BETTER MARKETS
TRANSPARENCY · ACCOUNTABILITY · OVERSIGHT

October 14, 2011

BY HAND DELIVERY

Chairman Gary Gensler
Commodity Futures Trading Commission
Three Lafayette Center
1155 21st Street, NW
Washington, DC 20581

Re: New Research on Commodity Index Funds & the Impact on Commodity Markets

Dear Honorable Chairman Gensler:

Enclosed is a research Report released by Better Markets today.

This research analyzes commodity market activity for more than 25 years and also specifically analyzes the impact of commodity index fund trading since 2004. It is, we believe, the first study to directly isolate the impact of monthly index fund roll trading and to compare it to the same monthly time periods before index funds, going back more than 25 years. The data shows that the trading those funds do every month has severely disrupted and dramatically changed the markets, causing food and fuel prices to surge, hedging costs for businesses to rise, and volatility to increase, which of course also raises everyone's costs.

As detailed in the Report, the analysis found large and statistically significant contango bias created by the roll trading which did not exist prior to the rapid expansion of commodity index funds in 2004. The research also revealed contango bias in the days before the roll, as other traders try to exploit the predictable regular monthly roll trading, which happens regardless of prices or any other market fundamentals. (Together, all this direct and indirect trading by or associated with index funds has been aptly referred to as a trading "ecosystem".) In the years prior to index funds, the historical price curve norm for longer-dated contracts was backwardation.

The research also specifically analyzed the same trading dates on which the roll now occurs, going back more than 25 years. The data shows that there was no contango bias present prior to the introduction of index funds and their monthly roll trading during or in connection with those dates. (While it is also likely that index fund swap dealers roll some futures contracts outside of the monthly roll window, that would involve taking on proprietary price risk, which would be extremely substantial if done in anything other than small quantities. This suggests that the large majority of index fund rolling takes place during the monthly roll window, a point that is borne out by the fact that consistent

contango bias was found in and around the roll window but at no other time of the trading month.)

The study looked primarily at NYMEX WTI Crude Oil and CBOT Wheat. The analysis was also extended to NYMEX Heating Oil, CBOT Corn, NYMEX Natural Gas, and CME Live Cattle.

When this new research and data is considered with the prior data in the Better Markets' comment letter filed on March 28, 2011 in response to the proposed rule on position limits, it is clear that commodity index funds have dramatically changed and are damaging the markets. Not only have they increased speculation to excessive levels, but they have also disrupted price discovery, among other things, as detailed in the letter and Report. Importantly, there are no offsetting benefits to the markets from index funds or their trading. For example, it is no longer disputable that index funds are liquidity takers, not liquidity providers. Thus, to restore the commodities futures and physical markets to their intended and proper roles, commodity index funds should be banned.

In addition to the report being released today, enclosed also for your convenience is a copy of our previously filed comment letter on position limits.

Thank you for your time and attention to this matter. Of course, if you have any questions or require any further information, please don't hesitate to contact me.

Sincerely,

Dennis M. Kelleher
President & CEO

Better Markets, Inc.
1825 K Street, NW
Suite 1080
Washington, DC 20006
(202) 618-6464

dkelleher@bettermarkets.com

www.bettermarkets.com

Commodity Index Traders and the Boom/Bust Cycle in Commodities Prices

David Frenk and Wallace Turbeville*

ABSTRACT

Since 2005, the public has lived with high and volatile prices for basic energy and agricultural commodities. The public focus on this unprecedented commodity price volatility has been intense, because a large proportion of the cost of living borne by individuals and families in the U.S. (and around the globe) is represented by commodities-based costs, notably food, fuel, and clothing. Interestingly, as commodity prices have shown more price volatility, there has been an accompanying significant increase in the volume of commodities futures and swaps transactions, as well as commodities markets open interest. Moreover, Commodity Index Traders ("CITs"), a relatively new type of participant, now collectively make up the single largest group of non-commercial participants in commodities futures markets. These CITs, which represent giant institutional pools of capital, have at times been the single largest class of participant, outweighing *bona fide* hedgers (producers and consumers of commodities) and traditional "speculators," who take short-term bi-directional bets and provide liquidity. Given both the size and the specific and largely homogeneous investment strategy of the CITs, many market observers have concluded that this group is most likely responsible for greatly disrupting price formation in commodities futures markets. Further, it has been posited that this distortion has directly led to recent unprecedented price volatility and higher absolute price levels for numerous food and energy commodities in markets around the world.

Using a new set of analytic approaches, the authors seek to test whether the behavior of CITs has impacted commodities prices in a manner independent of fundamental supply and

* David Frenk is Director of Research and Wallace Turbeville is Derivatives Specialist at Better Markets, Inc., a nonprofit, nonpartisan organization that promotes the public interest in the capital and commodity markets.

demand forces. Specifically, we examine the behavior of futures price spreads before, during, and after the monthly CIT "Roll" period, a set period from the 5th to 9th business day of each month, during which funds tracking the most popular commodity index, the Standard & Poor's Goldman Sachs Commodity Index (GSCI) must roll forward their expiring futures contracts. We find strong evidence that the CIT Roll Cycle systematically distorts forward commodities futures price curves towards a contango state, which is likely to contribute to speculative "boom/bust" cycles by changing the incentives of producers and consumers of storable commodities, and also by sending misleading and non-fundamental, price signals to the market.

