Devil or Angel? The Role of Speculation in the Recent Commodity Price Boom (and Bust)

by

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Abstract

It is commonly asserted that speculative buying by index funds in commodity futures and over-the-counter (OTC) derivatives markets created a "bubble" in commodity prices, with the result that prices, and crude oil prices, in particular, far exceeded fundamental values at the peak. The purpose of this paper is to show that the bubble argument simply does not withstand close scrutiny. Four main points are explored. First, the arguments of bubble proponents are conceptually flawed and reflect fundamental and basic misunderstandings of how commodity futures markets actually work. Second, a number of facts about the current situation in commodity markets are inconsistent with the existence of a substantial bubble in commodity prices. Third, available statistical evidence does not indicate that positions for any group in commodity futures markets, including long-only index funds, consistently lead futures price changes. Fourth, there is a historical pattern of attacks upon speculation during periods of extreme market volatility.

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Introduction

Led by crude oil, commodity prices reached dizzying heights during mid-2008 and then subsequently declined with breathtaking speed (see Figure 1). The impact of speculation, principally by long-only index funds, on the boom and bust in commodity prices has been hotly debated.[1] It is commonly asserted that speculative buying by index funds in commodity futures and over-the- counter (OTC) derivatives markets created a "bubble," with the result that commodity prices, and crude oil prices, in particular, far exceeded fundamental values at the peak (e.g., Gheit, 2008; Masters 2008; Masters and White, 2008). The main thrust of bubble arguments is that: i) a large amount of speculative money was invested in different types of commodity derivatives over the last several years, ii) this 'titanic' wave of money resulted in significant and unwarranted upward pressure on commodity prices, and iii) when the flow of speculative money reversed the bubble burst. Based on the bubble argument, a number of bills have been introduced in the U.S. Congress with the purpose of prohibiting or limiting index fund speculation in commodity futures and OTC derivative markets.

The purpose of this paper is to show that the bubble argument simply does not withstand close scrutiny. Four main points are explored. First, the arguments of bubble proponents are conceptually flawed and reflect fundamental and basic misunderstandings of how commodity futures markets actually work. Second, a number of facts about the current situation in commodity markets are inconsistent with the existence of a substantial bubble in commodity prices. Third, available statistical evidence does not indicate that positions for any group in commodity futures markets, including long-only index funds, consistently lead futures price

changes. Fourth, there is a historical pattern of attacks upon speculation during periods of extreme market volatility.

Conceptual Errors

As noted in the introduction, bubble proponents argue that large investment flows, through index-type investments, resulted in unjustified upward pressure on commodity prices. Not only was the pressure unjustified according to bubble proponents, but it also caused very large over-valuations of commodities. For example, Fadel Gheit, Managing Director and Senior Oil Analyst for Oppenheimer & Co. Inc., made the following statement while testifying before the U.S. House of Representatives in June 2008:

> "I firmly believe that the current record oil price in excess of $135 per barrel is inflated. I believe, based on supply and demand fundamentals, crude oil prices should not be above $60 per barrel…There were no unexpected changes in industry fundamentals in the last 12 months, when crude oil prices were below $65 per barrel. I cannot think of any reason that explains the run-up in crude oil price, beside excessive speculation." (Gheit, 2008).

While bubble arguments may seem sensible on the surface, they contain conceptual errors that reflect a fundamental and basic misunderstanding of how commodity futures and OTC derivative markets actually work.

The first and most fundamental error is to equate money flows into futures and derivatives markets with demand, at least as economists define the term. Investment dollars flowing into either the long or short side of futures or derivative markets is not the same thing as demand for physical commodities. Our esteemed predecessor at the University of Illinois, Tom Hieronymus, put it this way, "…for every long there is a short, for everyone who thinks the price is going up there is someone who thinks it is going down, and for everyone who trades with the flow of the market, there is someone trading against it." (Hieronymus, 1977, pp. 302) These are

zero-sum markets where all money flows must by definition net to zero. It makes as much logical sense to call the long positions of index funds new "demand" as it does to call the positions on the short side of the same contracts new "supply."

An important and related point is that a very large number of futures and derivative contracts can be created at a given price level. In theory, there is no limit. This is another way of saying that flows of money, no matter how large, do not necessarily affect the futures price of a commodity at a given point in time. Prices will change if new information emerges that causes market participants to revise their estimates of physical supply and/or demand. Note that a contemporaneous correlation can exist between money flows (position changes) and price changes if information on fundamentals is changing at the same time. Simply observing that large investment has flowed into the long side of commodity futures markets at the same time that prices have risen substantially (or the reverse) does not necessarily prove anything. This is more than likely the classical statistical mistake of confusing correlation with causation. One needs a test that accounts for changes in money flow and fundamentals before a conclusion can be reached about the impact of speculation.

It should be said that the previous argument assumes all market participants are equally informed. When this is not the case, it is rational for participants to condition demands on both their own information and information about other participants' demands that can be inferred ("inverted") from the futures price (Grossman, 1986). The trades of uninformed participants can impact prices in this more complex model if informed traders mistakenly believe that trades by uninformed participants reflect valuable information. An argument along these lines can be applied to the rise of index funds in commodity markets. It is possible that traders interpreted the large order flow of index funds on the long side of the market as a reflection of valuable private

information about commodity price prospects, which would have had the effect of driving price higher as these traders subsequently revised their own demands upward. Given the publicity that accompanied index fund entry into commodity futures markets and the transparency of their trading methods, it is highly doubtful that this happened on a wide enough scale in recent years to consistently drive price movements (more on this in a later discussion of noise trading).

