energy Information Administration, CFTC Commitment of Traders Reports

---

and reality can lead to short-lived but erroneous predictions of $200 oil that feed a temporary market frenzy. Not until physical producer responses are actually apparent to all players will the "bubble" pop. In the 1980s and 1990s, this disconnect between the market information of financial players versus physical market participants might have been a smaller factor in overall market direction perceptions because noncommercial players had a significantly smaller share of the market and thereby their perceptions might have been less influential on short term market direction. When commercial players, or those with a physical presence (asset holders), represented a larger share of the market, their ability to be better versed in the realities of the physical market meant the connection between physical market trends and market expectations were better tempered.

Generally speaking, speculators have been net long since the middle of 2003, just as prices began to rise consistently year after year. So, as the market presence of noncommercial traders increased between 2003 to early 2008, the stance of these noncommercial traders has fairly consistently been to hold bullish, long positions that supported rising prices. And, when their market share was highest, so was their net long position, which again roughly coincided (acting as a slight leading indicator) with the peak in oil prices at $147 a barrel in the middle of 2008 (see Figure 5).

Despite the trends evident in Figures 2 through 5, the CFTC, which is constantly analyzing market variables in effort to detect abnormalities, did not find any evidence in that the behavior of any single group of traders was creating a problem. In fact, CFTC chairman Walter Lukken told a committee of the U.S. House of Representatives in 2008 that CFTC analysis "did not find direct evidence that speculation was driving up (commodity) prices." This statement is not surprising in light of the time-series techniques employed by the CFTC. Specifically, the CFTC's own studies looked for extreme changes in the volatility of price using ARCH and GARCH models.[7] The CFTC found that such extreme changes in price volatility were not evident in the data. However, the volatility of time-series data need not exhibit any clustering or significant changes for the market to be influenced by the trading behaviors of a large group of participants. Shifting aggregate expectations due to relatively tight short-term fundamentals and changing composition of market participants are not aspects the CFTC normally examines, and these factors are indeed essential to the proper analysis of the question of the role of speculators in price formation. Thus, it can be argued that the models employed were not adequate to answer the types of questions being asked.[8]

While correlation does not imply causation, the trends evident in the open interest data are impossible to ignore. It is striking that only after the CFMA was enacted did the composition of players in the market significantly change and oil prices rise to unprecedented highs. However, analysis must also take into account that the physical crude oil market had to be tight in order for

[7] ARCH and GARCH are acronyms for Auto-Regressive Conditional Heteroskedasticity and Generalized Auto-Regressive Conditional Heteroskedasticity. ARCH and GARCH models can be used to forecast and analyze the volatility of time-series data. They are designed to deal with time-series that exhibit nonconstant variance over time, a feature sometimes called "volatility clustering."

[8] These points will be expounded in a Baker Institute paper to be released later this fall.

speculative activity to be able to exert such extensive upward pressure on price. Thus, a more complete discussion of the physical characteristics of the market and its interactions with speculative trader behavior is needed for a more conclusive analysis. This more comprehensive Baker Institute study, authored by Kenneth Medlock, will be forthcoming later this fall.

