Hedge Fund Speculation and Oil Prices

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Summary

Dramatic swings in crude oil prices have led Congress to examine the functioning of the markets where prices are set. A particular concern is that financial speculators may at times drive prices above the level justified by supply and demand. Most oil speculators produce no commercial quantities of oil and take no deliveries; rather, they trade financial contracts whose value is linked to the price of oil. These derivative contracts—futures, options, and swaps—allow speculators to profit if they can forecast price trends or exploit new arbitrage opportunities. Derivatives also permit oil companies, airlines, utilities, and other energy-consuming or energy-producing firms to reduce or "hedge" price risk by locking in today's price for transactions that will occur in the future. Hedgers and speculators trade on regulated futures exchanges in a continuous auction market. Prices set there serve as benchmarks for many physical oil transactions.

Some contend that oil speculators do not always trade on fundamental information related to supply and demand, but are nonetheless able to drive up prices by flooding the market with cash and overwhelming the influence of commercial hedgers who actually deal in physical oil. On the other hand, most empirical studies suggest that speculation does not generally increase price volatility, although the occasional emergence of speculative "bubbles," when market prices may diverge significantly from fundamental values, is well known. Neither economists nor regulators have reached a consensus as to the causes of oil price movements in recent years—some point to the fundamentals (where both demand and supply are inelastic in the short run, and questions exist about the capacity to meet growing global demand in the long run), while others focus on financial markets. Both are possible sources of price volatility.

This report examines the relationship between the price of oil and the positions of various classes of traders in crude oil futures and options. Position data come from the *Commitments of Traders* report, published weekly by the Commodity Futures Trading Commission (CFTC). A statistically significant correlation is evident between changes in positions held by "money managers" (a category of speculators that includes hedge funds) and the price of oil. In other words, during weeks when money managers have been net buyers of oil futures and options (or increased the size of their long positions), the price has tended to rise. Price falls, conversely, have tended to coincide with reductions in money managers' long positions. This statistical relationship is weaker for other classes of speculators and for commercial hedgers.

There are several possible explanations for why money managers' trades might be more closely linked to prices. Money managers might identify information that will affect prices (and trade on that information) more quickly or accurately than other market participants. Other traders might copy the trades of certain hedge funds viewed as market leaders, driving prices further in the same direction. In this way, money managers' trades could move the price, even though their positions account for a relatively small share of the total market.

Causation could also run in the opposite direction—perhaps on average money managers chase price trends rather than set them. Other traders whose positions appear in the *Commitments of Traders* data, such as commercial hedgers or swap dealers, may be less price-sensitive than hedge funds and react more slowly to price changes. Data presented in this report cannot explain causes of oil price movements, but are intended to provide a context for evaluating arguments about the impact of speculation. This report will be updated as events warrant.

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Oil Price Spikes and Speculation

The price of crude oil rose sharply in 2007 and the first half of 2008, sparking widespread concern about energy prices, their effect on the world economy, and consequences for household consumption.[1] Prices then fell sharply between July and December, from a peak of $145 per barrel to just over $30. To some observers, fundamentals of the oil market and macroeconomic conditions provide an adequate explanation for these price movements—the financial crisis deepened in the summer of 2008, leading to sharply reduced estimates of economic growth in much of the world and lowered projections of energy demand. Others, however, doubt that supply and demand conditions justified an 80% price plunge and argue that financial speculators had created artificially high prices. **Figure 1** shows trends in U.S. regular retail gasoline prices since 1990, as well as a predicted price based on the price of Brent crude oil, a key benchmark in petroleum markets.

In 2011 and 2012, crude oil prices again rose sharply, reviving the debate on whether oil price trends are mostly driven by speculation or by changes in supply and demand fundamentals.

Economists and market regulators have not reached a consensus as to the causes of oil price movements in recent years. A number of studies attribute volatility to such supply and demand factors as turmoil in oil-producing countries, reduced production in some major oil fields, and the growth of demand from China, India, and industrializing middle-income countries.[2] An interagency task force led by the Commodity Futures Trading Commission (CFTC) found that "the increase in oil prices between January 2003 and June 2008 [was] largely due to fundamental supply and demand factors" and that "analysis to date does not support the proposition that speculative activity has systematically driven changes in oil prices."[3]

Others, such as CFTC Commissioner Bart Chilton, have contended that oil price gyrations are likely the result of speculative trading.[4] A frequent argument has been that increasing investment flows from financial investors have affected prices.[5] Some analysts have sharply criticized those claims.[6] One econometric analysis that incorporated oil supply and energy demand effects concluded that speculation did not explain increases in oil prices in the 2003-2008 period, although the study suggested that speculation may have played some role in previous oil price spikes.[7]

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[1] (name redacted), a retired Specialist in Financial Economics, contributed to an earlier version of this report.

[2] James D. Hamilton, "Historical Oil Shocks," University of California, San Diego Department of Economics working paper, February 1, 2011, available at http://dss.ucsd.edu/~jhamilto/oil_history.pdf.

[3] Interagency Task Force on Commodity Markets, *Interim Report on Crude Oil*, July 2008, p. 3. Available at http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/itfinterimreportoncrudeoil0708.pdf.

[4] CFTC Commissioner Bart Chilton, "Speculators and Commodity Prices," Futures Industry Association's Panel Discussion: Financial Investors' Impact on Commodity Prices, Boca Raton, FL, March 16, 2011, available at http://www.cftc.gov/PressRoom/SpeechesTestimony/opachilton-41.html.

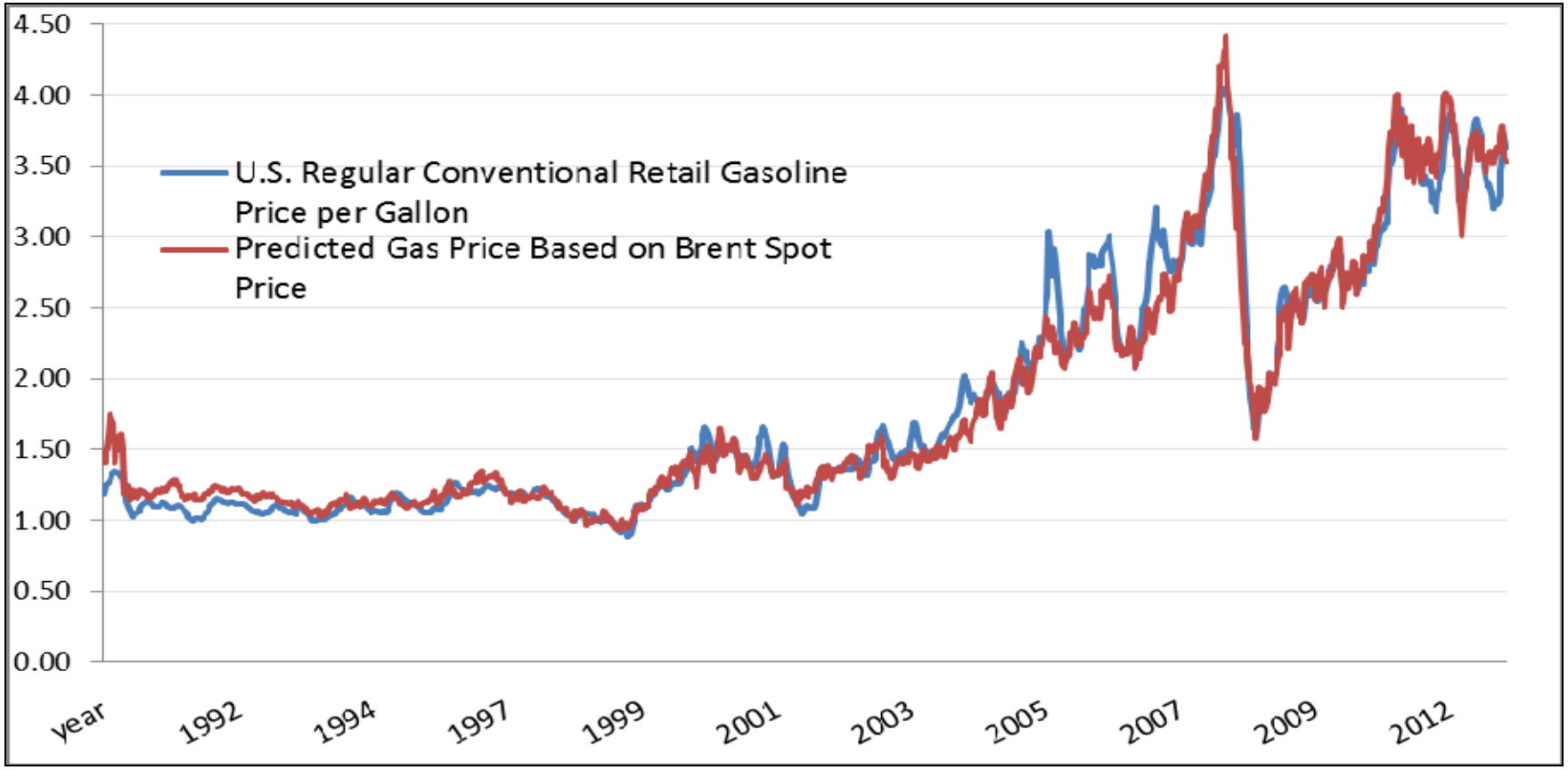
[5] Kenneth J. Singleton, "Investor Flows and the 2008 Boom/Bust in Oil Prices," March 23, 2011, available at http://www.stanford.edu/~kenneths/OilPub.pdf.