The second conceptual error is to argue that index fund investors artificially raise both futures and cash commodity prices when they only participate in futures and related derivatives markets. In the short-run, from minutes to a few days, commodity prices typically are discovered in futures markets and price changes are passed from futures to cash markets (e.g., Garbade and Silber, 1983). This is sensible because trading can be conducted more quickly and cheaply in futures compared to cash markets. However, longer-term equilibrium prices are ultimately determined in cash markets where buying and selling of physical commodities must reflect fundamental supply and demand forces. This is precisely why all commodity futures contracts have some type of delivery or cash settlement system to tie futures and cash market prices together. Of course, delivery systems do not always work as well as one would hope (Irwin et al., 2008).

It is crucial to understand that there is no change of ownership (title) of physical quantities until delivery occurs at or just before expiration of a commodity futures contract. These contracts are financial transactions that only rarely involve the actual delivery of physical commodities. In order to impact the equilibrium price of commodities in the cash market, index investors would have to take delivery and/or buy quantities in the cash market and hold these inventories off the market. There is absolutely no evidence of index fund investors taking delivery and owning stocks of commodities. Furthermore, the scale of this effort would have

had to been immense to manipulate a world-wide cash market as large as the crude oil market, and there simply is no evidence that index funds were engaged in the necessary cash market activities.

This discussion should make it clear that it is wrong to draw a parallel (e.g., Masters and White, 2008) between index fund positions and past efforts to "corner" commodity markets, such as the Hunt brother's effort to manipulate the silver market in 1979-80. The Hunt brothers spent tens of millions of dollars buying silver in the cash market, as well as accumulating and financing huge positions in the silver futures market (Williams, 1995). All attempts at such corners eventually have to buy large, and usually increasing, quantities in the cash market. As Tom Hieronymus noted so colorfully, there is always a corpse (inventory) that has to be disposed of eventually. Since there is no evidence that index funds had any participation in the delivery process of commodity futures markets or the cash market in general, there is no obvious reason to expect their trading to have impacted equilibrium cash prices.

A third conceptual error made by many bubble proponents, and unfortunately, many other observers of futures and derivatives markets, is an unrealistic understanding of the trading activities of hedgers and speculators. In the standard story, hedgers are benign risk-avoiders and speculators are active risk-seekers. This ignores nearly a century of research by Holbrook Working, Roger Gray, Tom Hieronymus, Lester Telser, Anne Peck, and others, showing that the behavior of hedgers and speculators is actually better described as a continuum between pure risk avoidance and pure speculation. Nearly all commercial firms labeled as "hedgers" speculate on price direction and/or relative price movements, some frequently, others not as frequently. In the parlance of modern financial economics, this is described as hedgers "taking a view on the market" (e.g., Stulz, 1996). Apparently, there is also some contamination in the non-commercial

category, with “speculators” engaged in hedging activities. This problem is highlighted in the recent Commodity Futures Trading Commission (CFTC) report on swap dealers and index traders, which included the statement that, “The current data received by the CFTC classifies positions by entity (commercial versus noncommercial) and not by trading activity (speculation versus hedging). These trader classifications have grown less precise over time, as both groups may be engaging in hedging and speculative activity.” (CFTC, 2008b, p. 2)

What all this means is that the entry of index funds into commodity futures markets did not disturb a sterile textbook equilibrium of pure risk-avoiding hedgers and pure risk-seeking speculators, but instead the funds entered a dynamic and ever changing “game” between commercial firms and speculators with various motivations and strategies. Since large commercial firms can take advantage of information gleaned from their far-flung cash market operations, it is not unreasonable to expect that these firms have a trading advantage compared to all but a few very large speculators.[2] The following passage from a recent article on Cargill, Inc. (Davis, 2009) corroborates this view of the operation of commodity futures markets:

> Wearing multiple hats gives Cargill an unusually detailed view of the industries it bets on, as well as the ability to trade on its knowledge in ways few others can match. Cargill freely acknowledges it strives to profit from that information. "When we do a good job of assimilating all those seemingly unrelated facts," says Greg Page, Cargill's chief executive, in a rare interview, "it provides us an opportunity to make money...without necessarily having to make directional trades, i.e., outguess the weather, outguess individual governments."

This sheds an entirely different light on the entry of large index fund speculators into commodity futures and derivatives markets. Large hedgers are no innocents in this game and their economic interests are not easily harmed by new entrants.

Inconsistent Facts

In addition to logical errors, a number of facts about the situation in commodity markets are inconsistent with the arguments of bubble proponents. To begin, if speculation drove futures prices consistently above fundamental values, the available data indicates it was not obvious in the relative level of speculation to hedging. The statistics on long-only index fund trading reported in the media and discussed at Congressional hearings tend to view speculation in a vacuum—focusing on absolute position size and activity. As first pointed out by Working (1960), an objective analysis of futures market activity must consider the balance between speculators and commercial firms hedging market risks. A key insight from this framework is that speculation can only be considered 'excessive' relative to the level of hedging activity in the market.[3]

Weekly Commitments of Traders (COT) data provided by the CFTC are enlightening in this regard. Table 1 shows the division of open interest for nine commodity futures markets, averaged for the first three months of 2006 and 2008.[4] The four basic hedging and speculative positions are: HL = Hedging Long = Commercial Long Positions; HS = Hedging Short = Commercial Short Positions; SL = Speculation Long = Non-Commercial Long + Index Trader Long Positions; SS = Speculation Short = Non-Commercial Short + Index Trader Short Positions. Note that index fund traders are allocated almost exclusively to the SL category in Table 1 and that HL + SL = HS + SS.[5]

As expected, Table 1 reveals that long speculation—driven by index funds—increased sharply in all but one of the nine commodity futures markets over January 2006 through April 2008.[6] In four of the eight markets with an increase in long speculation (corn, soybeans, soybean oil, and cotton), the increase in short hedging actually exceeded the increase in long

speculation. Corn provides a pertinent example. Speculative buying in corn, which includes commodity index funds for this analysis, increased by nearly 250,000 contracts; but, selling by commercial firms involved in the production and processing of corn increased by an even greater amount, around 500,000 contracts. What this means is that long speculators (as a group) must have been trading with short hedgers. Working (1960) argued that this was beneficial to overall market performance since speculators provide liquidity and risk-bearing capacity for hedgers.

