

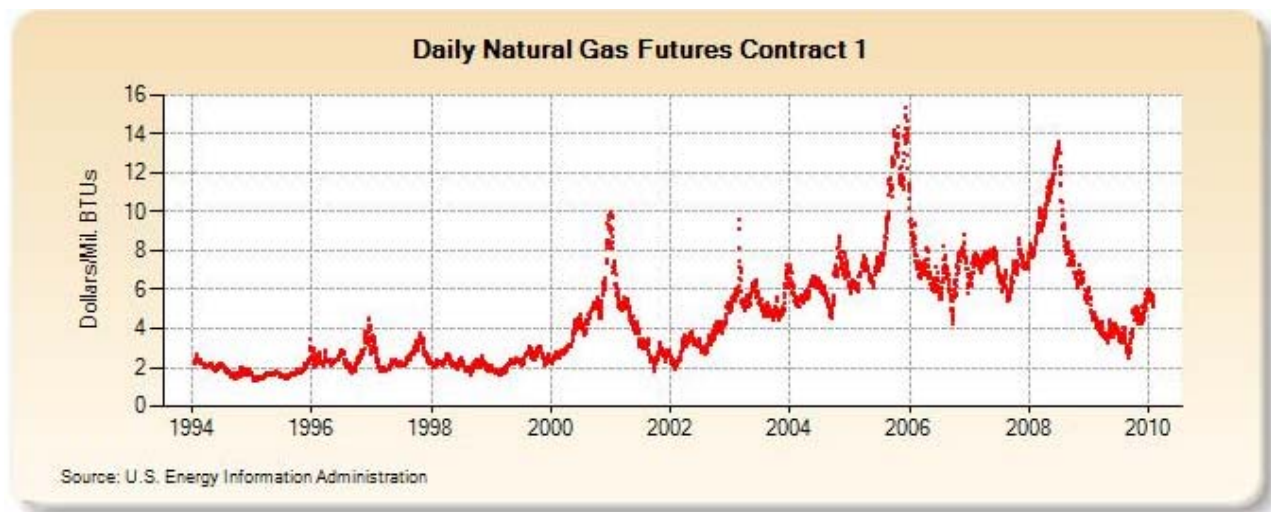
An Annotated Bibliography on Financial “Fundamentals” in Natural Gas Markets for the Natural Gas Supply Association (NGSA)

By *Lee-Ken Chao*, April 6, 2010

Executive Summary

Wide swings in natural gas prices have significantly affected consumers and producers in recent years. These wide swings have coincided with the increasing size and use of financial derivatives and transactions. The institutions that play big roles in the use of these instruments have also changed the energy trading landscape. This market evolution has raised questions and concerns on whether these financial transactions and institutions increasingly drive markets and prices. To date, efforts to explain these wide price swings exclusively by physical demand/supply fundamentals have not been convincing. The debate of whether financial markets influence physical markets continues.

It helps to ground this debate on reality, beginning with observed prices over time – see chart below for the front-month futures from EIA. By closely observing the chart, we can begin to pose questions. Initial answers will lead to other questions and so on. For example, we could ask: What are the factors that drove the sustained price rise to a peak in 2008 before falling sharply in the wake of the financial crisis? What portion of the price swings can be accounted for by the physical supply and demand fundamentals? What portion from index investing? What portion from directional speculation? What portion from fear, geopolitics, financial crisis, etc.? What other information besides price do we need? Positions by participant sector? Volume of transactions daily by participant sector? Changes in positions and volumes from day to day to infer behavior?



These financial transactions and the institutions that use them are now often referred to as the financial markets. The term financial markets will be used in this report to encompass all such activities, and the institutions who engage in them.

The annotated bibliography in this report lists representative publications which address this trend of financial market interactions with physical commodity markets, with emphasis on natural gas.

My review concluded that these studies have not definitively established or dismissed the linkage between financial and physical natural markets.

Because there are no definitive answers, I also discussed questions on possible market distortions, suggested the need to estimate these distortions, and made recommendations for further steps in this report. These thoughts will follow the Annotated Bibliography - Summary below.

Annotated Bibliography – Summary

The following is a summary of the annotated bibliography. The annotations are listed by “Item Numbers.” Besides publications related to the natural gas markets, this bibliography also lists work on oil and the growing body of work on the financialization of commodities. The body of literature is expected to grow as more studies are done by organizations with different interests.

Some of these research and publications sought to understand. Some sought reasons to limit financial participation due to “harmful” effects on the underlying physical markets while others tried to demonstrate the benefits provided by the growth of financial participation. Some have also argued that increased transparency is an intrusion and will limit financial innovations in over-the-counter (OTC) markets. Almost all seek to use statistics and some analytics to prove their points. Stakeholders with different interests and other “expert” observers have examined factors such as the decline of the US\$, geopolitics, the 2008-9 financial crisis, “excessive” speculation, massive increase of investment allocation to commodities (e.g. investing in the GSCI commodity index), and even psychologically driven behaviors like herding and fear-driven avoidance that can cause “bubbles” and collapses.

Item 1 showed that the Federal Energy Regulatory Commission (or FERC, the U.S. agency with market oversight responsibility over the physical natural gas markets) has observed, over time, that financial derivatives and transactions increasingly appear to have influence on the underlying physical natural gas markets and price formation as these financial activities grow in size and importance.

Items 2 and 3 leverages the Commodity Futures Trading Commission’s (CFTC) access to non-public transaction and position data for a “snap-shot” analysis of these data over a short 6-month period to examine the effects of financial markets, visible and less visible transaction venues, dealer roles and positions, speculation, and index investments. ***These studies did not establish definitive linkage between the financial and physical markets. They did suggest steps for greater transparency to improve market understanding and confidence.*** Item 2 estimated the size of the index investment in the commodity markets. It shone more light on the role of the swap dealer who bridges the OTC swap market and the futures markets. Data from this special call was insufficient to quantify the amount of speculative trading due to difficulties in distinguishing between hedgers from speculators. Item 3 found that available evidence “suggested” “that changes in the futures market participant by speculators have not systematically preceded price changes.” Note the use of the word “suggest” as opposed to the word “conclude”.

In item 4, The General Accountability Office (GAO) published a paper reviewing eight empirical studies and three qualitative studies concluding that they found “limited evidence that speculation was affecting commodity prices”. However, this was not definitive or conclusive (e.g. – see comments in item 7).

Items 5 and 6 were detailed investigations into speculation in the natural gas and oil prices by the Permanent Subcommittee on Investigations, United States Senate, which found that speculation did distort prices in the limited situations it specifically investigated using very detailed transaction data over a limited period that were obtained by subpoena. These publications from a range of federal agencies indicate how high profile this issue has become.

More recently, on September 9, 2009, the Energy Information Administration (EIA) announced an Energy and Financial Markets Initiative. For more on this, go to the link, <http://www.eia.doe.gov/neic/press/press325.html>.

Item 7 excerpted commentaries from a website devoted to critiques on the financialization of commodities and the consequent harm. Among other focal points, it builds the case that index investing is in effect “hoarding” that drives up prices, and this can only be solved by restructuring and/or greater transparency. Its articles contended that studies such as those in Items 2, 3 and 4 are merely statistical tests of limited focus to establish that there is no clear linkage between speculation and prices. There have been no publicly available models that predict prices which adequately reflect reality. Today, reality includes heavy financial participation and questions remain regarding the effects of such financial participation, which ranges widely in motivation and incentives.

Item 8 excerpted testimony from an officer of a large U.S. oil and gas producer at a CFTC hearing. It demonstrated the high cost of posting collateral to hedge longer-term prices in the face of very wide price swings.

Item 9 was the testimony from the manager of an Index Fund arguing against the imposition of position limits for index funds.

Item 10 was testimony from a hedge fund manager that trades in a proprietary manner - making directional calls and speculating, using a mix of physical, CME-NYMEX futures (regulated and quite transparent), ICE instruments (“exempt” exchange that executes both physical and financial transactions) and over-the-counter transactions. He agreed with setting position limits for physically settled futures but wanted no limits on financially settled contracts. These three items are representative of different interests advocating for different reforms to the regulations. As usual, the “devil is in the details”.

Items 11 and 12 are academic studies that are more policy analyses combined with limited statistical analyses on the effects of “financialization” of commodities. The use of the term “financialization” has gained traction. It has found increasing use in the literature and policy discussions globally. These two works are good early attempts at rigor. More work like this with a wider range of biases would be useful.

Items 13 through 16 are recent reports from the United Nations Conference of Trade and Development (UNCTAD). They cited statistics to demonstrate a trend towards the growing interdependence between financial and commodity markets. UNCTAD worried that financially driven higher prices will hurt populations in poor emerging countries the most. Effects range from harm to development efforts to social unrest such as food riots.