[6] Craig Pirrong, "About Those CFTC Claims That Speculation Has Distorted Oil Prices," Seeking Alpha blog, April 11, 2011, available at http://seekingalpha.com/article/262800-about-those-cftc-claims-that-speculation-has-distorted-oil-prices.

[7] Lutz Kilian and Dan Murphy, "The Role of Inventories and Speculative Trading in the Global Market for Crude Oil," CEPR (Center for Economic and Policy Research) Discussion Papers 7753, May 2010.

Figure 1. U.S. Gasoline Price and Predicted Price Based on Brent Spot Market Price

1990-March 2013, dollars per gallon



Source: CRS calculations based on Department of Energy, Energy Information Administration (http://www.eia.gov/petroleum/gasdiesel/ and http://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm).

Notes: Prediction line generated by simple regression results. Estimated regression is gas price = $0.68 + 0.0262*Brent spot price. The fitted line explains 97% of the variance in the gas price series. The intercept reflects gas taxes and markups. The slope term (0.0262) is about 1/38, which is almost the ratio of a gallon to a barrel of oil. A barrel of oil contains 42 U.S. gallons.

On June 20, 2011, Senator Maria Cantwell announced that the Federal Trade Commission (FTC) had notified her that it had opened an investigation of anticompetitive practices in crude oil and petroleum product markets.[8] The FTC has conducted several prior analyses of oil, gas, and petroleum markets.[9] The Energy Independence and Security Act of 2007 (EISA; P.L. 110-140) gave FTC broader powers to prevent market manipulation in the wholesale petroleum industry. In August 2009, FTC issued a Final Rule on Prohibitions on Market Manipulation, which became effective on November 4, 2009.[10]

Legislation before the 112th Congress (S. 1200) would authorize and direct the CFTC to take certain actions to reduce the volume of speculation in oil and related energy commodities.

This report provides background on futures and options markets for crude oil and presents data analysis of a possible relationship between market activities of speculative traders and oil prices. The data presented in this report cannot explain causes of oil price movements, but are intended to provide a context for evaluating arguments about the impact of speculation.

Crude Oil Contracts

A crude oil futures contract is an agreement to buy or sell 1,000 barrels of oil at some future date at a price set today. Thus, the contract gains or loses value as prices fluctuate. A contract to buy oil (called a long contract) gains value if the price rises, because the holder is entitled to buy at the old, lower price. Conversely, a short contract requires the holder to sell at today's price, and gains value if prices fall, because the holder may sell at above the market price. A long position in futures may be described as a bet that prices will rise; a short position is a bet that they will fall. Each futures contract has a long and a short side—whatever one trader gains, the other loses.

Hedgers use futures not to bet on the price, but to avoid price risk. For example, a long contract in effect provides insurance to an oil refinery against an increase in the price of crude oil; if prices rise, the firm will pay more for oil on the physical (or "spot") market, but appreciation in the

[8] Office of Senator Maria Cantwell, "FTC Launches Investigation into Sky-High Gas Prices After Cantwell's Request," press release, June 20, 2011, available at http://cantwell.senate.gov/news/record.cfm?id=333252. The letter from FTC Chair Jon Leibowitz, quoted in the release, noted that the

> Commission has opened an investigation and has authorized the use of compulsory process to determine whether certain oil producers, refiners, transporters, marketers, physical or financial traders, or others (1) have engaged or are engaging in practices that have lessened or may lessen competition – or have engaged or are engaging in manipulation – in the production, refining, transportation, distribution, or wholesale supply of crude oil or petroleum products; or (2) have provided false or misleading information related to the wholesale price of crude oil or petroleum products to a federal department or agency. The Commission seeks to determine through this investigation whether there is a reason to believe that the foregoing practices are in violation of Section 5 of the Federal Trade Commission Act, 15 U.S.C. § 45, as amended; the Commission's Prohibition of Energy Market Manipulation Rule; 16 C.F.R. Part 317; or Section 811 or Section 812 of the Energy Independence and Security Act of 2007, 42 U.S.C. §§ 17301, 17302.

[9] For a recent summary, see Federal Trade Commission, *Report on Activities in the Oil and Natural Gas Industries to the Congressional Appropriations Committees*, July 2010, available at http://www.ftc.gov/os/2010/07/P082108oilgasreport.pdf.

[10] Federal Trade Commission, "Prohibitions on Market Manipulation," 74 *Federal Register* 40686-40704, August 12, 2009. For an explanation of those regulations, see Federal Trade Commission, *Guide to Complying with Petroleum Market Manipulation Regulations*, November 2009, available at http://www.ftc.gov/os/2009/11/091113mmrguide.pdf.

futures position offsets the price increase. Thus, the firm can use futures to lock in the price that prevailed when it entered into its position.[11]

Futures contracts and options on futures are traded on a number of exchanges around the world, linked to several different grades of crude oil.[12] The most popular crude oil contract is traded on the New York Mercantile Exchange (or Nymex, now part of the CME Group, Inc.). The contract represents 1,000 barrels of West Texas Intermediate (WTI) grade crude oil, deliverable at Cushing, Oklahoma. Although Nymex WTI contracts call for physical delivery of 1,000 barrels at the time the contract expires, in practice nearly all contracts are settled for cash, without either party taking or making delivery.[13] A trader may exit the market at any time by simply purchasing an offsetting position. That is, the holder of a long contract purchases a short contract with the same expiration date—since his obligation is then to buy and sell the same commodity at the same time, his net exposure is zero, and he is said to be "evened up," or out of the market.

Nymex offers an oil contract expiring each month through the end of 2016. Most trading is in the contract expiring soonest, called the "near month." An identical WTI crude contract trades on the ICE Futures Europe exchange in London.

Most trading on the futures exchanges is short-term. Many traders prefer to even out their positions before the close of trading each day in order to avoid overnight price risk. Some traders, however, take longer-term positions, either to hedge transactions expected to take place months or years in the future, or to speculate on long-term price movements. The number of contracts outstanding at the end of the trading session is called the "open interest." The *Commitments of Traders* (COT) report published by the Commodity Futures Trading Commission (CFTC) shows the open interest in futures and options on futures, broken down by several classes of market participant, distinguishing between commercial hedgers and speculators. These data, though limited in important ways (discussed below), are the best public source of information on the activity of speculators in the crude oil market.

Commitments of Traders (COT) Reports

COT data, usually published each Friday in the late afternoon, reflect the open interest, or the number of contracts outstanding, as of close of trading on the previous Tuesday. Thus, comparing week-to-week COT figures shows whether classes of traders have increased or decreased the size of their long, short, or spread positions.[14] The COT figures do not show how much trading has

[11] For a more detailed exposition of the mechanics of futures, options, and swaps, see CRS Report R40646, *Derivatives Regulation and Legislation Through the 111th Congress*, by (name redacted).

[12] An option on a future gives the buyer the right to enter into a long or short futures contract at any time during the life of the option. The option will be exercised only if prices move in favor of the option buyer. The option seller receives a premium in exchange for this right, and profits if the option is not exercised.