In the other four markets with an increase in long speculation (CBOT wheat, live cattle, feeder cattle, and lean hogs), the increase in short hedging was less than the increase in long speculation. Live cattle provides a pertinent example here. Speculative buying in cattle, again including commodity index funds, increased by nearly 70,000 contracts; whereas selling by commercial firms increased by only about 16,000 contracts. In this situation the bulk of the increase in long speculation had to be absorbed by an increase in short speculation. Working (1960, p. 210) argued that trading between speculators generally was "unneeded" and reflected either, "entry into the market of a considerable group of inexpert or ill-informed speculators" or "recognition by one group of speculators of significant economic conditions or prospects that are currently being ignored by other, equally expert and generally well-informed, speculators." Either case could result in a deterioration of market performance. However, Sanders, Irwin, and Merrin (2008a) show that the observed increase in speculation for these markets was still well within historical bounds for commodity futures markets. Even higher levels of speculation have been observed in the past without adverse consequences for market performance.

In sum, observed speculative levels in commodity futures markets since early 2006, even after accounting for index trader positions, either did not exceed the hedging needs of

commercial firms or did not exceed historical norms for the level of speculation relative to hedging needs. Simply put, there is no compelling evidence that speculation was 'excessive.'

The second inconsistent fact is that price movements in futures markets with substantial index fund investment were not uniformly upward through the spring of 2008. Panel A in Table 2 shows the increase in commodity futures prices over January 2006—April 2008 for the same nine markets as in Table 1. The spectacular price increases were concentrated in grain and oilseed markets, while prices in other markets either increased moderately or declined. It is especially interesting to note that prices either dropped or rose only slightly in the markets with the highest level of speculation relative to hedging (Table 1: live cattle, feeder cattle, and lean hogs). Figure 2 reveals the same pattern in a different form. Here the position of commodity index traders over time is plotted as a percentage of total market open interest. The highest concentration of index fund positions was often in livestock markets, the very markets without large price increases through the spring of 2008. It is difficult to rationalize why index fund speculation would have little or no impact in commodity futures markets with the highest concentration of index positions, relative to either hedging positions or total open interest, yet have a large impact in the markets with the lowest concentration.

The third inconsistent fact is that high prices were also observed in commodity markets not connected to index fund investment. Panels B and C in Table 2 provide four examples.[7] Rough rice futures and fluid milk futures are not included in popular commodity indices tracked by index funds, but prices in these two markets increased 162% and 37%, respectively, over January 2006—April 2008. Apples for fresh use and edible beans do not have futures markets, and thus no index fund investment, yet prices in these markets increased 58% and 78%, respectively, over the same time interval. If index fund speculation caused a bubble in

commodity prices, why then did prices increase substantially in commodity markets without any index fund activity?

A fourth inconsistent fact has to do with inventories for storable commodities. Following Krugman (2008), Figure 3 illustrates market equilibrium for a storable commodity with and without a price bubble. The standard equilibrium occurs at the intersection of the supply and demand curves and results in a price of P_E. Now assume there is a bubble in the market that pushes price above equilibrium to P_B. At this inflated price the quantity supplied exceeds quantity demanded and the excess shows up as a rise in inventories. We should therefore observe an increase in inventories when a bubble is present in storable commodity markets. In fact, inventories for corn, wheat, and soybeans fell sharply over the last three years. Inventories of other commodities, such as crude oil, stayed relatively flat or declined modestly until very recently. The lack of a notable buildup in commodity inventories is one more reason to be skeptical that a large bubble developed in commodity futures prices.

A fifth inconsistent fact is the nature of commodity index trading. The literature on "noise traders" shows that a group of uninformed traders can consistently push prices away from fundamental value only if their market opinions are unpredictable, with the unpredictability serving as a deterrent to arbitrage (e.g., De Long et al., 1990). This notion seems unlikely given the ease with which other large traders can trade against index fund positions. Index funds do not attempt to hide their current position or their next move. Generally, funds that track a popular commodity index (e.g., Goldman Sachs Commodity Index) publish their mechanical procedures for rolling to new contract months. Moreover, they usually indicate desired market weightings when the index is re-balanced. So, the main uncertainty in their trading patterns

usually stems from overall in-flow or out-flows of monies associated with the underlying investment vehicle.

The problems created by the mechanical trading of index funds is well-illustrated by a recent story (Meyer and Cui, 2009) on problems experienced by the U.S. Oil Fund L.P., the largest exchange-traded crude oil index fund, when rolling positions from one nearby contract to the next:

> "It's like taking candy from a baby," said Nauman Barakat, senior vice president at Macquarie Futures USA in New York. That candy comes out of the returns of investors in the fund. Take Feb. 6, when U.S. Oil moved its 80,000 contracts from March to April at the end of the trading day, selling the March contract and buying April. Because U.S. Oil publishes the dates of its roll in advance, traders knew the switch was coming. At 2 p.m., 30 minutes before closing, trading in New York Mercantile Exchange oil contracts soared, and the price of the April contract narrowed to $4 more than the March contract. Within minutes, that gap had widened and closed at $5.98, according to trading records. As the fund's managers were about to roll their contracts, "suddenly came the awfully extreme move," said one manager. Some said the move is a sign that big trades were placed ahead of U.S. Oil's roll. The price move instantly made it more expensive for U.S. Oil to roll into the April contract and cost the fund about $120 million more than it would have a day earlier."