Item 17 from a think tank attempted to explain market prices by suggesting that kinks in the physical demand and supply curves (due to short-term inelastic supply or demand) can explain extreme price moves, thereby dismissing financial markets as influences in the market place. Item

18 from another think tank attempted to categorize “good” and “bad” speculations. It left open the question on who decides what is good or bad. Item 19 from a consulting firm demonstrated the “excessive” speculation did occur and recommended “fixes”.

Item 20 is a book (“The Mind of the Market”) that addressed markets as a human construct which has evolved as humans and societies have evolved. This evolution also naturally evolved market structures and rules that can be adaptive and foster the advancement of human society and welfare, but can also evolve structures and rules that are maladaptive and detrimental. Developing and using the “Science of Good Rules” (title of chapter 8 in the book) – linking the mind and the market - can potentially help adapt the market to function more effectively for more of us than for just a select few – important for long term efficacy of markets to serve the human species. The author, Michael Shermer, is the co-founder of the Skeptic Magazine. His early “heroine” is Ayn Rand. Since then, he has evolved.

Item 21 was a presentation by a macroeconomist from Lehman, a now-defunct investment banking firm with a sizable commodity trading arm. This analyst presented results of in-depth analyses, trying to distinguish between speculators and index investors, explicitly acknowledging that futures and OTC volumes dwarf the underlying physically delivered volumes. His presentation did demonstrate that the market is complex, and cannot be exclusively be explained by physical demand and supply fundamentals.

Item 22 is a 2007 testimony by an experienced industry consultant to a Congressional Committee. He reviewed the evolution of financial markets and their interactions with the physical markets citing studies and his personal experience. He argued that the growing complexity calls for better transparency for all market participants. He is worried that insufficient disclosure will “fatally undermine the efficacy of markets.”

Item 23 is a staff report from the Bank of England that lays out in detail the distorting market effects and harm to society due to the moral hazard of “too-big-to-fail”. Large banks have levered highly and taken on high risks to privatize gains and socialize losses. This arrangement also bestows asymmetric power to this select group in the financial and physical markets for energy and commodities. Their combined dealer and lender roles also give them advantageous asymmetric access to deal flow information.

Item 24 is a research note from the Center for Energy Economics – University of Texas (CEE-UT) which surveyed the changing landscape of energy trading, addressing the interactions of the financial and physical markets. It attempted to provoke questions and debate, identified areas where knowledge is lacking, and suggested areas for further research.

A detailed summary is provided for each item in this report under “**Annotated Bibliography - Details**”, as follows.

Annotated Bibliography - Details

1. Market Oversight Staff, U.S. Federal Energy Regulatory Commission (FERC), *2008 State of the Markets (SOM) Report* (August 2009). <http://www.ferc.gov/market-oversight/market-oversight.asp>.

On page 11 of the *Executive Summary* this report noted, “The volume of financial trading dwarfs physical trading” regarding financial markets as energy market

participants, Beginning on page 32 in the *Financial Fundamentals* sub-section of Section 1, *Natural Gas Markets in 2008*, this report noted, “The prices of futures, swaps and other financial instruments are now used by physical markets to form price indexes. Likewise, financial markets attempt to determine prices by looking at data on fundamentals that often are not confirmed until well after the fact.” It further stated, “Two key financial fundamental drivers of natural gas prices in 2008 were the large influx of passive investments into commodities and technical trading strategies based on trading around the prevailing market momentum.” It concluded, “Oversight staff believes that it was the upward pressure of financial fundamentals on top of modest tightening in the supply-and-demand balance for gas in first-half 2008 that explains the path of natural gas prices during the year.”

These observations follow years of market observations by FERC’s Office of Market Oversight and Investigations (OMOI), established in 2002 after the California energy crisis and the demise of Enron Corp. It is instructive to read previous SOM reports to review OMOI’s evolving understanding of financial and physical interactions in natural gas markets. A major finding was how the NYMEX contract settlement price has been accepted as a major determinant of price indices that are widely used throughout the industry, and how non-transparent OTC financial trading activity can influence NYMEX settlement prices. During this period, FERC staff also researched, analyzed and assessed the veracity of market commentaries from different sources such as the March 2006 report from the attorneys general of Illinois, Iowa, Missouri and Wisconsin, “The Role of Supply, Demand and Financial Commodity Markets in the Natural Gas Spiral” by Mark Cooper - http://www.illinoisattorneygeneral.gov/consumers/natural_gas_report.pdf. OMOI evolved into the Office of Enforcement (OE), which conducted significant investigations into how financial derivatives were used by trading entities to allegedly manipulate natural gas markets. Two such cases were Amaranth (IN07-26-000) and ETP (IN06-3-003). The publicly accessible case files on the FERC website provide good summaries of the analyses in the investigation. These can shed more light on the interactions of financial and physical trading behind the allegations.

This evolution at FERC reflects growing acknowledgement among the regulators and market participants in the affected markets that trading and position-holding of financial derivatives have grown in importance and must be considered a fundamental factor that influence market outcomes and form prices. Public releases of continuing observations and analyses by FERC staff will help inform market participants, enabling them to feel greater confidence in the markets they rely on.

2. U.S. Commodities Futures Trading Commission (CFTC) Staff, *Report on Commodity Swap Dealers & Index Traders with Commission Recommendations* (September 2008). <http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/cftcstaffreportonswapdealers09.pdf>.

CFTC indicated that this report is a preliminary survey, stating, “This preliminary survey was an unprecedented effort to quantify key components of the OTC swap and commodity index markets. It called for collection, organization, and analysis of the OTC trading of hundreds of counter-parties, millions of transactions, and billions of dollars of trading occurring over a 6-month period.” It found that the net notional value of index investment was \$200 Billion, with crude oil at \$51 Billion. The report did not break out

the natural gas net notional value, which would be \$10 Billion if the natural gas component was at 5% of this \$200 Billion. It also shined more light on the role of the swap dealer who bridges the OTC swap market and the futures markets. It further acknowledges, “This preliminary survey is not able to accurately answer and quantify the amount of speculative trading occurring in the futures markets.” It was not possible to clearly delineate hedgers from speculators. For each entity’s position, it was also not possible to tell what portion was held for hedging and what portion was for speculation. This would be especially difficult to determine for a large swap dealer such as Goldman Sachs and other “universal” banks that participate in physical transactions in the natural gas markets.

This report did not investigate the question of whether the massive increase in index investment amounts to a “buy-and-hold” strategy that some (e.g. Masters & White in Item 7) consider to be financial “hoarding.”

The report made eight recommendations, one of which is to disaggregate swap dealer positions into a separate category in the weekly Commitment of Traders (COT) report. This was implemented September 4, 2009. CFTC held hearings on other recommendations including hedge exemptions for swap dealers and tighter position limits.

On January 26, 2010, CFTC issued a rulemaking proposal on position limits and hedge exemptions in FR Doc 2010-1209 with a 90-day comment period in what appears to be a balanced proposal that is responsive to comments from different sides of the debate. New financial reform legislation, if enacted, would complement these regulations or add complexity. As usual, “the devil is in the details,” and there will be exemptions and areas where CFTC can exercise discretion. There will be learning to understand the new “rules of the game.” There will be genuine interest to make them work to produce more efficacious markets. There will also be learning to work around the new rules and “game” the markets. Market participants like NGA members must also intensify their learning and vigilance. A quote attributable to one of our founding fathers in the U.S., “The price of freedom is eternal vigilance” definitely applies in these markets.

3. CFTC-led Interagency Task Force on Commodity Markets (including staff from the Departments of Agriculture, Energy, and the Treasury, the Board of Governors of the Federal Reserve System, the Federal Trade Commission, and the Securities & Exchange Commission), *Interim Report on Crude Oil* (July 2008).
<http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/itfinterimreportoncrudeoil0708.pdf>

The prices of crude oil and other commodities have become a key concern of consumers, businesses, and policymakers in the United States and abroad. Because of the challenges posed by high commodity prices, several federal agencies are engaged in the analysis of developments in commodity markets. In an effort to develop, consolidate, and disseminate this knowledge, CFTC invited staff from several Federal agencies to participate in an Interagency Task Force on Commodity Markets (Task Force or ITF). The ITF was convened in June 2008 and issued the interim report in July – the report promised an “update” later in the year (2008), but no update has been found on the CFTC website.

Based on a quick analysis of available data (including non-public surveillance data obtained by CFTC), the ITF found that prices are primarily driven by fundamental demand and supply forces. The Task Force's preliminary analysis also suggests that changes in the positions of swap dealers and noncommercial traders most often followed price changes. This result does not support the hypothesis that the activity of these groups is driving prices higher. The Task Force has found that the activity of market participants often described as "speculators" has not resulted in systematic changes in price over the last five and a half years. On the contrary, most speculative traders typically alter their positions following price changes, suggesting that they are responding to new information – just as one would expect in an efficiently operating market. In particular, the positions of hedge funds appear to have moved inversely with the preceding price changes, suggesting instead that their positions might have provided a buffer against volatility-inducing shocks.