[13] Thus, purchase of a futures contract does not mean that 1,000 barrels of physical oil are set aside for eventual delivery. There is no relationship between the volume of futures contracts traded and the amount of oil bought and sold through physical channels. The only significant relationship between the cash and futures market involves price.

[14] In a spread position a trader has a long contract for a given month and a short contract for a different month. In effect, a spread position is a bet that the difference in prices between the futures contracts for the two months will widen or narrow. A spread position, other things equal, carries less risk than an outright long or short position, because whatever happens to the general price level, both legs of the spread will move in tandem to some degree.

gone on during the week, or whether a position has been liquidated and then built back up, but simply offer a snapshot of positions at the market close on Tuesday.

Another significant limitation of COT data is that they do not cover swap contracts—another form of oil derivative contract not traded on exchanges. Thus, COT figures arguably cover only a subset of oil derivatives, all of which play a role in setting prices. The Dodd-Frank Wall Street Reform and Consumer Protection Act (P.L. 111-203) gave the CFTC new regulatory authority over the swaps market. In the future, COT reports may reflect swap positions, but the data surveyed in this report cover only exchange-traded futures and options on futures.

COT data show the aggregate positions of hedgers and several classes of speculators, as follows:

- **Producer/Merchant/Processor/User**. These are entities that predominantly engage in the production, processing, packing, or handling of crude oil and use the futures markets to manage or hedge risks associated with those activities.
- **Swap Dealers** are entities that deal primarily in swaps for a commodity and use the futures markets to manage or hedge the risk associated with those swap transactions.[15] The swap dealer's counterparties may be speculative traders, like hedge funds, or traditional commercial clients that are hedging risk arising from their dealings in the physical commodity. Thus, swap dealer positions represent both hedging and speculation.[16]
- **Money Managers**, for the purposes of the COT reports, are registered commodity trading advisors (CTAs), registered commodity pool operators (CPOs), or unregistered funds identified by the CFTC. These traders, which include hedge funds, manage and conduct futures trading on behalf of clients.
- **Other Reportables.** Every other reportable trader[17] not placed into one of three categories above is put into the "other reportables" category. These may include floor traders and exchange members who trade for their own accounts.
- **Nonreportable** positions include all traders whose holdings are below the 350-contract reporting threshold. These may be hedgers or speculators.

[15] Crude oil swaps are not reflected in COT data, because the CFTC receives no information about swap positions. However, once the Dodd-Frank Act's derivatives provisions become effective, swap positions will be disclosed. See CRS Report R41398, *The Dodd-Frank Wall Street Reform and Consumer Protection Act: Title VII, Derivatives*, by (name redacted) and (name redacted).

[16] Section 737 of the Dodd-Frank Act (P.L. 111-203) specifies that swap dealers may be treated as bona fide hedgers if they are hedging a trade with a commercial user or producer of a commodity. If they are hedging a trade with a speculator, such as a pension fund, that transaction will be treated as speculation.

[17] CFTC receives information about the identity of traders only when the size of the trader's position exceeds a "reportable" threshold, which for crude oil is 350 contracts.

Table 1. Crude Oil Open Interest: May 24, 2011

(Futures and Options on Nymex and ICE Futures Europe)

			Number of Traders with Reportable Positions	
Type of Trader	**Number of Contracts (1,000s)**	**Percent of Total**	**Nymex**	**ICE**
Producer/Merchant—Long	490	10.9	51	36
Producer/Merchant—Short	730	16.2	60	36
Swap Dealers—Long	275	6.1	17	15
Swap Dealers—Short	371	8.2	30	12
Swap Dealers—Spread	871	19.3	42	25
Managed Money—Long	298	6.6	87	21
Managed Money—Short	33	0.7	47	4
Managed Money—Spread	379	8.4	94	16
Other—Long	115	2.5	88	14
Other—Short	77	1.7	50	16
Other—Spread	660	14.6	120	30
NonReportable—Long	124	2.7	NA	NA
NonReportable—Short	91	2.0	NA	NA

Source: CFTC, *Commitments of Traders* report.

Table 1 shows the breakdown of open interest in crude oil futures and options, for Nymex and ICE Futures Europe WTI crude contracts, as of May 24, 2011. The data in **Table 1** suggest that speculators account for most of the open interest in crude oil contracts**.** The long and short hedging positions of the "Producer/Merchant" category accounted for only 27.1% of open interest.

Some observers believe that the limited presence of commercial hedgers itself indicates excessive speculation in the market.[18] The proportions by themselves, however, do not appear to explain recent oil price changes because they have been relatively constant since mid-2006, when the disaggregated COT data series begins.[19] Indeed, the total level of open interest has been relatively constant since 2006, as the data in **Figure 2** and **Figure 3** indicate. Thus, the data do not appear to support an argument that recent oil price spikes are the result of large, sudden inflows of speculative funds.

[18] S. 1200, for example, authorizes the CFTC to impose position limits to reduce the aggregate positions of noncommercial participants and speculators to 35% of the market.

[19] Prior to June 2006, COT data distinguishes only between "commercial" and "non-commercial" traders. The current disaggregation of categories was begun because it was believed that swap dealer positions were mistakenly categorized as "commercial" (i.e., hedging positions).

Figure 2 and **Figure 3** plot total crude oil open interest against the price of oil between August 2007 (when oil prices began to rise to their 2008 peak) and May 2011. **Figure 2** ends on July 28, 2009; **Figure 3** begins the following week. **Figure 2** reports only Nymex positions, whereas **Figure 3** shows the sum of Nymex and ICE Futures Europe positions (which the CFTC did not report earlier). As noted above, the ICE and Nymex contracts are identical, so positions on the two exchanges have been added together.

While the total level of open interest appears to be more stable than the price of oil, the aggregate figures mask significant fluctuations in the size of positions held by different classes of traders. **Figure 4** and **Figure 5** break down open interest positions for the various types of traders holding reportable positions. The time periods covered are the same as in **Figure 2** and **Figure 3**. **Figure 4** shows Nymex positions; **Figure 5** shows Nymex plus ICE.

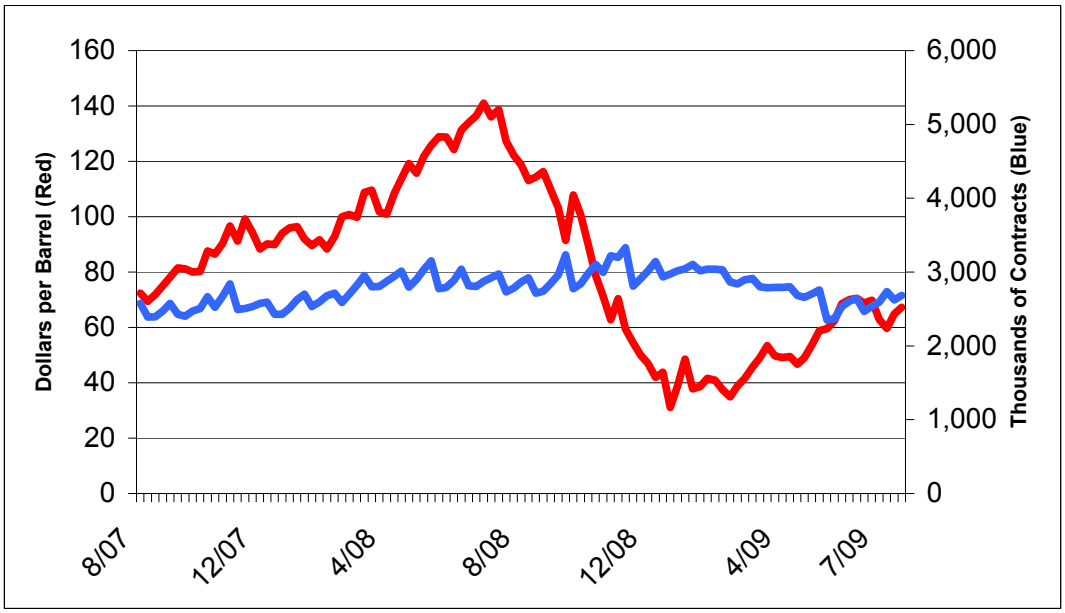
Even though the aggregate open interest fluctuates within fairly narrow bounds, the number of contracts held by particular classes of traders may change significantly, as **Figure 4** and **Figure 5** indicate. For example, commercial hedgers' positions (both long and short) shrank significantly beginning in June 2008, when oil prices neared their peak. Between June 10 and August 26, 2008, combined long and short positions of commercial hedgers fell by 49.7%. Meanwhile, the price of oil peaked at $145.32 per barrel on July 3, 2008, stood at $116.31 on August 26 (when the size of hedgers' positions reached a low point), and ultimately bottomed out at $30.28 on December 23, 2008.