As the above passage so amply highlights, it is highly unlikely that other well-capitalized speculators, such as commodity trading advisors, hedge funds, and large floor traders, would allow index funds to push futures prices away from fundamental values when index trades are so easily anticipated.

A related point is that large and long-lasting bubbles are less likely in markets where deviations from fundamental value can be readily arbitraged away (easily "poached" in the terminology of Patel, Zeckhauser, and Hendricks (1991)). There are few limitations to arbitrage in commodity futures markets because the cost of trading is relatively low, trades can be executed literally by the minute, and gains and losses are marked-to-the-market daily. Moreover, the finite horizon of futures contracts further diminishes the likelihood that speculative arbitrage

is limited (Shleifer and Summers, 1990). This stands in contrast to markets where arbitrage is more difficult, such as residential housing. The low likelihood of bubbles is also supported by numerous empirical studies on the efficiency of price discovery in commodity futures markets (e.g., Zulauf and Irwin, 1998). Where pricing problems have been documented, they are typically associated with the delivery period of particular commodity futures contracts. However, as noted by the CFTC in a recent background memorandum on the application of its emergency powers, even this type of problem has only risen to an "emergency" level three times since the Commission was founded in 1974 (CFTC, 2008a).

Empirical Tests

The preceding discussion focuses on empirical facts that are inconsistent with substantial bubbles in commodity futures prices. When considered as a whole, these facts build a persuasive case against bubbles. However, the facts are largely circumstantial, since they tend to rely on indirect evidence. Bubble proponents can then argue that "this time is different" even if the links between commodity money flows and bubbles are not fully understood. This is an especially difficult argument to settle because the one variable that can provide definitive evidence about the level of commodity prices—fundamental value—is unobservable. It is like politics, everyone has an opinion.

While fundamental value is unobservable, all is not lost. It is still possible to conduct empirical tests of the hypothesis that money flows from index funds aided and abetted the recent boom and bust in commodity prices. This can be done by running standard Granger causality tests between futures price changes and position changes in commodity futures markets. These tests establish whether lagged position changes help to forecast current futures price changes.[8]

Sanders, Boris, and Manfredo (2004), Bryant, Bessler, and Haigh (2006), Gorton, Hayashi, and Rouwenhorst (2007), and Sanders, Irwin, and Merrin (2008b) conduct Granger causality tests using publically available data on positions of commercial, non-commercial, and non-reporting trader groups from the weekly COT report published by the CFTC.[9] A typical set of results, drawn from Sanders, Irwin, and Merrin (2008b), is presented in Table 3. A statistically significant relationship between the movement of commodity futures prices and measures of position change is found in only 5 out of 30 cases. In other words, position changes by COT trader groups helps forecast futures price movements in only 16% of the cases, hardly more than what one would expect based on pure randomness. And the evidence is even slimmer if results are limited to non-commercial traders (speculators).

The previously cited studies cast considerable doubt on the value of position changes for any group in consistently forecasting futures price movements. However, these studies also use publically-reported COT data, which is aggregated across all contracts and reported only on a weekly or monthly basis. This may limit the power of Granger causality tests because positions cannot be matched precisely to contract maturity months and positions cannot be tracked over daily intervals. Some have argued that if speculator positions do impact returns it is most likely over time horizons shorter than a week (Streeter and Tomek, 1992).

The Interagency Task Force on Commodity Markets led by the CFTC recently conducted thorough Granger causality tests for the crude oil futures market using non-public data on the daily positions of commercial and non-commercial traders (ITFCM, 2008). Daily price changes and position changes for commercial and non-commercial traders, as well as various sub-groups of traders, were examined over January 2003—June 2008. Consistent with the findings in other studies, there was no evidence that daily position changes by any of the trader sub-categories

systematically led crude oil futures price changes over the full sample period. This result held for all categories of speculators tracked by the CFTC: non-commercial traders in total, hedge funds, swap dealers, and non-commercial traders combined with swap dealers. At least in the crude oil futures markets, Granger causality test results are unaffected by the use of daily versus weekly data or position changes for sub-groups of traders. This bolsters the findings from other studies that did not have access to such detailed data on trader positions.

Bubble proponents can still point out that none of the above referenced studies tested specifically whether commodity index trader positions help to forecast price movements over the last several years. In forthcoming work, Aulerich and Irwin (2009) provide just this type of evidence for 12 commodity futures markets. They conduct Granger causality tests using non-public data from the CFTC on the daily positions of commodity index traders over January 2000 through July 2008. A unique feature of this study is that the authors were able to extend the series on commodity index positions back through the entire sample under study for each of the 12 markets. Aulerich and Irwin found only a few cases where index trader position changes helped to forecast price changes in commodity futures markets. When significance was found the size of the estimated price impact was small. These findings also held when the sample was broken into sub-periods.

While it is always possible to dither over the power of Granger causality tests or whether specifications adequately control for changing fundamentals, the evidence to date leads to a high degree of skepticism that positions for any group in commodity futures markets, including index traders, consistently forecast futures price changes (this will not be true for skilled individual traders within a group).