This report did not investigate the question of whether the massive increase in index investment amounts to a "buy-and-hold" strategy which could be considered financial "hoarding".

Perhaps, a later report with more rigorous analysis of more detailed data over a longer time frame would confirm the initial findings and establish greater credibility. Hopefully, it will also tackle questions around the effects of index investing, among other "sacred cow" questions that remain untouched. In the mean time, the debate on how financial trading and investment allocations influence prices in commodity markets rages on.

Rather than try to prove financial speculation and investment allocation have no effects (in the long-term equilibrium – given market dynamics and evolution, an impossible state), the market could be better served if CFTC would provide market participants with sufficient data (with disguised identities) to perform their own analysis to assess the details and timing of interactions and feedbacks among the spectrum of transactions from purely financial to purely physical. Timely, regular reporting of such information like an expanded COT report will provide market participants with more information, enabling better competitive market outcomes.

4. Financial and Community Investment Staff led by Orice M. Williams, United States Government Accountability Office (GAO-09-285R January 2009). *Issues Involving the Use of Futures Markets to Invest in Commodity Indexes*. <http://www.gao.gov/products/GAO-09-285R>.

Natural gas is about 5-10% of a commodity index depending on which index is used. Institutional allocation to commodity investment is "reportedly" (news media estimates – no mandatory reporting requirements) in the \$100-500 Billion range. Therefore this report on commodity indexes is relevant. While this report primarily examined the laws (CEA and ERISA), margins and position limits, it also covered the review of eight empirical studies and three qualitative studies, some of which we can potentially annotate depending on our assessment of relevance. The GAO review concluded that these studies found limited evidence that speculation was affecting commodity prices, and the statistical studies among them detected "weak or even spurious" causal relationship between futures speculators and commodity prices.

The commentary by Masters & White (item 7 of this annotated bibliography) disagrees with the conclusions of this GAO report even though this GAO report cited Masters & White as one of the empirical studies GAO reviewed. This raises the question of whether the GAO study was in depth or merely cursory. It also raises the question of whether the report was approached with a preconceived notion or conclusion. I tend to agree with Masters & White that none of the studies developed models that adequately predicted the prices that can be verified with real data in a robust way. Until a multivariate model is developed that can be verified with real-world data, dismissive assertions will continue to be made from all sides, depending on each side's special interest.

The studies cited by this GAO report are:

Empirical Studies

Ahn, Daniel. Lehman Brothers Commodities Special Report: Index Inflows and Commodity Price Behavior (July 31, 2008).

Antoshin, Sergei, Elie Canetti, and Ken Miyajima. "Annex 1.2. Financial Investment in Commodities Markets" in Global Financial Stability Report: Financial Stress and Deleveraging, Macrofinancial Implications and Policy, International Monetary Fund (Washington, D.C. October 2008)

Haigh, Michael S., Jana Hraniova, and James A. Overdahl, Office of the Chief Economist, U.S. Commodity Futures Trading Commission. "Price Dynamics, Price Discovery and Large Futures Trader Interactions in the Energy Complex." Staff Research Report (Washington, D.C. April 2005)

Interagency Task Force on Commodity Markets. Interim Report on Crude Oil (Washington, D.C. July 2008)

Plato, Gerald and Linwood Hoffman. "Measuring the Influence of Commodity Fund Trading on Soybean Price Discovery." Proceedings of the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management (Chicago, Ill: 2007).

Sanders, Dwight R., Scott H. Irwin, and Robert P. Merrin. "The Adequacy of Speculation in Agricultural Futures Markets: Too much of a Good Thing?" Marketing and Outlook Research Report 2008-02, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign (June 2008)

Sanders, Dwight R., Scott H. Irwin, and Robert P. Merrin. "Smart Money? The Forecasting Ability of CFTC Large Traders" Proceedings of the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Management (Chicago, Ill: 2007)

Sommer, Martin. "The Boom in Nonfuel Commodity Prices: Can it Last?" in World Economic Outlook, International Monetary Fund (Washington, D.C.: September 2006)

Qualitative Studies

Eckhaus, R.S. “The Oil Price Is a Speculative Bubble.” Working paper 08-007, Center for Energy and Environmental Policy Research, Massachusetts Institute of Technology (June 2008)

Masters, Michael W. and Adam K. White. “The Accidental Hunt Brothers: How Institutional Investors Are Driving Up Food and Energy Prices.” The Accidental Hunt Brothers Blog, Special Report (July 31, 2008).

U.S. Commodity Futures Trading Commission, Staff Report on Commodity Dealers & Index Traders with Commission Recommendations (Washington, D.C.: September 2008).

I also found several more related studies, from the Congressional Research Service (CRS), a sister agency to GAO, listed below:

Jickling, Mark and Lynn J. Cunningham. Speculation and Energy Prices: Legislative Responses (Updated July 8, 2008)

Jickling, Mark. “Regulation of Energy Derivatives.” (July 7, 2008 and April 21, 2006)

Jickling, Mark. “The Enron Loophole.” (July 7, 2008)

5. Permanent Subcommittee on Investigations, United States Senate (released in conjunction with the June 26 & July 9, 2007 Subcommittee Hearings), **Excessive Speculation in the Natural Gas Market.**

http://hsgac.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=27f2e684-2076-4e87-a454-145c5d797ec5-

This report analyzes in great detail the trading activity in natural gas markets by Amaranth and its counterparties in the months leading up to Amaranth’s demise in 2006. It concluded that there was excessive speculation. It found that Amaranth was able to benefit its non-transparent positions in ICE NYMEX look-alike financially settled contracts by exercising a dominant influence in the physically settled NYMEX futures markets, distorting prices through excessive speculation. It recommended corrective measures including greater transparency and CFTC imposition of position limits across trading platforms. The lead investigator, Dan Berkovitz, is now the General Counsel at CFTC.

Recommendations from this report contributed in part to relevant provisions in the CFTC Reauthorization Act of 2008 that affect the regulation of these markets. CFTC is exercising its authority under these legislative provisions in proposing the rule changes in FR Doc 2010-1208.

6. Permanent Subcommittee on Investigations, United States Senate (June 27, 2006), **The Role of Market Speculation in Rising Oil and Gas Prices: A Need to Put the Cop Back on the Beat.** <http://hsgac.senate.gov/public/files/SenatePrint10965MarketSpecReportFINAL.pdf>.

This report found that there is speculation in oil and gas markets and that speculation contributed to higher prices. It also found that ICE has evolved to become a price discovery market, a role similar to that held by NYMEX. It found that CFTC does not have sufficient access to data for large trader reports as exempt markets such as ICE evolve to assume greater importance. It recommended eliminating the “Enron loophole” and that CFTC

requires large traders to report U.S. commodity transactions over-the-counter and on foreign exchanges in order for CFTC to properly aggregate large trader positions. To deal with “excessive speculation”, it called for greater cooperation between CFTC and its UK counterpart and to determine the extent that ICE has become a price discovery market requiring greater oversight and supervision. Dan Berkovitz also served on this team.

This report is a precursor to the natural gas report and built the case for improved regulation of the oil commodity markets.

7. Michael W. Masters and Adam K. White, *The Accidental Hunt Brothers: How Institutional Investors are Driving Up Food and Energy Prices* (July 31, 2008). <http://accidentalthuntbrothers.com/>; click “Download Reports”.

This “public” website is regularly updated by the principals, Masters and White. Michael Masters (a hedge fund manager) has testified before Congressional Committees and CFTC hearings with the theme that investment allocation to financial positions in commodities are in effect “paper hoarding” of commodities, with the effect of withholding supply, and when done on a large scale, has appreciable effects on market prices.

The latest two web postings are headlined, “\$344 Million Buys a Lot of Loopholes” (December 10, 2009) and “End-Users Are Wall Street’s Puppets” (December 2, 2009). It criticized the GAO report above in an article headlined, “Shocking News! Academics and Bureaucrats Can Not Build Model to Predict Commodity Prices” (February 6, 2009). Two relevant paragraphs are reproduced below.

To burst Ms. Williams’ “bubble” (pun intended), there is no statistical proof that supply and demand have caused commodity price movements either – especially the outrageous price movements we saw in 2008. So because there is no “statistical proof,” is it reasonable to conclude that supply and demand played no part in commodity price movements – of course not. This is the ultimate red herring.

In order to have “statistical proof” you need a model that can predict prices. All of these studies use simplistic linear models that fail to predict prices. But that proves nothing. Any model you try to build is going to have to be non-linear / non-parametric / multi-factor (since it’s foolish to think only one factor can predict prices) and once built it will have to constantly be updated because reality changes. If you’re successful in building a predictive model, you are not likely to publish it in an academic paper, but rather to start making millions trading on NYMEX.