In another example, money managers' long positions averaged 211,000 contracts during the second quarter of 2010, but increased by 46.4% to an average of 309,000 during the first quarter of 2011, when there was a significant upswing in the price of oil.

Are changes in futures positions statistically related to price changes? Is the relationship the same for different classes of traders? The next section of this report examines how changes in crude oil futures and options positions correlate with changes in price.

Figure 2. The Price of Oil (Left Axis) and Nymex Open Interest (Right Axis)

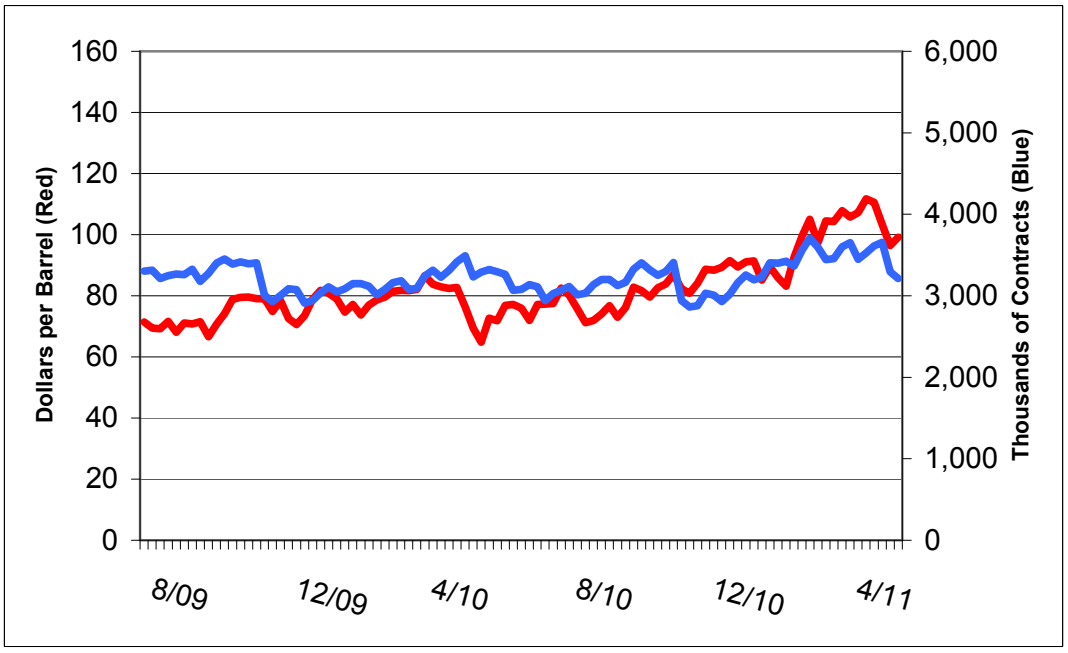
(August 2007 through July 2009)



Source: CFTC, *Commitments of Traders*, and Global Financial Data.

Figure 3. The Price of Oil (Left Axis) and Open Interest on Nymex and ICE Futures Europe (Right Axis)

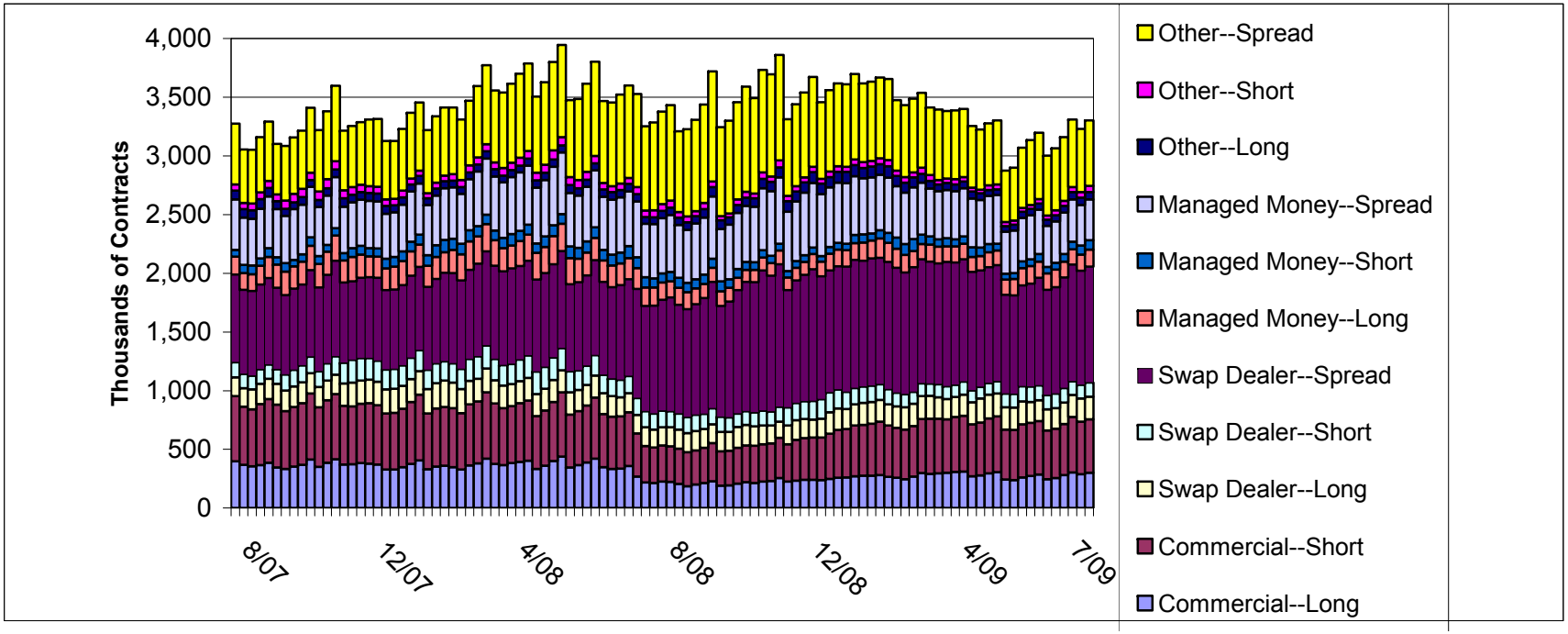
(July 2009 through May 2011)



Source: CFTC, *Commitments of Traders*, and Global Financial Data.

Figure 4. Nymex Crude Oil Futures and Options in Open Interest, by Type of Trader