Lessons from History

A pervasive theme running through the history of U.S. futures markets is skepticism or out-and-out hostility towards speculators (Jacks, 2007).[10] Rapidly increasing or decreasing commodity prices at various times over the last 125 years have been accompanied by assorted attempts to curtail speculation or control prices. For example, just after World War II, soaring grain futures prices, especially for wheat, attracted political attention. President Truman proclaimed that, "the cost of living in this country must not be a football to be kicked around by grain gamblers," and ordered the Commodity Exchange Authority (precursor to today's Commodity Futures Trading Commission) to require futures exchanges to raise margins to 33% on all speculative positions, a truly extraordinary level. In a statement that echoes those being made today, President Truman added, "If the grain exchanges refuse, the government may find it necessary to limit the amount of trading."[11]

In the boldest move against speculators in U.S. commodity futures, trade in onion futures was banned by the U.S. Congress in 1958. The ban, actually still in place, was due to the widespread belief that speculative activity created excessive price variation (Working, 1963). Again, in language very similar to that heard today, a Congressional report stated that "speculative activity in the futures markets causes such severe and unwarranted fluctuations in the price of cash onions as to require complete prohibition of onion futures trading in order to assure the orderly flow of onions in interstate commerce."[12]

The experience of the last time period with a comparable level of structural change in commodity markets, 1972-1975, is particularly instructive. U.S. and international commodity markets experienced a period of rapid price increases from 1972-1975, setting new all-time highs across a broad range of markets. These price increases were often blamed on speculative

behavior associated with the "…tremendous expansion of trading in futures in a wide range of commodities" (Cooper and Lawrence, 1975, p. 702).[13] Following these price increases, public and political pressure to curb speculation resulted in a number of regulatory proposals and the upward adjustment of futures margin requirements (Hieronymus, 1977; Rainbolt, 1977; Tomek, 1985). These changes were accompanied by even more drastic measures—such as federal price controls and an embargo against soybean exports—aimed at lowering commodity price levels.

The actions used to reign in supposedly damaging speculation in the past run the gamut from requiring futures exchanges to raise margins to an outright ban on futures trading. The historical evidence is thin, at best, that measures to limit the impact of speculation had the desired effect on market prices. For instance, there is no historical evidence that directives to increase futures margins were effective at lowering overall price levels. The only consistently documented impact of the higher margin requirements is a decline in futures trading volume due to the increased cost of trading (Fishe and Goldberg, 1986; Peck and Budge, 1987; Haradouvelis and Kim, 1996).

Finally, it is important to note the historical pattern of attacks upon speculation. Petzel (1981, p. 117) commented that, "In periods of rising prices (e.g., the early 1920s, the Korean War, inflation, and the 1970s) grain speculators have been accused of increasing the prices of agricultural commodities artificially. During the early 1930s when agricultural prices were low, grain speculators were accused of depressing prices." Market cycles seem to be accompanied by a predictable pattern of speculative complaints: when prices are exceptionally low, natural sellers in the market, such as farmers, complain that speculators are the problem and when prices are exceptionally high, natural buyers in the market – consumers and processors – complain about speculators. While his focus was a relatively obscure episode in the 1925 wheat market, the

conclusion reached by Petzel (1981, p. 126) applies with equal force today, "…it is all too easy after suffering an economic loss to look for the villain in the piece. In 1925 the public found its villains and conspirators in the large speculators."

Conclusions

There is little evidence that the recent boom and bust in commodity prices was driven by a speculative bubble. If speculation by long-only index funds did impact commodity futures prices, it is not evident in the empirical evidence available to date. Economic fundamentals, as usual, provide a better explanation for the movements in commodity prices. The main factors driving prices up in the energy markets included strong demand from China, India, and other developing nations, a leveling out of crude oil production, a decrease in the responsiveness of consumers to price increases, and U.S. monetary policy (Hamilton, 2008). In the grain markets, factors driving up prices also included demand growth from developing nations and U.S. monetary policy, as well as the diversion of row crops to bio-fuel production and weather-related production shortfalls (Trostle, 2008). The favorable demand factors were reversed in quick order due to the recent financial market meltdown and burgeoning world-wide recession, leading to large price drops across-the-board in commodity futures markets (Good and Irwin, 2008). The complex interplay between these factors and how they impact commodity prices is often difficult to grasp in real-time and speculators have historically provided a convenient scapegoat for frustration with rapidly rising and falling prices.[14]

Legislative proposals currently being considered may in fact curtail speculation—through reduced volume of trade—but the initiatives could severely compromise the ability of commodity markets to accommodate the needs of firms to manage price risks. In particular, limiting the participation of index fund investors would rob the markets of an important source

of liquidity and risk-bearing capacity at a time when both are in high demand. The net result is that commodity futures markets will become less efficient mechanisms for transferring risk from parties who don't want to bear it to those that do, creating added costs that ultimately get passed back to producers in the form of lower prices and back to consumers as higher prices.

The recent attacks on speculation in commodity markets harkens back to an earlier era. For most of the past 30 years a consensus seemed to have been reached among policy-makers that speculation played a valuable and important role in commodity futures markets. Writing in the 1970s, Tom Hieronymus had this to say about the matter:

> "For many years the anti-futures trading arguments tended to prevail so that speculation was treated as a necessary evil that accompanied the desirable hedging process. During the last decade the balance appears to have shifted so that a favorable view is more widely held. It is doubtful that the favorable view is yet in the majority but it is generally held by students of futures markets and increasingly held by members of Congress and the CFTC." (Hieronymus, 1977, p. 298)

Much to the surprise of agricultural economists, there is little doubt after the political uproar of the last year that a majority of the public still does not hold a favorable view of speculation. It is yet to be determined whether members of the U.S. Congress hold the same view and whether this portends a return to the anti-futures trading environment of an earlier era.

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Endnotes

[1] In reality, a variety of investment instruments are lumped under the heading "commodity index fund." Individuals may enter directly into over-the-counter (OTC) contracts with swap dealers to gain the desired exposure to returns from a particular index of commodity prices. Some firms also offer investment funds whose returns are tied to a commodity index. Exchange-traded funds (ETFs) and structured notes (ETNs) have also recently been developed to make it even easier to gain commodity exposure. ETFs and ETNs trade on securities exchanges in the same manner as stocks on individual companies. See Engelke and Yuen (2008) and CFTC (2008b) for further details.