INTRODUCTION

Since 2005, the public has experienced prices for basic energy and agricultural commodities that have gone through numerous periods of significant volatility and also higher absolute levels. The public focus on this unprecedented commodity price volatility has been intense, because a large proportion of the cost of living borne by individuals and families in the U.S. (and around the globe) is represented by commodities-based costs, notably food, fuel, and clothing.[2] Moreover, this situation has been magnified as incomes have suffered from declining employment and other economic damage caused by the recent financial crisis and associated recession.

Interestingly, during the time that commodity prices have become more volatile, the volume of commodities futures and swaps transactions, as well as open interest, has increased sharply.[3,4] In fact, "the ratio of the notional amount of commodity derivatives contracts in June 1998 to world GDP rose from 1.5 percent in 1998 to 21.6 percent in 2008."[5] Unsurprisingly, much discussion in political, financial, and academic circles has revolved around the question whether the increased trading activity/open interest and the more erratic behavior of commodities prices are causally related, as well as how such a causal relationship might function.[6]

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2 According to the U.S. Bureau of Labor Statistics, Comparison of Consumer Price Index for All Urban Consumers: U.S. City Average, All Items and All Items Less Food and Energy, 2001-2011, *available at* http://data.bls.gov/pdq/SurveyOutputServlet?request_action=wh&graph_name=CU_cpibrief.

3 The Commodity Futures Trading Commission ("CFTC") defines open interest as "The total number of futures contracts long or short in a delivery month or market that has been entered into and not yet liquidated by an offsetting transaction or fulfilled by delivery." CFTC, *CFTC Glossary: A Guide to the Language of the Futures Industry,* p40, *available at* http://www.google.com/url?sa=t&source=web&cd=2&ved=0CCMQFjAB&url=http%3A%2F%2Fwww.cftc.gov%2Fucm%2Fgroups%2Fpublic%2F%40educationcenter%2Fdocuments%2Ffile%2Fcftcglossary.pdf&rct=j&q=open%20interest%20definition%20cftc&ei=IkuTTpXTMcStsALA7e2uAQ&usg=AFQjCNHWJJsj_DJp6d9RTakzYuvGxSyZGQ&cad=rja

4 *See* Crude Oil West Texas Intermediate (WTI) – Cushing, OK., St. Louis Federal Reserve, FRED Database, available at http://research.stlouisfed.org/fred2/series/DCOILWTICO?cid=32355.

5 Basu and Gavin, "What Explains the Growth in Commodity Derivatives," Federal Reserve Bank of St. Louis Review, January/February 2011, *available at* http://research.stlouisfed.org/publications/review/11/01/37-48Basu.pdf.

6 *See* Appendix A: Review of Academic Literature, *in* Better Markets, Inc., Comment Letter to the Commodity Futures Trading Commission, "Position Limits for Derivatives," March 28, 2011, ("Position Limits Comment Letter") *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=34010&SearchText=better%20markets

Because the discussion of these issues is so intense, it is often distorted by hyperbolae and illogic. It is critically important that the question is posed accurately. It would be unreasonable to suggest that commodities prices are a purely financial construct. On the other hand, it appears absurd to claim that commodity futures markets, with their enormous relative size and trading volume, have no impact at all on prices for physical commodities, especially given their leading role as both a hedging vehicle and a direct price benchmark for physical transactions.[7] The real question is the relative strengths and interactions of these two sets of forces. Because of the relatively inelastic nature of commodities, global supply and demand conditions evolve over a long cycle.[8] However, financial market trends and behaviors typically involve a much shorter cycle.[9] The two phenomena are related, but often can display significant independence.

One of the most-discussed elements of the recent inflow of financial capital into commodities markets is the group known collectively as Commodity Index Traders ("CITs"). Today, the *CITs collectively make up the single largest group of non-commercial participants in commodity markets*, and their size as well as their specific investment strategy has led many market observers to conclude that they are the most likely group to disrupt price formation in commodities markets.[10]

We now briefly recap the analytical approach taken by Better Markets, and summarize the basic conclusions drawn in the present study.[11]

ANALYTICAL APPROACHES

Price Spreads

Using a new set of analytical approaches, the authors seek to test whether the behavior of one specific set of commodity futures market participants –CITs– has directly impacted commodities futures prices in a manner independent of fundamental supply and demand forces. Specifically, we examine the behavior of futures price spreads before, during, and

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7 *See* Platts Methodology and Specification Guide available at http://www.platts.com/IM.Platts.Content/methodologyreferences/methodologyspecs/usoilproductspecs.pdf,

8 *See* Petrostrategies, Inc., "World Oil Supply and Demand," available at http://www.petrostrategies.org/Graphs/World_Oil_Supply_and_Demand.htm.

9 *See* Bloomberg, GSCI Index Spot CME, available at http://www.bloomberg.com/apps/quote?ticker=SPGSCI:IND.