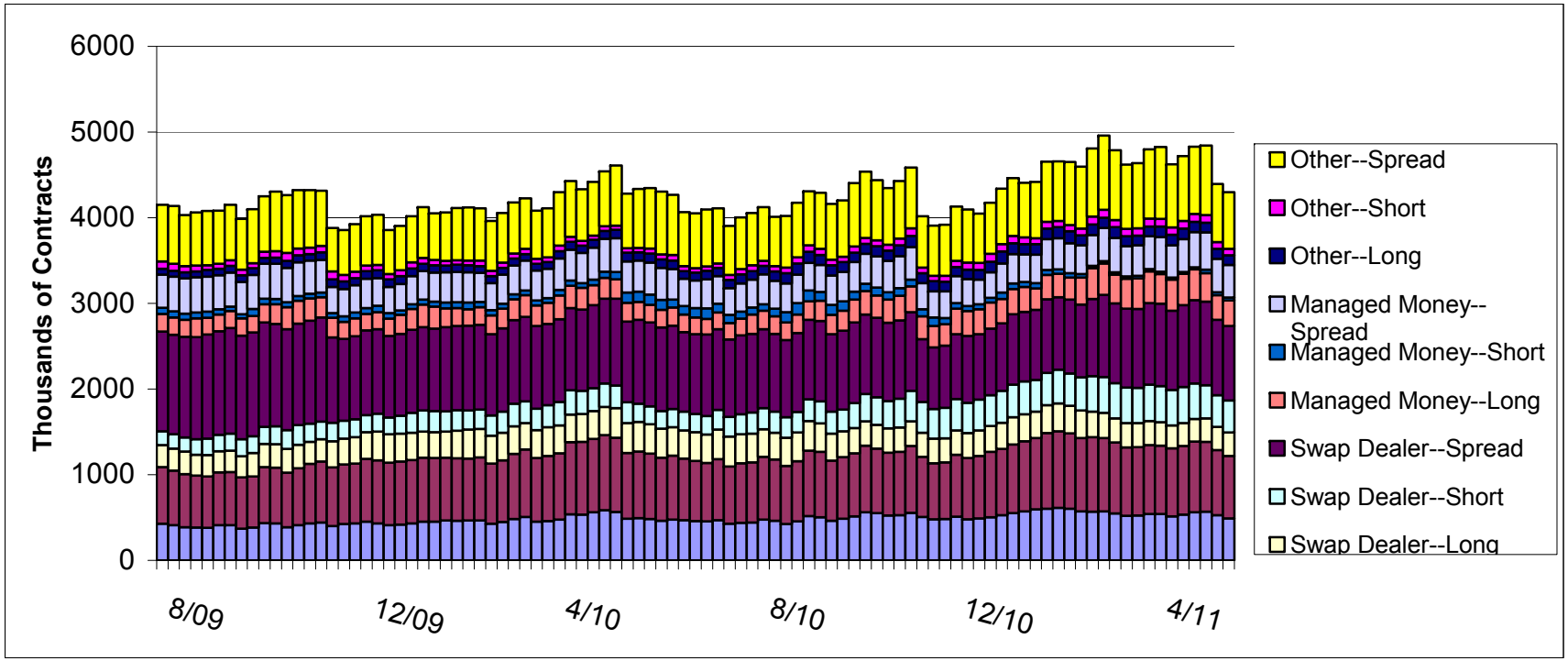
(August 2007 through July 2009)



Source: CFTC, *Commitments of Traders* report.

Figure 5. Nymex and ICE Futures Europe Crude Oil Futures and Options in Open Interest, by Type of Trader

(July 2009 through May 2011)



Source: CFTC, *Commitments of Traders* report.

Changes in Futures Market Positions and Price Trends

Scatter Plots of Changes in Positions and Oil Prices

Analysis of COT data suggests that week-to-week changes in managed money long positions are positively correlated with changes in oil prices. **Figure 6** shows a scatter plot between week-to-week changes in managed money long positions and weekly changes in oil prices.[20] Each point in the figure represents a single week's data: changes over the previous week in the size of the long position are shown on the X-axis, price changes on the Y-axis. Points below zero on the Y-axis represent weeks when the price has fallen, while points to the right of zero on the X-axis show weeks when positions have increased. Thus, points in the lower left quadrant of the graph represent weeks when the price fell and money managers reduced their short positions. Points in the upper right indicate that prices rose that week and money managers increased their long positions.

The distribution of the points in **Figure 6** suggests a trendline rising from left to right. In other words, price rises are positively correlated with increased long positions, price falls with smaller positions.

Figure 7 shows a similar scatter plot for managed money short positions. Week-to-week changes in managed money *short* positions show a weaker negative correlation with changes in oil prices. In other words, money managers tended to increase short positions, which gain value as prices fall, when prices did fall, although the trend is not as clear as on the long side shown in **Figure 6**.

Figure 8 shows a scatter plot with changes in swap dealers' long positions, and **Figure 9** shows a scatter plot with changes in producer/merchant long positions. Note that while the changes in producer/merchant long positions are generally much larger than for managed money long positions, changes in producer/merchant long positions are not correlated with oil price changes.[21]

Scatter plots make visible the relationship between two variables and are especially useful in identifying outlier observations, which can have disproportionate influence on statistical models. For example, outliers seen in **Figure 6** and **Figure 7** include the week following the Lehman Brothers bankruptcy in September 2008 and the weeks just after oil prices reached their lowest level in years in late December 2008.[22]

One limitation of scatter plots is that the effects of control variables are not shown. An evident correlation between two variables could result from the influence of a unseen third, confounding

[20] The oil price figures are Tuesday close-of-market prices, to correspond with COT data, which reflect positions at Tuesday's close.

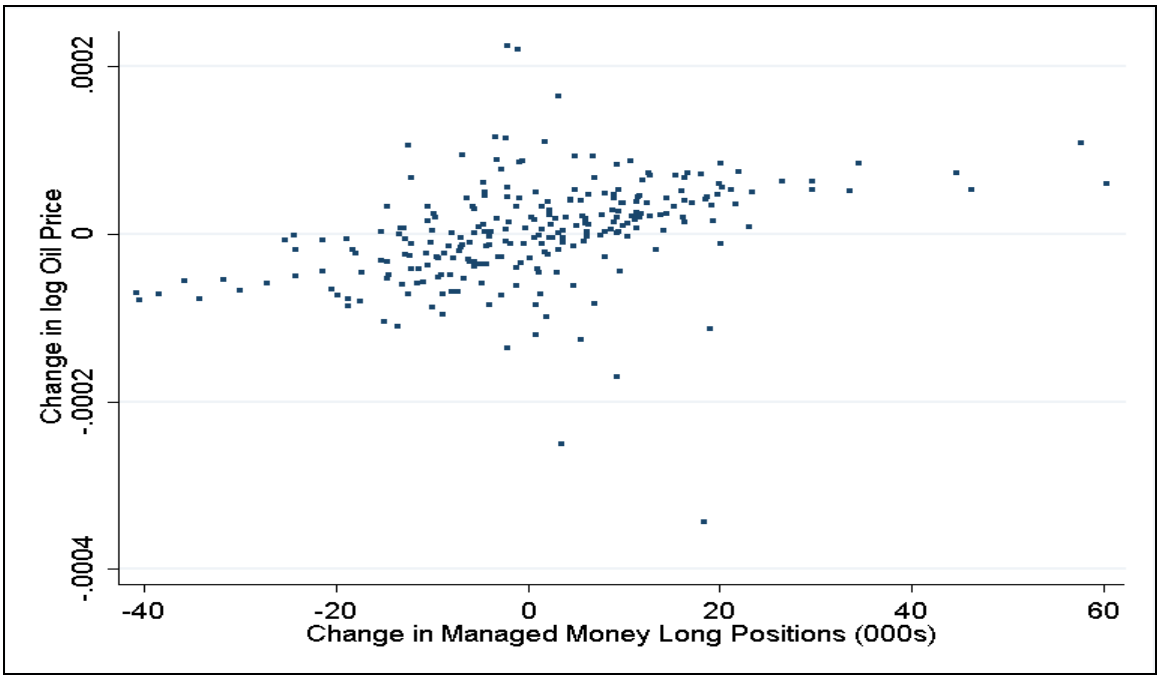
[21] The same is true of short positions, which are not illustrated here.

[22] Büyükşahin and Robe find that linkages between markets were disrupted in the wake of the Lehman bankruptcy, which among other things, made leveraged finance on which hedge funds rely more costly and difficult. Bahattin Büyükşahin and Michel A. Robe, "Speculators, Commodities and Cross-Market Linkages," American University working paper, February 12, 2011, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1707103.

variable. Alternatively, a relationship between two variables might only emerge after appropriate control variables were added. Correlations evident in **Figures 5 and 6**, however, also appear in regressions that account for the time-series nature of the data and control for seasonal variations, interest rates, and other financial variables.[23]

Figure 6. Changes in Managed Money Long Positions and (log) Oil Prices

(Weekly data, June 2006-May 2011)