[2] Hieronymus (1977) argued that large commercial firms dominated commodity futures markets and speculators tended to be at a disadvantage. Based on his theoretical analysis, Grossman (1986, p. S140) asserted, "…it should come as no surprise if a study of trading profit finds that traders representing large firms involved in the spot commodity (i.e., commercial traders) make large trading profits on futures markets." In the classic empirical study on this subject, Hartzmark (1987) showed that large commercial firms in six of seven futures markets make substantial profits on their futures trades.

[3] Peck (1979-80, p. 339) provides a succinct re-statement of Working's argument, "Taken together, these analyses reaffirm the fundamental importance of hedging to futures markets and dependence of total activity upon hedging needs. The results also lend support to the Working definition of an appropriate measure of hedger demands upon a market. Net hedging is not the most useful view of the demands commercial users make on a market. Speculation is needed to offset both long hedging and short hedging. Only coincidentally are long and short hedgers

sufficiently alike in date and amount to be offsetting, although increased balance increases the probability of such correspondence and differences in seasonal needs between long and short hedgers decreases this probability. The appropriate measure of minimum required speculation must at least begin with total hedging demand."

[4] Note that total open interest consists of futures open interest and delta-adjusted options open interest.

[5] Non-reporting trader positions are allocated to the commercial, non-commercial, and index trader categories in the same proportion as that which is observed for reporting traders (see Sanders, Irwin, and Merrin, 2008a).

[6] There is an important omission from Table 1—crude oil futures. As the CFTC noted when it first began publishing data on index fund positions, it is difficult to separate out index fund transactions in energy markets because of the degree to which many firms in these markets engage in multiple trading activities that fall into different classifications and the degree to which firms engage in internal netting of these activities. The special swap dealer survey (CFTC, 2008b) does provide an estimate of index trader positions in the crude oil futures market; however, the data are limited to a six-month period from December 31, 2007 to June 30, 2008 and reported only on a net long basis. Computations for crude oil that parallel those reported in Table 1 can be made only by assuming that short positions for index funds are zero.

[7] The four markets were not selected at random, but instead represent markets that generally have low-cross price elasticities relative to the nine markets in Panel A. If the selected markets had high cross-price elasticities, then observed price increases could have been due to linkages with

the markets in Panel A (and possibly bubble effects in these markets) rather than fundamental factors specific to the selected markets or fundamental factors common to all the markets.

[8] Granger causality tests reflect the basic idea that if event *X* causes event *Y*, then event *X* should precede event *Y* in time. These tests require careful interpretation if the null hypothesis of no causality (no statistical prediction) is rejected (Hamilton, 1994). A statistical correlation may be observed between *X* and *Y* when in reality an omitted variable *Z* is the true cause of both *X* and *Y*. Hamilton (1994, p. 308) suggests it is better to describe "Granger causality" tests between *X* and *Y* as tests of whether *X* helps forecast *Y* rather than whether *X* causes *Y*. He notes that the tests may have implications for causality in the conventional sense, but only in conjunction with other assumptions.

[9] In a work well ahead of its time, Petzel (1981) conducted Granger causality tests between the daily position changes of three groups of speculators and price changes for the May 1925 wheat futures contract at the Chicago Board of Trade. Foreshadowing later results, he did not find any evidence that lagged position changes helped to forecast current price changes.

[10] See Stout (1999) for an in-depth discussion of the legal and regulatory history of opposition to speculation in the U.S.

[11] Quoted in Peck and Budge (1987, p. 172).

[12] Quoted in Working (1963, p.18).

[13] It is fascinating to observe the similarity of the current public debate about speculation and the one that followed the mid-70s commodity boom. For instance, Labys and Thomas (1975, p. 287) motivate their paper with words that could have been written in 2008 instead of 1975, "This paper analyses the instability of primary commodity prices during the recent period of economic

upheaval, and determines the extent to which this instability was amplified by the substantial increase in futures speculation which also occurred. Of particular interest is the degree to which this speculation rose and fell with the switch of speculative funds away from traditional asset placements and towards commodity futures contracts."

[14] The origin of the word "scapegoat" is of more than passing interesting in the present context. In ancient Israel, the high priest confessed all the sins of the children of Israel on the Day of Atonement over the head of a live goat. As a symbol of their sins, the goat was then sent into the wilderness to perish.

Table 1. Speculative and Hedging Positions (number of contracts) in Agricultural Futures Markets, First Quarter of 2006 and 2008

Market	HL	HS	SL	SS
Corn				
2006	328,362	654,461	558,600	208,043
2008	598,790	1,179,932	792,368	182,291
Change	270,428	525,471	233,768	-25,752
Soybeans				
2006	126,832	192,218	183,105	107,221
2008	175,973	440,793	351,379	74,844
Change	49,141	248,575	168,274	-32,377
Soybean Oil				
2006	66,636	124,134	92,515	35,599
2008	121,196	228,515	128,546	25,844
Change	54,560	104,381	36,032	-9,755
CBOT Wheat				
2006	57,942	213,278	251,926	92,148
2008	70,084	240,864	300,880	121,578
Change	12,141	27,585	48,954	29,430
KCBT Wheat				
2006	43,993	110,601	80,158	13,560
2008	46,459	96,556	67,827	15,767
Change	2,466	-14,045	-12,330	2,207
Cotton				
2006	41,582	108,085	86,777	21,824
2008	107,826	296,434	200,773	18,918
Change	66,244	188,349	113,995	-2,906
Live Cattle				
2006	54,549	128,951	129,786	45,305
2008	34,970	144,549	198,211	80,303
Change	-19,579	15,599	68,425	34,998
Feeder Cattle				
2006	10,707	17,725	20,769	10,632
2008	6,310	13,435	28,284	18,111
Change	-4,397	-4,290	7,515	7,479
Lean Hogs				
2006	15,949	65,438	93,522	40,036
2008	36,825	113,971	149,415	69,055
Change	20,876	48,533	55,893	29,019

Notes: HL = Hedging, Long; HS = Hedging, Short; SL = Speculating, Long; SS = Speculating, Short. The data reflect average positions in the first calendar quarter of 2006 and 2008, respectively. Open interest is aggregated across futures and options, with options open interest delta-adjusted to a futures equivalent basis.