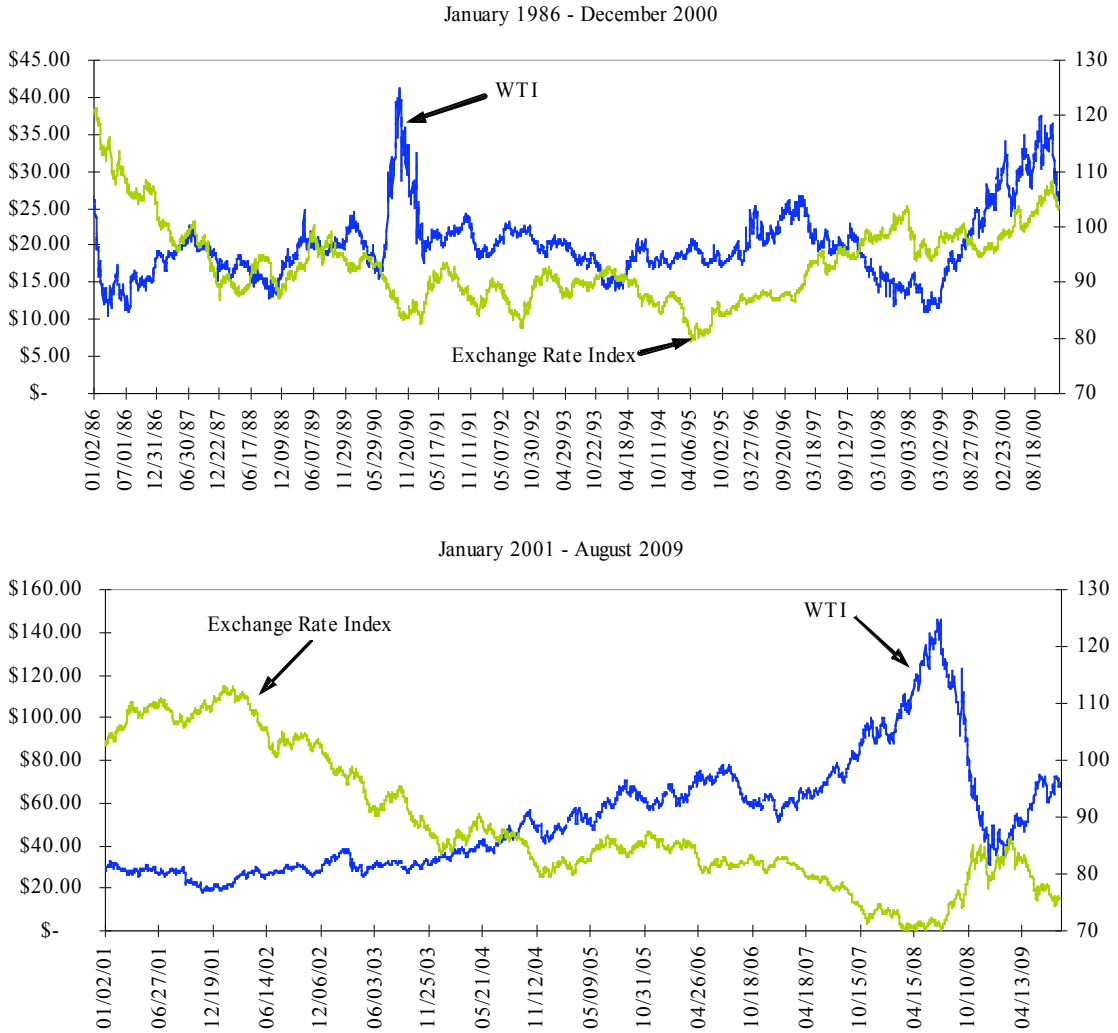
III. The Dollar and Oil: The Downside to Correlations

A high oil price can contributed to a weakening of the dollar, through mounting trade deficits and U.S. debt.[9] In 2007 and 2008, dramatically rising oil prices fed the U.S. trade deficit leading to increased U.S. indebtedness. This, in turn, contributed to an even weaker dollar, which further drove oil prices higher in a self-perpetuating pattern. Oil-linked index funds became an asset class for investors wanting to escape the falling dollar and weakening stock market, adding to the speculative fervor in oil. According to the International Energy Agency, as of July 2008 financial investors had about $300 billion invested in such indexes, which track the value of futures contracts. The IEA contends that this 2008 level of investment represented a fourfold increase from index-related investment in January 2006.

Analysis of dollar-oil price data for this period shows a dramatic change in price correlation from historical patterns. Figure 6 indicates the daily oil price and the daily value of the dollar against the currencies of major U.S. trading partners. For the period from January 2001 through August 2009, these two measures are very highly correlated, exhibiting a simple correlation of -0.82. However, data from a prior period—January 1986 though December 2000—the correlation was only -0.08, implying virtually no correlation during that period. The strong -0.82 measurement implies that oil prices and the value of the dollar tend to have a negative correlation. In plainer terms, depreciation in the dollar will very likely coincide with a rise in the price of oil or vice versa.

[9] Mahmoud El-Gamal and Amy Myers Jaffe, "Energy, Financial Contagion, and the Dollar," The Global Energy Market: Comprehensive Strategies to Meet Geopolitical and Financial Risks, James A. Baker III Institute for Public Policy, May 2008, available at http://www.rice.edu/energy/publications/WorkingPapers/IEEJcontagion-ElGamalJaffe.pdf.