The studies reviewed by GAO and denigrated by Masters and White mostly applied statistical tests (such as linear regression analyses) to test for postulated hypotheses of cause and effect using available data. When the correlation is low, then the conclusion would be that “a definitive link between speculation and prices could not be found”. These studies also tended to confine themselves to testing a limited set of questions, such as whether entities and transactions (such classifications are usually the assumptions of the analyst, depending on his or her bias) are speculative transactions that drive prices. Other hypotheses, such as whether the size and change of index investments drive prices,

should also be tested for other potential correlations. Also, tests should be done on how these correlations could change over time and how they may behave differently due to particular events and shocks. None of these studies developed models that can predict prices which accurately reflect reality. Furthermore, it is challenging to adapt these models quickly to realities that change suddenly and in ways not conforming to past patterns.

8. Testimony by Elliot Chambers, Chesapeake Energy (CHK), *CFTC Hearings on Position Limits and Hedge Exemptions* – July 28, July 29 and August 5, 2009
<http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/transcript080509.pdf>

Wide swings in prices affect producers who hedge, as indicated below by Elliot Chambers' testimony at a CFTC hearing. Excerpts from Chambers' testimony below came in response to Commissioner's questions regarding the posting of credit collateral for its hedges. Chambers was concerned that CHK would have to post additional collateral if its hedges were also cleared on a clearinghouse platform. It is also notable that it already has pledged \$11 billion of assets as collateral to secure the \$6 Billion mark-to-market loss caused by the steep rise in natural gas prices after hedging at a lower price. The increased volatility require more assets to be pledged against the hedges, taking away collateral capacity to pledge against loans and reducing unsecured assets available to debt holders and shareholders. Below are some relevant excerpts.

“A perfect example of that is in 2008 when natural gas prices were so high, we had been selling in the market actively that price was above our break even. So we had a fairly substantial mark to market loss around June 30 of last year in excess of \$6 billion. If we would have had to post that as collateral on an exchange and cash collateralize that, frankly, we don't know if we would have been able to find that cash, number one, but it definitely would have impacted our drilling efforts. Going back to whenever we owed over \$6 billion in our mark to market on our hedge positions, we had around \$11 billion worth of oil and gas properties pledged. It's a question mark whether a regulatory answer would have been \$11 billion, \$16 billion, \$20 billion, \$5 billion. It's a big question and does cause us some concern.”

This testimony illustrates the high cost of hedging. If these hedges had to be cleared through a central clearinghouse by way of a Futures Commission Merchant (FCM), CHK would need to stand ready to post cash collateral whenever the mark-to-market changes, putting a strain on cash liquidity, even if it has a line of credit to do so. Putting up cash collateral on short notice appears more challenging for CHK than pledging valuable assets as security for the hedges. Either way, the “financial intermediary” counterparty providing the hedging services has the producer “over-the-barrel” – you can pay me cash immediately because of mark-to-market or you can pledge assets with a “cushion” (larger than the mark-to-market value). The value of these assets moves up and down with the mark-to-market pricing. It is notable that CHK had to pledge \$11B worth of assets to meet a \$6B change in mark-to-market value. This large \$5 B cushion represents a big opportunity cost. CHK's total debt was about \$12B at year end 2009. The collateral cost of hedging is comparable to the magnitude of the total corporate debt. This is in effect a line of credit to post cash collateral, secured by valuable assets.

Would CHK have been better off by hedging and clearing on a transparent platform like NYMEX and make daily collateral calls as needed using a secured credit line with a bank consortium for the purpose of meeting collateral calls? Would less assets (<\$11B) be tied up as a result? Would this alternative potentially cost less than the all-in cost of a private OTC hedging arrangement with a financial counterparty? Would an open competitive NYMEX futures market result in a bid-ask spread lower than the bid-ask spread of a private OTC hedge? Would the fact that the only eligible OTC counterparties for CHK are likely to be financial institutions from the select group identified in (iv) above make a difference to CHK? Would this fact put CHK at an asymmetric disadvantage regarding deal flow information and market power? What is the market distortion cost of this asymmetry?

9. Testimony by John Hyland, US Commodity Funds (UNG, a natural gas ETF), *CFTC Hearings on Position Limits and Hedge Exemptions* – July 28, July 29 and August 5, 2009
<http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/transcript080509.pdf>

Hyland's contention is that his funds are passive investments and investors in his funds are so numerous that no single investor can exercise any influence on market moves and prices. Investment flows merely follow fundamentals or anticipate the directions of fundamentals and do not constitute speculative positioning. This is contrary to the "hoarding" effect that Masters and others attribute to the massive allocation of investment funds to commodities. Masters would counter that even though not intentional, the large accumulation of "long" positions of index investments is the financial equivalent of physical hoarding, and will likely drive up prices artificially the same way. This "hoarding" can be considered accidental, and probably in part explains why Masters and Adams name their website, the accidentalhuntbrothers.com.

CFTC appears to propose allowing exemptions to index investors in the proposed rules under FR Doc 2010-1209. It does not resolve the question of whether index investing in commodities constitutes financial "hoarding" which can raise price by building "long" positions and lower prices by shedding positions – going "short", even when there is no visible increase or decrease in physical supply or demand.

10. Testimony by John Arnold, Centaurus (among the largest energy hedge funds), *CFTC Hearings on Position Limits and Hedge Exemptions* – July 28, July 29 and August 5, 2009
<http://www.cftc.gov/ucm/groups/public/@newsroom/documents/file/transcript080509.pdf>

Arnold indicated he shares the CFTC goals of promoting efficiency, transparency and integrity in the economic markets and that Centaurus relies almost exclusively on fundamental analyses to guide its trading strategies. Arnold suggests imposing hard limits on physical natural gas futures as they approach expiry, decreasing in a step fashion at regular intervals as expiration approaches, granting no hedge exemptions to any party. A second suggestion is to replace accountability levels with hard limits on the forward physical natural gas futures based on maximum positions in any one month. A third suggestion is to have transparency and oversight into financially settled contract positions on exchange and over the counter but should not impose hard limits on financial contracts. He explained why there should be no limits on financially settled contracts by citing NYMEX proposed limits that would have the unintended effect of getting traders to

transact in the non-transparent OTC. He did not explain how they would be a problem if CFTC requires transparency and limits across all transaction venues including the OTC.

CFTC's proposed rule making includes setting limits across venues, perhaps acknowledging that positions in financially settled contracts can feed back to the physical or physically settled futures markets affecting price formation in those markets.

11. Ke Tang (Renmin University of China) and Wei Xiong (Princeton University), *Index Investing and the Financialization of Commodities* – draft (September 2009). <http://www.princeton.edu/~wxiong/papers/commodity.pdf>

This paper examines the financialization process of commodities precipitated by the rapid growth of index investment to the commodity markets since the early 2000s. It found that concurrent with the increasing presence of index investors, commodity prices have been increasingly exposed to market-wide shocks, such as shocks to the world equity index and US Dollar exchange rate, and due to shocks experienced by other commodities, such as oil. In particular, the trend is more pronounced for commodities in the two most popular indices, the GSCI and DJ-AIG indices (natural gas is a component in both). As a result of the financialization process, the spillover effects of the recent financial crisis contributed substantially to the large increase in commodity price volatility in 2008. The study highlighted the increasingly important interactions between commodities markets and financial markets.

This paper helps frame the natural gas, oil and other commodity markets in the context of the much larger financial markets, suggesting conditions, motivations and behaviors in these larger markets may be a bigger influence on when and how much money flows into and out of the energy commodity markets. The resulting market outcomes and prices would naturally reflect these causes more than the underlying physical fundamentals if actions from these causes are as large or larger than the buy-sale transactions of the physically settled markets.

12. L. Randall Wray (Center for Full Employment and Price Stability, University of Missouri – Kansas City and Levy Economics Institute at Bard College), *The Commodities Market Bubble: Money Manager Capitalism and the Financialization of Commodities* (Levy Institute Public Policy Brief 96, October 2008). http://www.levy.org/pubs/ppb_96.pdf

The following excerpts from the preface by Levy Institute's President Dimitri B. Papadimitriou to this policy brief captures Wray's key findings and conclusions.

“Money manager capitalism has resulted in a series of boom-and-bust cycles in equities, real estate, and commodities. Because subsequent cycles have been increasingly damaging to the U.S. economy, we are now at the point where we are experiencing the most severe financial crisis since the Great Depression. Hasty interventions (bailouts) by Congress, the Treasury, and the Federal Reserve are attempting to keep the financial industry solvent, in the belief that government inaction would result in a prolonged recession.....

Wray determines that speculation, rather than fundamentals, dominates the boom in the commodity futures markets (contrary to the notions of both NYMEX and the CFTC). Supply is largely controlled to set the price, while demand from end users is supplemented by the demand from arbitrageurs, manipulators, hedgers, speculators, and index “investors.”