Source: Sanders, Irwin, and Merrin (2008a)

Table 2. Change in Commodity Prices, January 3, 2006—April 15, 2008

Commodity	January 2006	April 2008	Change
Panel A. Futures Markets Included in Popular Indexes			
Corn	$2.20/bu.	$6.06/bu.	175%
Soybeans	$6.28/bu.	$13.80/bu.	120%
Soybean Oil	22.96¢/lb.	62.52¢/lb.	172%
CBOT Wheat	$3.46/bu.	$8.96/bu.	159%
KCBOT Wheat	$3.90/bu.	$9.50/bu.	136%
Cotton	55.24¢/lb.	75.23¢/lb.	36%
Live Cattle	$96.37/cwt.	$91.57/cwt.	-5%
Feeder Cattle	$114.00/cwt.	$103.95/cwt.	-9%
Lean Hogs	$64.65/cwt.	$71.65/cwt.	11%
Panel B. Futures Markets not Included in Popular Indexes			
Rough Rice	$8.27/lb.	$22.17/lb.	168%
Fluid Milk	$12.65/cwt.	$17.29/cwt.	37%
Panel C. No Futures Markets			
Apples Fresh Use	$0.26/lb.	$0.41/lb.	58%
Edible Beans	$19.30/cwt.	$34.40/cwt.	78%

Notes: All prices refer to the relevant nearby futures price except apples and edible beans, which are monthly prices received by farmers.

Table 3. Granger Causality Test Results for CFTC Trader Categories, Positions Do Not Lead Returns, 1995-2006.

$$R_t = \alpha_t + \sum_{i=1}^{m} \gamma_i R_{t-i} + \sum_{j=1}^{n} \beta_j PNL_{t-j} + \varepsilon_t$$

Market	P-values for Hypothesis Test: $\beta_j=0, \forall j$		
	Commercials	**Non-Commercials**	**Non-Reporting**
Wheat CBOT	**0.01**	0.18	0.54
Wheat KCBOT	**0.03**	0.24	0.71
Wheat MGE	0.63	0.15	0.76
Corn	0.35	0.79	0.33
Soybeans	0.83	**0.05**	0.78
Soybean Oil	0.24	0.30	0.94
Soybean Meal	0.70	0.93	0.61
Lean Hogs	**0.05**	0.34	0.08
Live Cattle	0.75	0.83	0.48
Feeder Cattle	**0.10**	0.16	0.23

Notes: *R* is the weekly return for nearby futures in the given market and *PNL* is the net long position of the trader group in percentage terms.

Source: Sanders, Irwin, and Merrin (2008b)