Figure 6: Oil Price and the Value of the Dollar



Source: St. Louis Federal Reserve Database (FRED) and the Energy Information Administration

While there were short windows of time prior to 2001 where the oil price and value of the dollar are more strongly correlated, a dramatic sustained period of high correlation emerged during the 2000s. Moreover, given the fact that the correlation has increased so dramatically in absolute value in the period post-2000, the relationship between the price of oil and the value of the dollar seems to have tightened since the beginning of this decade. Again, it is worth noting that this coincides with data presented above, and occurs after the enactment of the CFMA.

The threat to the U.S. economic health and national security is that the dollar risks getting caught in a vicious cycle where continually rising oil prices feed the U.S. trade deficit, leading to

increased U.S. indebtedness and thereby an even weaker dollar, which further drives oil prices higher. This pattern is accentuated by petrodollar recycling where a sudden influx of oil revenue flows to and from the Middle East fuel financial bubbles and investor speculation in commodity markets because local Persian Gulf economies cannot easily absorb the sudden influx of dollars. Instead, Middle East governments and private businessmen seek the same investment outlets for their petrodollars as other global investors, fueling inflated prices in commodity futures markets and index funds.

IV. Tools for Preventing Another 2008 in the Oil Market

Mechanisms exist for government intervention in oil markets but the trigger and policy framework for their use is not well-defined and poorly and sporadically implemented. For example, government-controlled strategic stockpiling systems and oil producer spare capacity can both serve an important role in limiting the power of speculators in the global oil market during times of crisis or significant oil supply-demand imbalances, but use of these tools has been spotty at best.

The experience of 1990-1991 demonstrated the clear benefit of coordinated use of strategic stocks and producer spare capacity in contrast to competitive responses in the 1970s and in 2007-2008. Several years after 1990, the Clinton administration also used the "test sale" tool to cap oil prices at $40 a barrel, by signaling to oil markets and OPEC that it would use such sales from the U.S. strategic petroleum reserve to calm oil markets and discourage speculative activity during a sudden disruption or severe imbalance of markets. The strategy proved similarly successful, discouraging future markets players from holding long positions above the $39 a barrel level for fear that U.S. government intervention in the market could cause them losses.

In 2007-2008, however, governments around the world, including the United States, engaged in building strategic stockpiles, as oil prices rose from $65 per barrel to $125. This policy signaled to oil markets participants and OPEC that governments would not use strategic petroleum stocks to ease prices under any circumstances except major wartime supply shortfalls. This allowed

speculators to confidently expand their exposure in oil market futures exchanges without fear of repercussions and revenue losses from a surprise release of U.S. or IEA strategic oil stocks.

Ironically, this new policy for strategic stocks coincided with new regulations that allowed financial players to obviate position limits for speculators.[10] Thus, while the CFTC needs to rethink the regulation and market design of organized exchanges and the role of indexed funds in price movements, a re-evaluation of the role for government physical intervention in oil markets in extreme circumstances is also warranted.[11]

The surge in oil prices from 2007-2008 set the stage for renewed analysis of the proper regulation of U.S. and U.K. commodity futures markets as well as the role of government in preventing oil price shocks from harming the overall U.S. economy. An important aspect of this policy analysis must be a careful study of the unintended consequences of the CFMA, and of the effect of the ballooning share of noncommercial participants in exchange-based and OTC oil futures and swaps trading.

American consumers are perplexed about the continued volatility in fuel prices and seek to understand the complex features of oil price formation. Only by delving deeper into the interaction between the rising market share of financial players in oil futures commodities and changing global oil market fundamentals can sound and effective energy security policy be created. Better understanding of the role of financial players in oil futures markets is necessary not only to ameliorate the impact of future oil shocks, but also to instruct proper use of government strategic oil stockpiles and to create proper and effective regulation of markets.

[10] Mark Jickling and Lynn J. Cunningham, CRS Report for Congress: Speculation and Energy Prices: Legislative Responses, June 30, 2008, Congressional Research Service Order Code RL34555.
[11] Kenneth Medlock, "Speculation: A Cause or Symptom? An Important Question for Designing a Policy Remedy," James A. Baker III Institute for Public Policy, Sept. 17, 2008, available at: http://www.bakerinstitute.org/opinions/speculation-a-cause-or-symptom-an-important-question-for-designing-a-policy-remedy.