Furthermore, CFTC regulations have allowed pension and other passive investment funds to surge into the commodity markets. The end users of commodities cannot win by hedging because they continue to pay progressively higher prices. Moreover, the dominant players in the futures markets have no interest in taking possession of the underlying physical commodities.

Wray believes that bailouts will be needed, but with strings attached in the form of regulatory constraints. The proposed Commodity Speculation Reform Act (July 2008) to amend the Commodity Exchange Act of 1936 would accomplish several of the objectives outlined in this brief. However, the proposed act does not address the bigger problem: the propensity of managed money to destabilize one market after another....”

The question is whether these investors realize that their investment positions in commodities potentially or already dwarf the size of the underlying physically-settled markets and that their very presence is moving the markets up or down depending on whether they are moving in or out. In effect, they may not be gaining exposure to the commodity but are actually gaining exposure to the actions of investors like themselves, creating more demand or less demand “virtually”, and changing the resulting market prices depending on behaviors that express their market sentiments.

13. Mayer, Jörg (United Nations Conference of Trade and Development), *The Growing Interdependence Between Financial and Commodity Markets* (Discussion Paper No. 195, October 2009). http://www.unctad.org/en/docs/osgdp20093_en.pdf

This paper noted that financial investment has become increasingly important on commodity exchanges. It distinguishes two types of financial investors and emphasizes differences in their position taking motivation and price impacts. Index traders follow a passive strategy holding virtually only long positions. Money managers trade on both sides of the market and attempt to maximize short-term returns. Regression analysis indicates that: (i) index trader positions are particularly influenced by roll returns, while money managers emphasize spot returns; and that: (ii) money managers moved from emphasizing diversification to a more speculative strategy by taking commodity positions that are positively, rather than negatively, related to developments in equity markets. Granger-causality tests indicate that these differences translate into different price impacts: (i) index trader positions have a causal price impact particularly for agricultural commodities; and (ii) money managers had a causal impact during the sharp increases in the prices for some non-agricultural commodities.

This report includes the use of regression analyses and Granger causality tests. Approaches similar to these should be carried out as part of the tests for the rudimentary model that is proposed in this report. To the extent that available public data is not sufficient, government agencies such as CFTC, FERC and the EIA could be persuaded to undertake such analyses using more detailed non-public data to determine the degree of interdependence between financial and commodity markets. Regular updated analyses to capture trends and changes in market conditions will also help. Most studies tend to be one-time studies that capture only a “snap-shot” in time. For participants to respond to these market signals, the responsible agencies must regularly publish these transaction data and metrics, similar to the publication of GDP, unemployment, weekly petroleum inventory,

weekly natural gas inventory, expanded COT reports that include even more categories, etc.

14. UNCTAD Staff (United Nations Conference of Trade and Development), *The Financialization of Commodity Markets* (Chapter 2 of Trade and Development Report 2009).
http://www.unctad.org/en/docs/tdr2009ch2_en.pdf

The following excerpts from the report's conclusion illustrate understanding of the issues and the willingness to propose reforms that will attenuate the effects of this financialization.

“The financialization of commodity futures trading has made commodity markets even more prone to behavioral overshooting. There are an increasing number of market participants, sometimes with very large positions, that do not trade based on fundamental supply and demand relationships in commodity markets, but, who nonetheless, influence commodity price developments.....

These effects of the financialization of commodity futures trading have made the functioning of commodity exchanges increasingly contentious. They tend to reduce the participation of commercial users, including those from developing countries, because commodity price risk hedging becomes more complex and expensive. They also cause greater uncertainty about the reliability of signals emanating from the commodity exchanges with respect to making storage decisions and managing the price risk of market positions.....

...Data for the first few months of 2009 indicate that both index traders and money managers have started to rebuild their speculative positions in commodities. This makes a broadening and strengthening of the supervisory and regulatory powers of mandated commodity market regulators indispensable. The ability of any regulator to understand what is moving prices and to intervene effectively depends upon its ability to understand the market and to collect the required data. Such data are currently not available, particularly for off-exchange derivatives trading. Yet such trading and trading on regulated commodity exchanges have become increasingly interdependent.

...Hence, comprehensive trading data need to be reported to enable regulators to monitor information about sizeable transactions, including on similar contracts traded over the counter that could have an impact on regulated futures markets. In addition to more comprehensive data, broader regulatory mandates are required. Supervision and regulation of commodity futures markets need to be enhanced, particularly with a view to closing the swap dealer loophole, in order to enable regulators to counter unwarranted impacts from OTC trading on commodity exchanges. At present, banks that hold futures contracts on commodity exchanges to offset their short positions in OTC swap agreements vis-à-vis index traders fall under the hedge exemption and thus are not subject to speculative position limits. Therefore, regulators are currently unable to intervene effectively, even though swap dealer positions frequently exceed such limits and may represent “excessive speculation.

...Another key regulatory aspect concerns extending the product coverage of the CFTC's COT supplementary reports and requiring non-United States exchanges, particularly those

based in London that trade look-alike contracts, to collect similar data. The availability of such data would provide regulators with early warning signals and allow them to recognize emerging commodity price bubbles. The resulting enhancement of regulatory authority would enable the regulators to prevent bubble-creating trading behavior from having adverse effects on the functioning of commodity futures trading.”

While the language is different, it appears bubble-creating behavior described in this report is akin to the excessive speculation provision in CFTC’s statutes. As required by statute CFTC can regulate excessive speculation by setting limits. Whether or not limits are set, it is always useful to provide an appropriate level of transparency to accommodate equitable interactions among market participants fostering efficient markets and credible price formation.

15. UNCTAD Staff (United Nations Conference of Trade and Development), *Commodity Prices, Capital Flows and the Financing of Investments* (Trade and Development Report 2008). <http://www.unctad.org/templates/webflyer.asp?docid=10438&intItemID=1397&lang=1>

This report anticipated the financial crisis and assessed potential impacts on developing countries - “uncertainty and instability in international financial, currency and commodity markets, coupled with doubts about the direction of monetary policy in some major developed countries, are contributing to a gloomy outlook for the world economy and could present considerable risks for the developing world.” It serves as a precursor to the 2009 reports which examined the interactions of financial activities and commodity prices in greater detail.

16. UNCTAD Secretariat Task Force on Systemic Issues and Economic Cooperation, *The Global Economic Crisis: Systemic Failures and Multilateral Remedies* (2009). http://www.unctad.org/en/docs/gds20091_en.pdf

Major findings include:

“Market fundamentalist laissez-faire of the last 20 years has dramatically failed the test. Financial deregulation created the build-up of huge risky positions whose unwinding has pushed the global economy into a debt deflation that can only be countered by government debt inflation.

Blind faith in the efficiency of deregulated financial markets and the absence of a cooperative financial and monetary system created an illusion of risk-free profits and licensed profligacy through speculative finance in many areas.

The growing role and weight of large-scale financial investors on commodities futures markets have affected commodity prices and their volatility. Speculative bubbles have emerged for some commodities during the boom and have burst after the sub-prime shock.

The absence of a cooperative international system to manage exchange rate fluctuations has facilitated rampant currency speculation and increased the global imbalances. As in Asia 10 years ago, currency speculation and currency crisis has brought a number of countries to the verge of default and dramatically fuelled the crisis.”

This illustrates that the language used to describe events can create particular perceptions. For example, one can assert that since “deregulation”, bad things have happened including the recent financial crisis. Therefore we must reverse the “deregulation” and everything will be fine. On the other hand, there is strong historical evidence showing bad results have come from centralized regulation. In the US, consumers suffered from utilities’ gold-plating of investments to build rate base in the 1970’s. Soviet Union collapsed under the weight of centralized control, which tends to corrupt the powerful.

Was it really financial deregulation or was it really more of a radical change to financial regulation that enabled behaviors which sowed the seeds later crises? These regulatory changes enabled some financial institutions to build massive leverage (30-40 to 1 - > 95% levered compared to a producer’s 30-70%), take big risks in massive proprietary trading books, privatized the gains (profits from energy trading in the \$ Billions) while socializing the losses (through bailout of AIG, etc. with massive counterparty exposures to these entities). In effect, the so-called deregulation was a really an massive institutional change that conveyed disproportionate privilege to a special group at the expense of other market participants (e.g. oil & gas producers are not bailed out when they fail, and find it impossible to leverage at more than 70% without risking insolvency and failure), as well as taxpayers of this and future generations. It was not deregulation at all. Calling the debate deregulation versus reregulation only serve to divert attention from learning the lessons from the previous market distortion to enact reforms that are needed to improve market functioning. Whatever legislative and regulatory reforms that are proposed need to incorporate provisions to correct the inequities created in the last few decades. These inequities have transferred massive wealth form the majority to a select few, and have in part fueled the populist discontent reflected in the recent results of the Massachusetts Senate Elections and potentially other social upheavals (from both the right and the left). Quantifying some of these effects may help producers get support to create a more level playing field in these trading markets.