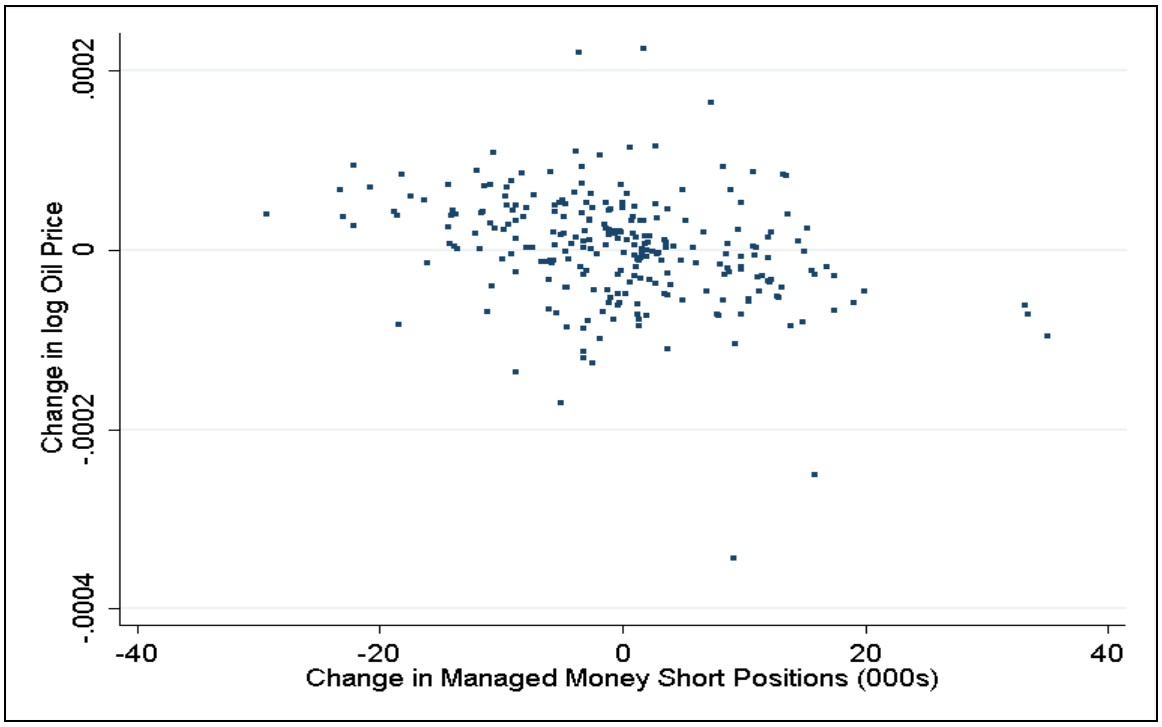
Source: CFTC and Global Financial Data (see text).

Note: Each dot represents data for one week.

[23] Some caution is warranted when using weekly data to analyze markets that trade in real time. Nevertheless, if longer-term trading strategies are most relevant to oil price dynamics, weekly data may capture the most important effects. Büyükşahin and Robe (op. cit.) find no important differences between weekly and daily data in their analysis.

Figure 7. Changes in Managed Money Short Positions and (log) Oil Prices

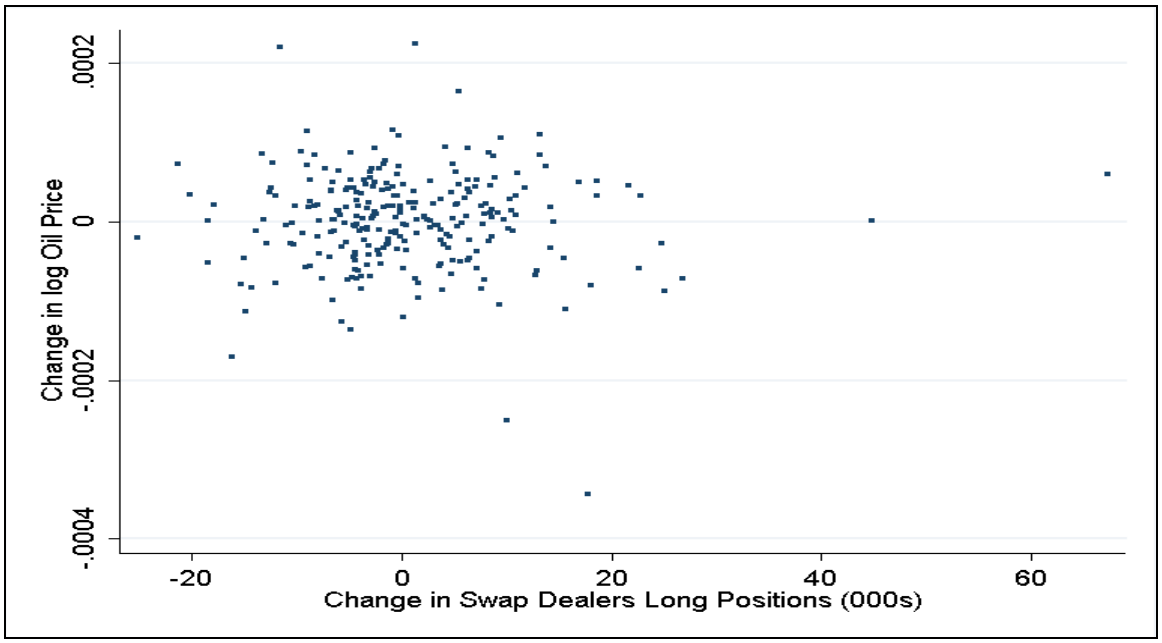
(Weekly data, June 2006-May 2011)



Source: CFTC and Global Financial Data (see text). **Note:** Each dot represents data for one week.

Figure 8. Changes in Swap Dealers' Long Positions and (log) Oil Prices

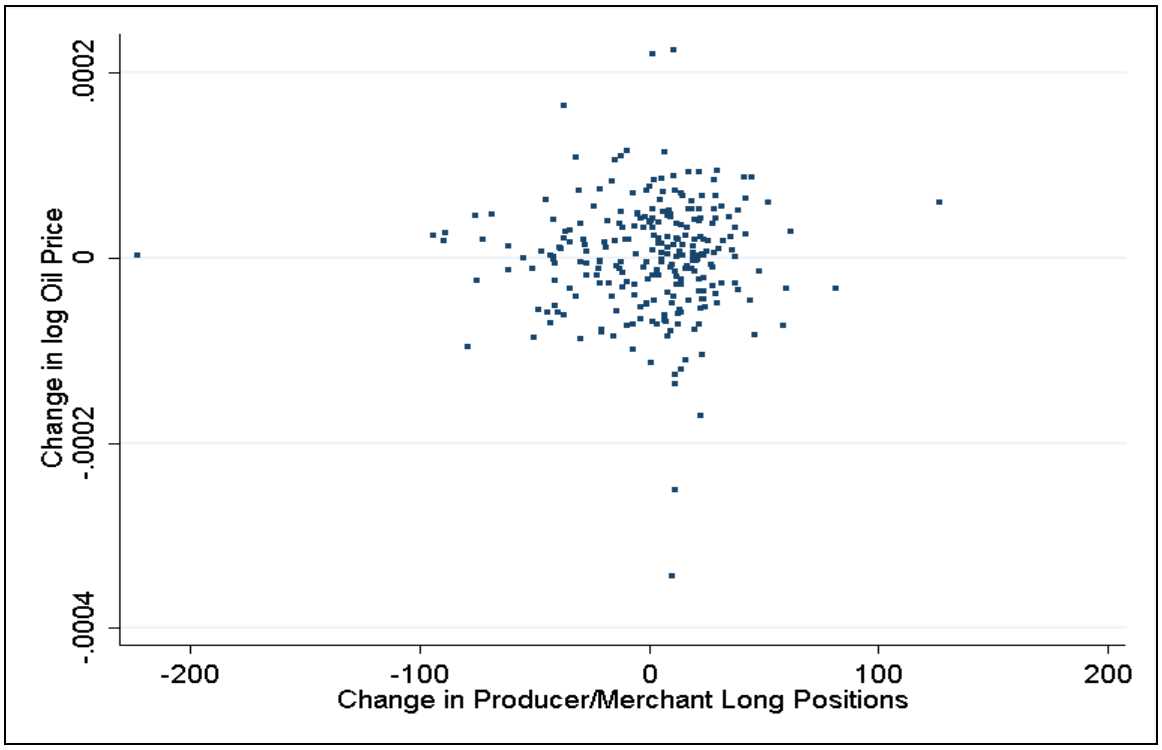
(Weekly data, June 2006-May 2011)



Source: CFTC and Global Financial Data (see text). **Note:** Each dot represents data for one week.

Figure 9. Changes in Producer/Merchant Long Positions and (log) Oil Prices

(Weekly data, June 2006-May 2011)



Source: CFTC and Global Financial Data (see text). **Note:** Each dot represents data for one week.