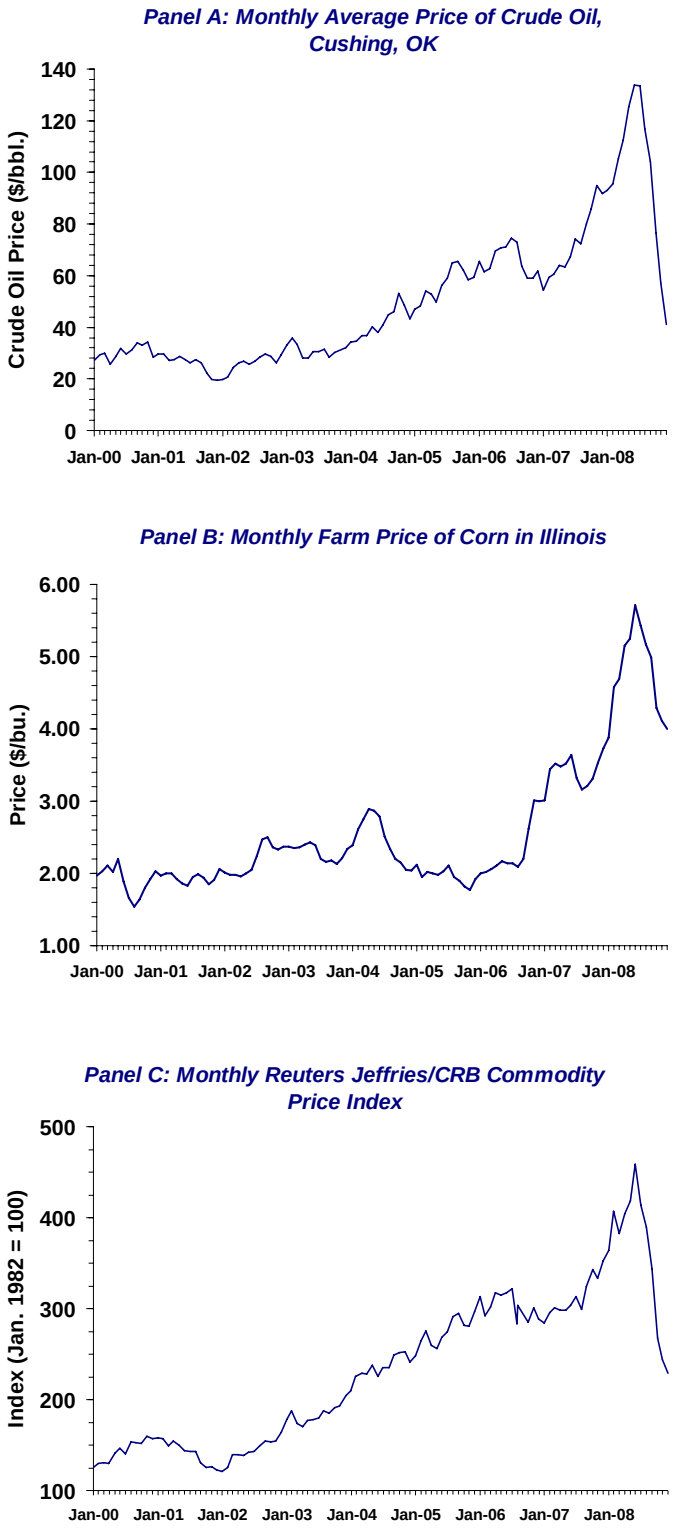
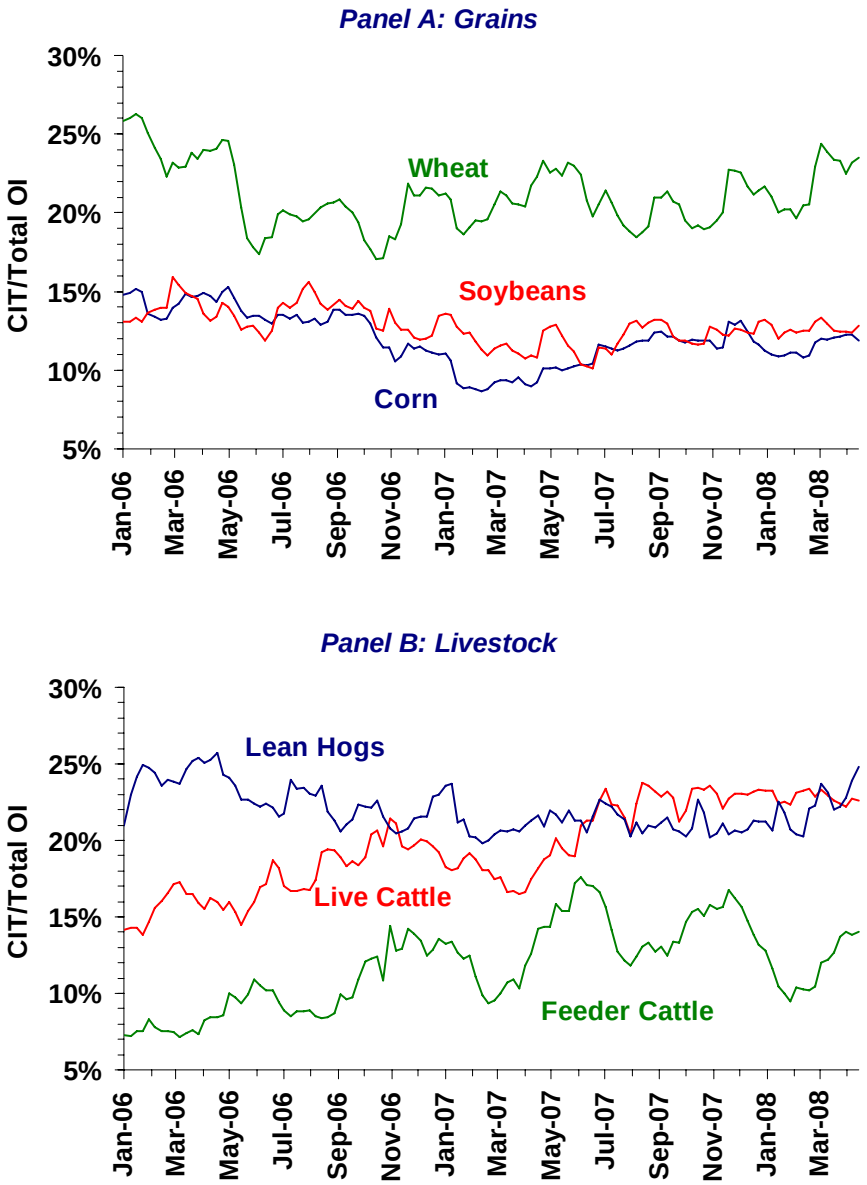


Figure 1. Selected Examples of the Movement of Monthly Commodity Prices, January 2000—December 2008



Note: Total open interest is aggregated across futures and options markets, with options open interest delta-adjusted to a futures equivalent basis.

Source: Sanders, Irwin, and Merrin (2008a)

Figure 2. Proportion of Open Interest Held by Commodity Index Traders (CITs) in Grain and Livestock Futures Markets, January 2006—June 2008

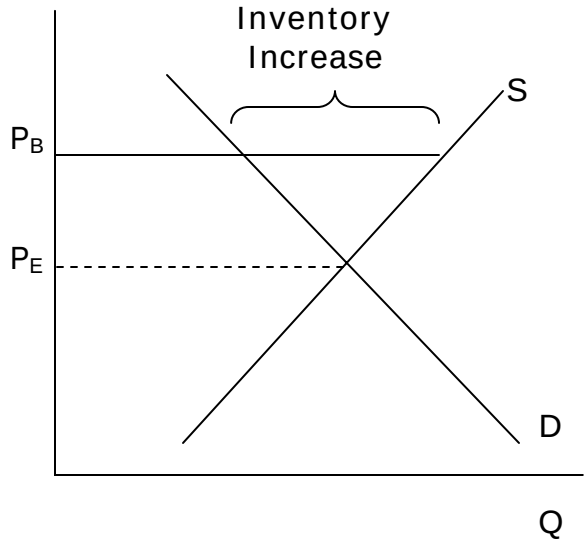


Figure 3. Theoretical Impact of a Price Bubble in a Storable Commodity Market