17. James Hamilton, Brookings Institution, *Causes and Consequences of the Oil Shock of 2007-08* (Spring 2009 Conference Draft).
http://www.brookings.edu/economics/bpea/~media/Files/Programs/ES/BPEA/2009_spring_bpea_papers/2009_spring_bpea_hamilton.pdf

Quoting, “This paper explores similarities and differences between the run-up of oil prices in 2007-08 and earlier oil price shocks, looking at what caused the price increase and what effects it had on the economy. Whereas historical oil price shocks were primarily caused by physical disruptions of supply, the price run-up of 2007-08 was caused by strong demand confronting stagnating world production. Although the causes were different, the consequences for the economy appear to have been very similar to those observed in earlier episodes, with significant effects on overall consumption spending and purchases of domestic automobiles in particular. In the absence of those declines, it is unlikely that we would have characterized the period 2007:Q4 to 2008:Q3 as one of economic recession for the U.S. The experience of 2007-08 should thus be added to the list of recessions to which oil prices appear to have made a material contribution.....

With hindsight, it is hard to deny that the price rose too high in July 2008, and that this miscalculation was influenced in part by the flow of investment dollars into commodity futures contracts. It is worth emphasizing, however, that the two key ingredients needed to

make such a story coherent— a low price elasticity of demand and the failure of physical production to increase— are the same key elements of a fundamentals-based explanation of the same phenomenon. I therefore conclude that these two factors, rather than speculation per se, should be construed as the primary cause of the oil shock of 2007-08. Certain casual conclusion one might have drawn from glancing at Figure 1 and hearing some other accounts of speculation — that it was all just a mistake, and the price should have stayed at \$50/barrel throughout the period 2005-08— would be profoundly in error.”

This paper illustrates that it is possible to explain that all market outcomes are due to physical demand and supply fundamentals by changing the assumptions of elasticity for different points on the supply curve and demand curve, and adjusting those curves over time. It is timely here to paraphrase one of Charlie Munger’s favorite sayings in ‘Poor Charlie’s Almanack’ – if a man is handy with the hammer, he will use it to solve every problem that comes up – i.e. use classical demand-supply curves no matter how complex the situation; just adjust the curves and the answers will fit.

18. Ken Costello, National Regulatory Research Institute (NRRI), *Speculation in the Natural Gas Market: What It is and What It Isn’t; When It’s Good and When It’s Bad* (08-11, November 2008). http://nrri.org/pubs/gas/speculation_gas_nov08-11.pdf

Quoting, “This paper aimed to educate state commissions on the basics of speculation and why speculation has emerged as an issue in commodity markets. It attempted to delineate the difference between socially desirable (“good”) and undesirable (“bad”) speculation. The intent is to help the reader better understand the reasons for the flows and ebbs of natural gas prices, of which speculative activity is one possible factor.”

This paper illustrates the difficulty of exercising moral judgment – deciding between what is good and what is bad. Whose authority is the right one to decide what is good or bad? Who granted the right to this authority? Is it possible to arrive at some consensus collective judgment? What is a fair process to use to arrive at this consensus?

19. Paul M. Corby, Planalytics, Inc., *Are Speculators Causing Price Increase in Natural Gas?* (presented at the NARUC Annual Convention, November 17, 2008). http://nrri.org/pubs/gas/speculation_gas_nov08-11.pdf

Corby provided anecdotal analyses to demonstrate that “excessive” speculation did occur and have costly consequences for consumers and producers. Corby proposed Congressional “fixes” that provide clear requirements for different classes of market participants and a list of recommended “fixes” for state regulators.

The challenge is whether anecdotal analyses can be sufficiently robust to be credible and supportive of any proposed legislative and regulatory reforms. In the interim, perhaps the solution is to maximize transparency - to err on the side of public good at the expense of potential commercial harm to individual market participants. With sufficient information, we can usually count on the natural intelligence and goodwill of most market participants to actively engage and interact. The natural outcome tends to be collective good – market efficient prices, etc.

20. Michael Shermer, *The Mind of the Market* (2008). <http://www.michaelshermer.com/the-mind-of-the-market/>

Paraphrasing Shermer, as humans evolved from small hunter-gatherer communities to consumer-trader communities with billions of possible interactions, markets naturally arose and evolved as institutions to mediate such interactions. Shermer addressed the primary market characteristics as follows:

- 1) How the market has a mind of its own
- 2) How minds operate in markets
- 3) How minds and markets are moral

These three qualities can guide thinking on how humans can best help markets evolve to serve collective interests and improve chances for humans to survive and thrive long-term. It helps to think about markets from an evolutionary economics perspective where we can think of evolution as complex adaptive systems moving from the simple to complex through “autocatalytic self-driving feedback loops”.

Chapter 8, “The Science of Good Rules” potentially provides a conceptual framework to help us sort through the debate on how to deal with the increase of financial activities in physical commodity markets generally, and natural gas markets in particular. This framework would also build on the work of other “giants” like Adam Smith (on markets and moral sentiments) and Charles Darwin (on evolution of not only predatory but also altruistic traits) to more recent “giants” like Elinor Ostroms on institutional economics. This framework can potentially bridge the divide among the different stakeholders towards the most adaptive outcome for our market institutions, enabling human society to continue flourishing.

21. Daniel P. Ahn, *Speculation and Commodity Prices* (January 2009). http://www.sais-jhu.edu/bin/k/g/Daniel_Ahn_Speculation_Commodity_Prices.pdf

Ahn provided good perspectives and a good start on some rigorous analysis regarding the impact of index investors in commodities. Ahn presented this on behalf of Lehman Brothers shortly before Lehman collapsed. Further “googling” found him working as Director of Macroeconomic Research at Louis Capital Markets through Linked-In. Ahn acknowledges the complexity of this issue by listing the following points on slide 3 of his presentation, as follows:

- Political constituents in the US, frustrated by record high food and energy prices, have blamed speculators and pressured Congress to crack down on financial activity.
- But speculators play an essential role in providing liquidity and information in markets so commercial participants can conduct effective risk management, bringing business costs and ultimately prices down.
- Many market observers and academics have also argued against the ability of purely financial actors to affect a futures price linked to physical markets.
 - One commonly cited “folk wisdom” is that every buyer needs a seller.
- But a more nuanced analysis is necessary before passing judgment

Ahn focused on the crude oil markets as a proxy for commodities in his presentation, citing data that indicates NYMEX crude futures trading volume is over 5 times total global physical consumption, and when OTC trading is added, daily trading may be greater than

20 times global production. Ahn argued that crude oil exhibits kinked supply and demand curves since large fixed costs are required for a substantial physical response from consumers and producers drive extreme short-run inelasticity to price. He provided good arguments that commodity markets are prone to market herding and clustering due to informational imperfections and illiquidity. The more recent inflows of index investing, by being large and idiosyncratic, can impact both returns and volatility in the short-term. Ahn went on to examine index investing in some detail – size, etc. What drove the large increases? What impact do these flows have on returns and volatility, using econometric approaches such as “absolute flow measures”, “relative flow measures” and “panel approach”? These studies detected signs of tactical momentum-chasing, a key building block of an unsustainable asset bubble.

Ahn also provided the following useful observations regarding the debate on this issue:

- Our analysis suggests reality is considerably more complex and does not align with either extreme of the debate. We feel while prices may ultimately reflect long-term fundamentals, imperfections due to illiquidity and asymmetric information allows financial activity to drive short-term deviations.
- The empirical evidence returns a mixed bag:
 - Estimates of price impact depend on whether one uses relative or absolute measures of inflow
 - Positive effect is concentrated in smaller agricultural and precious metals markets, not the energy markets which have received so much attention
 - For volatility, picture more consistent but magnitudes small
- Debate clouded by short history and doubts about accuracy of available data. Weekly freq. may be too low to capture significant intra-day effects.
- Commodities markets are not theoretical ideals but imperfect human constructs.
- The complexity of issue warrants intelligent and judicious regulatory consideration.

Ahn feels that as these markets mature, distortions will diminish. In the interim, he suggested a couple of transparency improvements:

- Extending supplementary index reports to all commodities, not just agriculturals, is an excellent first step (a step already taken by CFTC in September 2009 – with time we will see if further disaggregation is needed)).
- On fundamental side, more transparency is required in critical but opaque regions, such as Saudi Arabia and China.

22. Edward N. Kraepels, ESAI, ***Financial Energy Markets and the Bubble in Energy Prices: Does the Increase in Energy Trading by Index and Hedge Funds Affect Energy Prices?***

Testimony before a Joint Hearing of the U.S. Senate Permanent Subcommittee on Investigations on Homeland Security and Government Affairs and the Subcommittee on Energy of the Committee on Energy and Natural Resources, December 11, 2007.