Regression Results

This section presents results from a time-series regression, reported in the **Appendix**, used to investigate possible effects of trading positions on the price of oil. This analysis uses the same weekly COT data discussed in the report, along with monthly seasonal controls and other financial controls.[24] Correlations between changes in managed money positions and percentage changes in oil prices are robust, and appear in a variety of specifications.[25] While this analysis addresses some statistical issues associated with time-series data, a more thorough investigation would be required to disentangle the relationship between trading positions, prices, and macroeconomic conditions.

Control variables include a measure of bond yields and the euro/dollar exchange rate. The Corporate AAA Bond index may signal changes in market expectations of long-term economic growth. Oil investments may have been used as hedges against exchange rate risks for the U.S. dollar. In addition, fluctuations in the euro/dollar exchange rate affect the relative price of oil in Europe. Percentage changes in the euro/U.S. dollar exchange rate are therefore included as a control. Control variables are measured as changes or as percentage changes.

[24] A constant term and indicator variables for months, used for seasonal adjustment, were also included but not reported. Robust standard errors are estimated.

[25] These are not reported here for the sake of brevity, but are available upon request.

Results show a statistically significant positive correlation between managed money long positions and oil prices. The negative correlation between managed money short positions and oil prices is about as large, although less precisely estimated.

Swap dealers' positions show a similar pattern, although the estimated size of the effects are about two-thirds smaller and are less precisely estimated.

While changes in long and short positions of swap dealers and producer/merchant hedgers are not correlated with price changes when considered individually, controlling for changes in short positions does produce positive correlations between long positions and prices for swap dealers and producer/merchants, as well as for money managers. When controlling for long position changes, short position changes appear to be correlated to prices, and vice versa. These statistical relationships are discussed further in the **Appendix**.

The correlations between managed money long and short positions and oil prices, as estimated with these controls, are about twice as strong as those for producer/merchant traders. That is, an increase in managed money traders' long or short positions is associated with a percentage price change twice as large as for a change in producer/merchant positions. For swap dealers' position changes, the effect on prices is about 30% larger than for producer/merchant trades. While all of the position changes are estimated to have statistically significant effects, those for managed money positions, which are those held by professionally managed investment vehicles such as commodity pools and hedge funds, are more precisely measured.[26]

Coefficients for corporate bond yields and the euro/dollar exchange rate are also statistically significant and have the expected signs.

Interpreting the Results

Correlation between changes in managed money positions and oil price movements, even with the introduction of control variables, does not show causation. Prices might rise because money managers buy, or trading decisions by money managers may reflect price changes. To use the terminology of a classic study on hedging and speculation, are money managers driving the price of oil, or are they hitchhikers along for the ride?[27] Interpretations on either side of the question are plausible.

Do Hedge Funds Cause Oil Price Changes?

The argument that money managers cause price movements faces certain difficulties. Any increase in a long position is equivalent to a purchase of the underlying commodity and thus tends to raise the price. However, money market long positions are a fairly small fraction of the total open interest positions.[28] That adjustments to this small market share would trigger discernible

[26] In figures presented above this contrast in precision is evident. While the relation between managed-money long positions and price is clear in **Figure 6**, the relation between swap-dealer long positions and price shown in **Figure 8** is less clear.

[27] Holbrook Working, "Futures Trading and Hedging," *American Economic Review*, v. 43, 1953, p. 314.

[28] As **Table 1** shows, they accounted for only 6.6% of total open interest in May 2011.

price movements might be considered surprising, especially when comparable or larger position changes by other market participants are not correlated with price swings.

One hypothesis is that money managers' trades may have a unique impact on intraday trading, which the weekly open interest data fail to capture. Short-term traders might observe and seek to copy the strategies of certain money managers who are regarded as especially capable of identifying new information that might be expected to move prices, or who simply have achieved superior returns in the past.[29] If significant numbers of short-term speculators copy money manager trades, the impact of those trades on prices would be magnified. In effect, under this scenario, money managers may have market power beyond what the size of their positions would suggest.[30]

Under this interpretation of the data, it would not matter whether hedge funds trade based on relevant fundamental information or not. If their trades trigger a significant number of similar transactions by others, they become a kind of self-fulfilling prophecy. Such "herding behavior" among speculators, if it exists, would support arguments that the oil price often includes a "speculative premium" above and beyond the price justified by the fundamentals.

An alternative explanation is that money managers do trade on fundamental information and that they are more adept than others at identifying information that is going to move prices. If money managers are consistent in their ability to identify new and relevant information that will affect prices (and trade on that information before others do), one result would be the observed correlation. A potential objection to this explanation is that it implies that some financial speculators are better analysts of the oil market than actual producers and end-users of oil, who also trade in the futures market.

Do Price Changes Cause Hedge Fund Trades?

Money managers might also profit by following price trends. Rather than cause price changes, they may buy when prices are rising and sell when they fall. But why would money managers' trading patterns, and not those of other market participants, be correlated with price changes in this way?

Other market participants may have longer investment time horizons or be less sensitive to price changes. Hedgers, for example, are generally less affected by price changes, because whatever they may lose on their futures positions, they make back in the spot market (because, for example, the physical commodity they produce will have gone up in price). Similarly, swap dealer positions may reflect long-term index investments by pension funds and other institutional investors who are seeking to allocate part of their portfolio to an asset class that is not correlated to other assets they hold, such as stocks and bonds.[31] Since the object of such investment is

[29] A similar phenomenon has been observed in the equity market; stocks purchased by investors like Warren Buffett or the Fidelity Magellan Fund under Peter Lynch were almost certain to rise in the short-term because of "copycat" trading.

[30] Firms are said to have market power when they can change the market price of a good or service. In perfectly competitive markets, no firm has market power and all are "price takers" rather than "price makers."

[31] Index investors typically purchase swap contracts that are linked to a commodity price index (reflecting numerous commodities) and gain value when the index rises.

portfolio diversification, such investors are less likely to buy or sell in reaction to short-term price movements.

Hedge funds, by contrast, are known for taking aggressive positions in search of high yields and for seeking to extract the maximum return from any price trend. A 2008 CFTC study referred to speculators "who take positions based on price expectations over a period of days, weeks, or months" as "trend followers."[32] Trading with this time horizon would be captured by the weekly COT reports, and may be more typical of money managers than other traders in oil futures and options.

Another possibility is that swap dealer COT data may represent the net of proprietary and customer positions, potentially masking the relationship between positions and price. It may be that swap dealers' trading for their own accounts would be correlated with prices, just as managed money positions are, but their trading on behalf of customers may follow a different pattern.

Money managers may follow prices in other ways. Some hedge funds apparently use "momentum trading" strategies to identify pricing blips that signal market activities of traders who are informed but lack the backing of major financial resources.[33] For example, a scientist may understand the implications of a new technology, but may lack the ability to capture the full value of that information in markets. If that scientist bought shares of a company based on that knowledge, a hedge fund might infer something about that scientist's realization. The hedge fund, however, would be able to harness substantial financial leverage to exploit that information.

Certain hedge funds trading in oil markets might thus bootstrap information gleaned from trades of specialist traders who lack the financial resources to take full advantage of their informational advantages. Some contend that hedge funds and other sophisticated traders have used advantages in trade execution to benefit from slow-footed rivals.

Does Hedge Fund Speculation Raise Policy Issues?

The potential of money managers' trades to move prices does not necessarily raise any policy issue. If some commodity trading advisors or hedge funds are better or faster than others at trading on new information, the effect should be to make pricing more efficient. If too much "copycat" trading occurs, the market price may overshoot, but it is not clear why any such overshooting would not soon correct itself. One study found that open interest positions are highly correlated with macroeconomic activity.[34] This might suggest that traders with better information on macroeconomic trends, which strongly influence energy demand, take more aggressive positions, which would then influence oil prices. This interpretation suggests that speculative traders may have better information about market fundamentals, such as expectations

[32] CFTC, *Staff Report on Swap Dealers and Index Traders*, Sept. 11, 2008, p. 39. Available at http://www.cftc.gov/PressRoom/PressReleases/pr5542-08.html.

[33] Harrison Hong and Jeremy C. Stein, "A Unified Theory of Underreaction, Momentum Trading, and Overreaction in Asset Markets," *Journal of Finance*, vol. 54, no. 6 (Dec. 1999), pp. 2143-2184. Some hedge funds have apparently used more direct means of obtaining information as well. See George Packer, "A Dirty Business: New York City's Top Prosecutor Takes on Wall Street Crime," *New Yorker*, June 27, 2011.