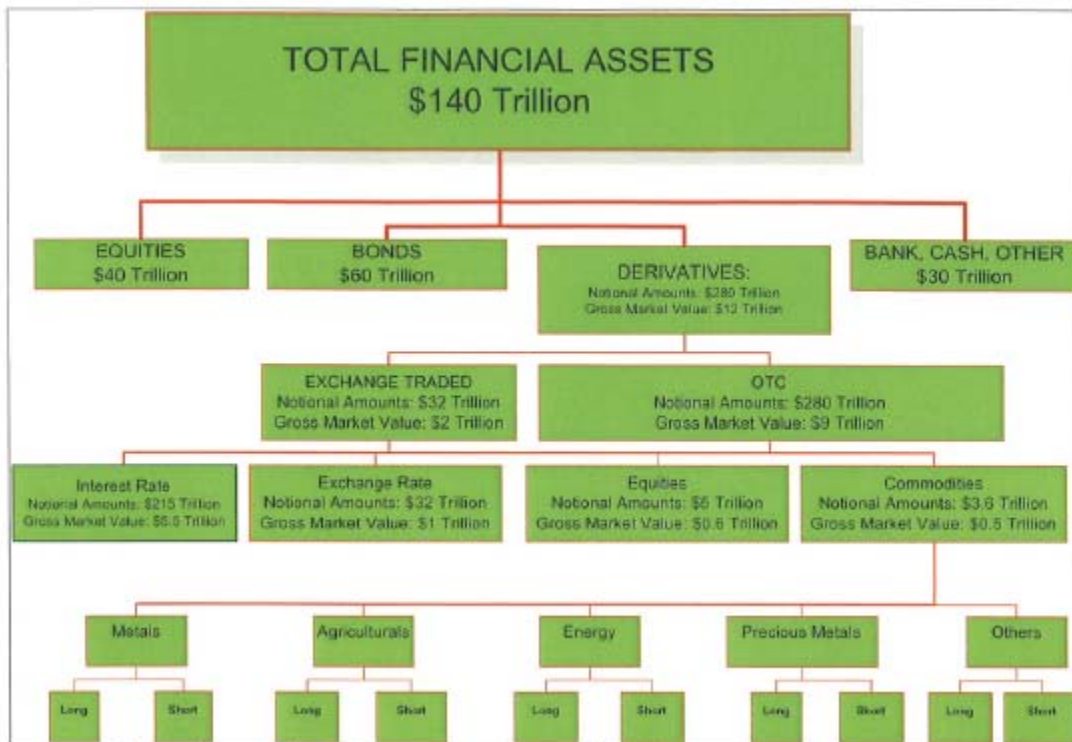
<http://energycommerce.house.gov/images/stories/Documents/Hearings/PDF/Testimony/OI/110-oi-hrg.062308.Kraepels-testimony.pdf>

Kraepels provided good historical perspectives (even working in the “Tulip Bubble”) and a balanced narrative on how the financial energy markets evolved, summarizing the different sides of the debate, assertions by prominent experts (from Greenspan and Mabro) and

analytical studies that have taken place. Kraepels acknowledged the complexities and the inconclusiveness of studies to date. In conclusion, he urges:

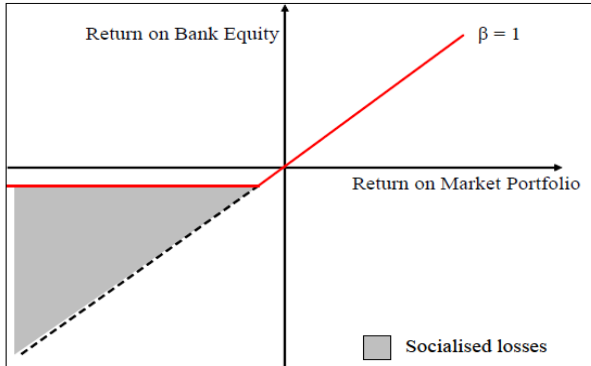
“Thriving markets have an insatiable appetite for information. It is up to governments – the same ones that have surrendered some of their controls to the market – to ensure that adequate flows of information exist to feed the markets to which they have entrusted their fates. Governments must insist that those who sell critical commodities and associated financial services – whether it be Saudi Arabia (*I would add Russia for production and China for consumption and inventory information*) or ICE or NYMEX (*I would add Goldman Sachs, Morgan Stanley, JP Morgan, Deutsche Bank, etc. – the top ten global banks/dealers*) – disclose enough information to ensure that known abuses (like insider trading), and preventable problems (like development of market power by an aberrant single hedge fund or herd of funds) do not fatally undermine the efficacy of markets. At the end of the day, markets exist because governments allow them to. Support for oil, gas, and electricity markets is ebbing, inside and outside the United States, and advocates for markets as the best way to organize energy activities must do all they can to shore up this support.”

Kraepels provided a diagram showing the size of financial markets – “the intricate web”. See below. It would be interesting to determine how the picture has changed since the financial crisis. The Bank of International Settlements (BIS) provides periodic reports for some of these measures.



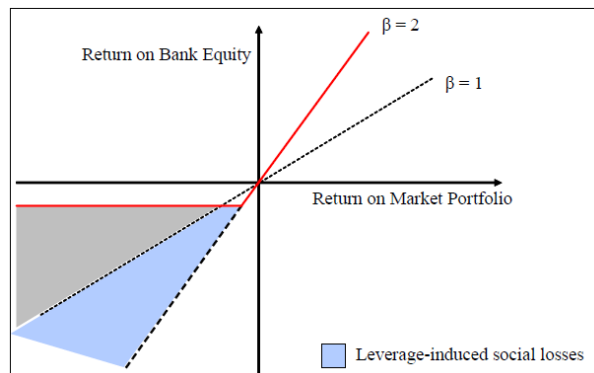
23. Piergiorgio Alessandri & Andrew G. Haldane, Bank of England, *Banking on the State* (November 2009), <http://www.bankofengland.co.uk/publications/speeches/2009/speech409.pdf>

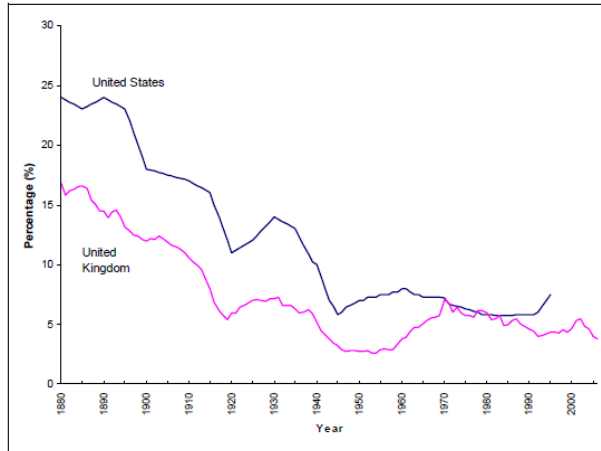
This report examines the evolution of banking safety net and how this has stoked risk-taking incentives, as owners of banks adapt their strategies to maximize expected profits, in the run-up to the recent crisis. This safety net in effect limits the downside risk for banks and socializes the losses beyond that, as indicated by the graph below (Figure 1 in the report).



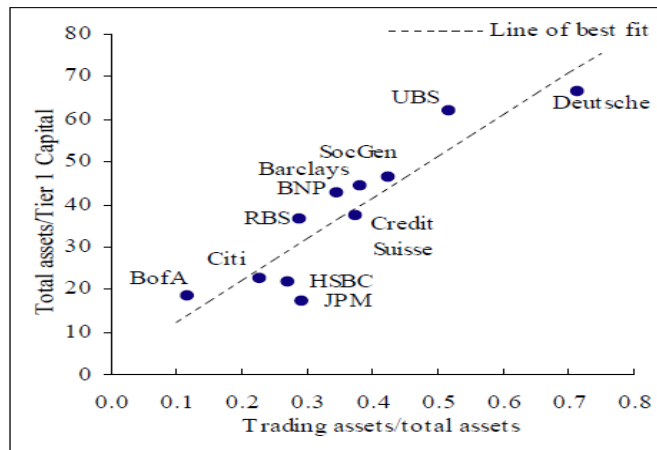
This report noted that five strategies to amplify risk were clearly in evidence, as follows:

- Higher leverage – the simplest way to exploit the asymmetry of payoffs arising from limited liability is to increase leverage – by halving the capital ratio from 10% to 5% the beta of the bank’s equity would double. Graphs below show how the social loss is increased due to increased bank leverage and the trend towards increased bank leverage leading up to the crisis.



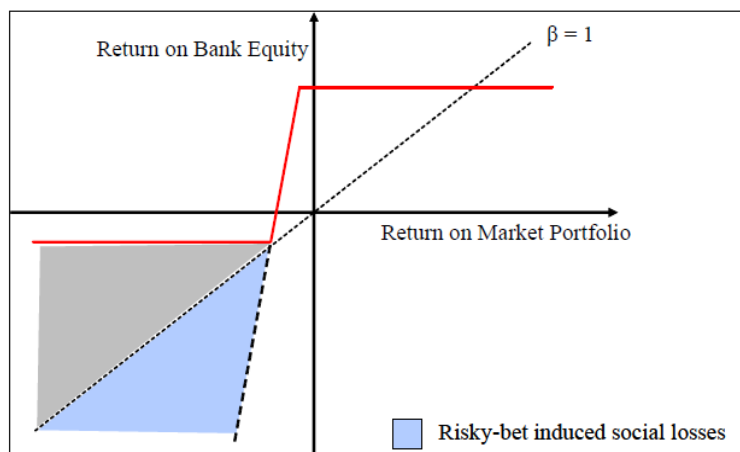


- Higher trading assets – banks can replicate the effects of higher leverage by increasing the proportion of assets held in the banks’ trading books. Gains in asset prices boosted mark-to-market profits, returns on equity and bonuses. When asset prices fell, these same global banks suffered trading book losses totaling over \$900 Billion. The bailouts enabled almost immediate reversal and return to record profits in 2009 and bonuses matching or exceeding those in 2007. Below is a graph showing the high proportion of risky trading books among these “too-big-to-fail” banks. Note absence of Goldman Sachs and Morgan Stanley (bailed out non-banks).



Sources: Published accounts and Bank calculations

- Business line diversifications – increased the risk of adversity being socialized and prosperity privatized. These banks have aggressively expand into areas where others without safety nets fear to tread.
- High default assets – exploit asymmetry of equity payoffs by originating assets which themselves have asymmetric returns. Because losses are bunched at the tails, the result is more of the gain is privatized and more of the loss socialized. This helps explain their venture into sub-prime, leveraged lending (e.g. for hedge funds to trade more massively), and various kinds of “securitized exotica”. The graph below illustrates the risky bet induced social losses.



- Out-of-the-money options – the payoffs to high-risk lending can be replicated using the alternative strategy of writing deep out-of-the-money options, for example by selling protection in the CDS market. Quoting from the report, “This was, in effect, the AIG strategy. This strategy delivered apparent large “alpha” returns during the disco years. But when the music ceased and true beta was revealed, AIG required state support of around \$180 Billion.” The AIG bailout in effect propped up Goldman Sachs, JP Morgan, Deutsche Bank, etc. since they were AIG counterparties, enabling their return to high-risk trading and record profits for 2009.

The paper concludes, “It is an open question whether reform efforts to date....can bring about that change in direction.””moral hazard continues”.....**at a grander scale.**

24. Michelle Michot Foss, Lee-Ken Choo, Gürcan Gülen, Bhamy Shemoy, Center for Energy Economics, Bureau of Economic Geology, University of Texas at Austin (CEE-UT), *The Future Landscape of Energy Trading* (Research Note dated June 17, 2009) http://www.beg.utexas.edu/energyecon/thinkcorner/Energy_Trading_Foss.pdf

This research note suggested that answers to the questions: “who trades energy commodity derivatives and why do they trade?” could help us learn the extent to which financial markets interact with the underlying physical markets.

This research note suggested that “...interactions do exist between physical fundamentals and financial markets. *Arguments that energy commodity trading reflects purely or only physical fundamentals do not, we believe, properly reflect true strategic behavior among market participants.* The search for returns in financial markets can exert profound impacts on energy commodity prices and price signals.”

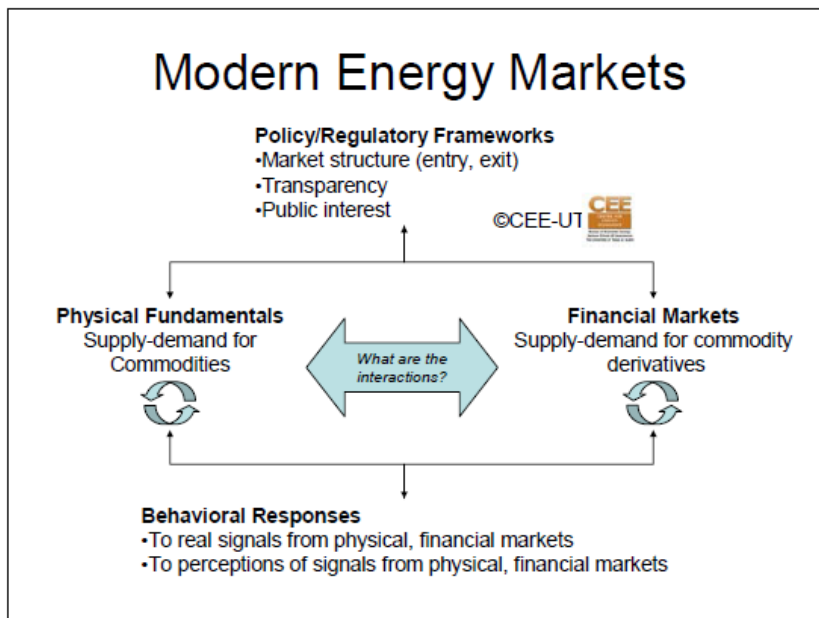
To provoke reactions and encourage thinking among market participants, the note used the analogy of side bettors in sporting events by asking a series of questions:

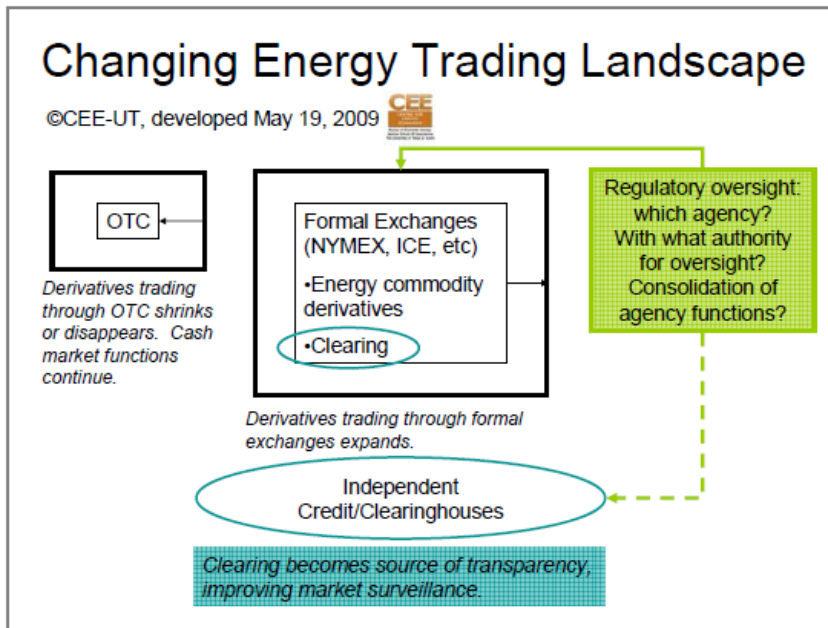
“To use an analogy that is somewhat far afield, we as a society prohibit side bettors in a sporting event from influencing the outcome of a game by bribing coaches and key players to fix it. Why are commodity markets so special that we allow side bettors (those transacting financially settled contracts) to freely influence the underlying commodity markets? Who pays to deal with social unrest that may result from extremely high prices? Who pays for reduced investments because producers have been burned too many times by

whip-sawing prices? And if side betting is to be discouraged, what is the best and most neutral way to achieve this goal?”

The note went on to indicate a suggestion from an outside source on how one might separate the financially settled transactions from the physically settled market to avoid the “side betting” problem.

To help characterize the changing landscape of financial and physical markets, this research note provided a couple of conceptual models to illustrate the modern energy markets and the changing energy trading landscape. These conceptual models are illustrated by a couple of relationship diagrams. The first sought to represent the market landscape as it appears to be at this “juncture”. The second poses the question of how it would evolve depending on the direction of financial reforms. They can serve as good starting points to begin disaggregating the different factors that can affect the market behavior for the various sectors of market participants. Elaboration of this framework can potentially assess out the extent to which financial markets affect physical markets and vice-versa, as well as identifying other factors that materially affect market outcomes.





The note concluded by indicating the need for further research. Paraphrasing, the research suggestions are:

- (1) Conduct a thorough empirical examination of all available physical and financial numbers, disaggregated by as many categories of market participants as possible (need access to non-public data in government agencies or analysis of these data by the government agencies – e.g. the September 2009 EIA initiative may be able to provide).
- (2) Conduct comprehensive research on the historical evolution of these markets.
- (3) Assess policy alternatives being debated and the potential consequences.
- (4) Move beyond simple demand-supply modeling to incorporate financial transaction behavior and other variables.
- (5) Other implications – carbon trading, asymmetry posed by market participants who get too-big-to-fail protection from governments, etc.