[34] Harrison G. Hong and Motohiro Yogo, "What Does Futures Market Interest Tell Us about the Macroeconomy and Asset Prices?" American Finance Association 2010 Atlanta Meetings Paper, March 13, 2011, available at http://ssrn.com/abstract=1364674.

of future economic growth, and thus help channel the effects of changes in current and future energy demand into market prices.

Some argue that money managers who are not involved in the physical oil business trade on information that is not fundamental and that this distorts prices. This effect would be exacerbated by copycat trading. Specifying which information is fundamental and which is irrelevant noise, however, is difficult. Experts may express opinions about what the fundamental price should be, given current supply and demand conditions, but a basic axiom of classical economics is that free markets do a better job of weighing information and determining prices than any group of experts.

On the other hand, asset markets can be susceptible to price bubbles, in which rising prices convince some traders that future prospects are rosier than previously thought.[35] Some have contended that identifying asset bubbles before a readjustment to fundamental levels (i.e., a crash) may be difficult.[36] Even if some traders understood that asset values exceeded fundamental values, it might be impossible given financing constraints to exploit that information to a degree sufficient to prevent the formation of bubbles.

Policy tools to address speculation that is viewed as excessive or destabilizing are generally blunt instruments. It is possible to prohibit trading in derivative instruments based on oil (or other energy commodities). With the Onion Futures Act (P.L. 85-39), Congress enacted a ban on onion futures, which remains in force, although it is not clear that onion prices have become more stable as a result.[37]

Other policy options (included in S. 1200) are steps to reduce the size of speculative positions, either by raising the costs of speculative trading or by limiting the number of contracts that speculators can hold. These measures could certainly reduce the volume of speculative trading in oil, but it is not clear that the effect would be to lower prices, for two reasons. First, the curbs would fall on short as well as long traders, making the net effect unpredictable. Second, oil is a global commodity, and a parallel futures market exists in London. ICE Futures Europe trades contracts based on U.S. oil, suggesting that oil speculation would continue despite any U.S. restrictions.

[35] Utpal Bhattacharya and Xiaoyun Yu, "The Causes and Consequences of Recent Financial Market Bubbles: An Introduction," *Review of Financial Studies*, vol. 21 no. 1(2008), pp. 3-10.

[36] See CRS Report RL33666, *Asset Bubbles: Economic Effects and Policy Options for the Federal Reserve*, by (name redacted).

[37] Susan Shultz, "Commodity of the Quarter: Onions," *Journal of Agricultural and Food Information*, v. 11, 2010, pp. 8-15. The article presents "anecdotal evidence" that some onion farmers would welcome a return of the futures market.

Appendix. Statistical Relationships Between Changes in Positions and Price

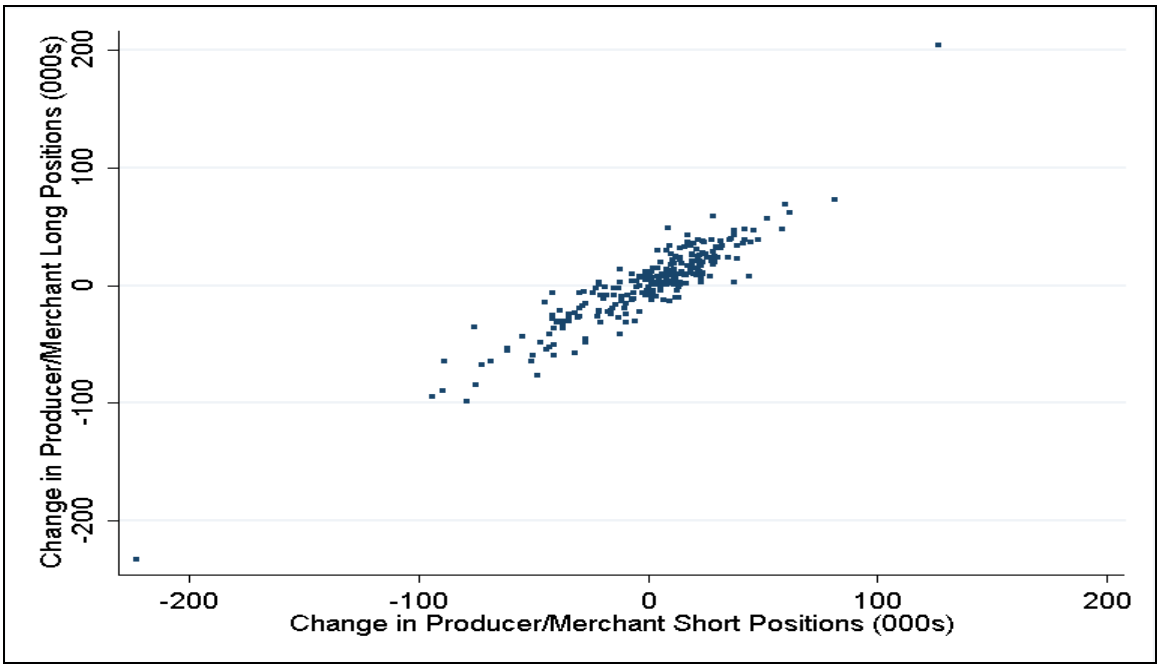
The regression results presented below show the correlation between changes in long and short positions held by money managers, swaps dealers, and commercial hedgers (producer/merchants).

While producer/merchant long and short positions are uncorrelated with price changes when considered individually, they are jointly correlated with price changes. Moreover, producer/merchant traders' long and short positions strongly correlate with each other, as **Figure A-1** shows. This result is counterintuitive, since long and short hedgers face opposite price risks. That is, when prices are rising, or expected to rise, long hedgers such as airlines or utilities would appear to have greater incentives to hedge the risk of further price rises, while short hedgers, such as oil companies, might be expected to reduce their hedging position to reap the full benefits of higher prices. But in fact, long and short hedgers appear to change their positions in tandem, whatever the prevailing price trend. (An example is discussed in the text: when oil prices peaked and began to fall in mid-2008, both long and short hedgers reduced the size of their positions.)

Long and short positions for swap dealers and managed money traders, by contrast, are not strongly correlated.

Figure A-1.Producer/Merchant Long and Short Positions

(Weekly data, June 2006-May 2011)



Source: CFTC and Global Financial Data (see text).

Table A-1. Autoregression (AR) Changes in log Oil Prices

(Weekly data, June 20, 2006 through May 24, 2011)

					95% Confidence Interval	
	Coefficient Estimate*	**Standard Error***	**z statistic**	**p-value**	**Low***	**High***
Producer/Merchant Positions (Change, 000s)						
Long	0.953	0.313	3.05	0.002	0.34	1.57
Short	-0.999	0.308	-3.25	0.001	-1.60	-0.40
Swap Dealer Positions (Change, 000s)						
Long	1.290	0.386	3.33	0.001	0.53	2.04
Short	-1.330	0.423	-3.15	0.002	-2.16	-0.50
Managed Money Positions (Change, 000s)						
Long	2.14	0.257	3.33	0.001	1.64	2.65
Short	-2.05	0.402	-3.15	0.002	-2.83	-1.26
A Corporate Bond Index (Change in logs)						
	0.710	0.335	2.12	0.034	0.05	1.37
Euro/U.S. $ Exchange Rate (Change in logs)						
	1.084	0.386	2.81	0.005	0.33	1.84
Lag Terms						
one-week lag	-0.180	0.155	-1.16	0.247	-0.48	0.12
two-week lag	-0.261	0.142	-1.84	0.065	-0.54	0.02
Wald chi2(21) = 430.38						
Prob > chi2 = 0.0000						
Number of obs = 258						

Source: Calculated by CRS using data from the CFTC and Global Financial Data.

Notes: * Magnitudes for positions variables coefficients, standard errors, and confidence interval bounds multiplied by 10^6 for legibility. Estimation used semirobust standard errors and was conducted with Stata 11 arima procedure.

The coefficient ("Coef." in Column 2) shows the marginal (i.e., incremental) effect of independent (control) variables on the dependent variable (here, changes in the log crude oil price). Changes in logs are one way to calculate variables in percentage change terms. For example, the regression results suggest that a 1% change in the Euro/U.S. dollar exchange rate results in a 1.08% increase in the oil price. Results for month variables, included as seasonal controls, and a constant term are not reported. (See text for variable definitions and notes.)

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