10 United States Senate, Permanent Subcommittee on Investigations (2009): Excessive Speculation in the Wheat Market: "This Report concludes there is significant and persuasive evidence that one of the major reasons for the recent market problems is the unusually high level of speculation in the Chicago wheat futures market due to purchases of futures contracts by index traders offsetting sales of commodity index instruments."

11 Better Markets recently submitted a comment letter to the CFTC on the subject of financial participation in commodities markets, and the appropriate use of "speculative position limits," a key tool by which regulators may restrict the percentage of open interest held by any group or class of trader, such as the group of CITs as a whole. Better Markets, Inc., Comment Letter to the Commodity Futures Trading Commission, "Position Limits for Derivatives," March 28, 2011, ("Position Limits Comment Letter") *available at* http://comments.cftc.gov/PublicComments/ViewComment.aspx?id=34010&SearchText=better%20markets An analytic framework for understanding the role and impact of CITs in commodities markets is laid out in that letter. The analysis in this paper is related to, but significantly different from that set out in the letter.

after the monthly CIT "Roll" period, a set period from the 5th to 9th business day of each month, during which funds tracking the most popular commodity index, the Standard & Poor's Goldman Sachs Commodity Index (GSCI) must roll forward their expiring futures contracts.[12] As is discussed in Mou (2011), some CIT rolling also occurs outside of this period, but the vast majority of CIT rolling activity typically occurs during this window every month. [13] We focus initially on Crude Oil and Wheat, the two largest and most prominent U.S. commodity futures markets.[14] We examine the change in price spreads for these commodities before, during, and after the Roll (or, prior to 2004, the dates corresponding to what is now the Roll), every month from January 1983 to June 2011.

For both of the primary commodities studied, in this case the agriculture and energy benchmark CBOT Wheat and NYMEX WTI Crude Oil contracts, we find strong evidence that commodities futures price spreads display a consistent bias towards an increasing contango curve during the Roll Period, and also that this bias is not present during the rest of the trading month. [15] Moreover, we find no evidence that this persistent contango bias existed prior to the large growth in commodity index trading from 2004 onwards, strongly suggesting that it is caused by CIT trading, and is not caused by another structural or fundamental phenomenon.[16]

To supplement the primary study, we also examine two other important commodities future's benchmark contracts, those of Heating Oil and Corn. The results show the same overall pattern (a bias towards increasing contango during the general Roll Period, which is not present during the rest of the trading month, and which did not exist prior to the rise of CIT trading). However, the pattern of results is not identical. Therefore, we include two more benchmark futures contracts, Feeder Cattle and Natural Gas, to obtain an even broader perspective and also to give additional insight into potential reasons for non-identical results.

One major advantage of this approach, which tests publicly available price spreads during the known Roll Period, is that the validity of the underlying data is generally accepted. The analytical model for several prior studies of CIT activity has involved testing for correlations between CIT flows and prices, which is subject to well-publicized deficiencies in public data relating to CIT flows.[17] In contrast to the relatively uncertain direct investment flows data,

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12 Futures contracts expire at regular periods. Traditional hedgers simply close out their contracts for cash at expiration, or make or take delivery. However, speculative commodity index funds are designed to keep bets on the table for long periods of time. That is what gives rise to the necessity of "rolling" those expiring contracts into new futures contracts every month.

13 Since the GSCI TR index is calculated *as though* all rolling occurred during this window, any commodity index sponsor (CIT) tracking the index must either conduct all rolling activity at this time, or else take on proprietary risk.

14 CME Group, "WTI – The Global Benchmark," *available at* http://www.cmegroup.com/trading/energy/files/WTI-Global-Benchmark.pdf

15 A "contango" curve is one in which prices are higher the further out you go into the future. Its inverse is "backwardation". In the present study, we look at the slope between the contract that the index fund closes out and the longer-dated contract which replaces the expiring one. Hence, "contango" refers to the bought contract displaying a higher price than the sold contract, and "backwardation" to the inverse.

16 "Fundamentals" are facts relating to actual supply and demand from producers and consumers of a commodity. In a well-functioning market, futures prices reflect expectations of future prices, based on available information about fundamentals.

17 Much of the analysis to date has sought to identify the effect of index fund inflows and outflows on price. Inflows and out flows are measured by aggregate index-related positions over time. The data available from the CFTC used to measure these positions are problematic. Available data sets (such as the CFTC's Commitment of Traders CIT supplement) which are granular and represent a long history of activity must be

the Roll Period is well known and structurally determined. Historical daily settlement prices on futures contracts are also widely available.

In fact, the widening and narrowing of futures price spreads is a particularly useful way to measure the impact of index funds because these spreads reflect the essential characteristic peculiar to index fund-related trading activity: the continuous increasing of duration to hedge exposure under a total return swap to replicate a "perpetual index".[18] Moreover, it provides a key insight into the direct relationship between futures prices and physical prices. Temporal spreads form a price curve which is the primary signal to the market of the direction in which commodities prices are moving. Thus, the price needed to induce supply into the market sooner rather than later is directly related to the *perceived* direction in prices over time.

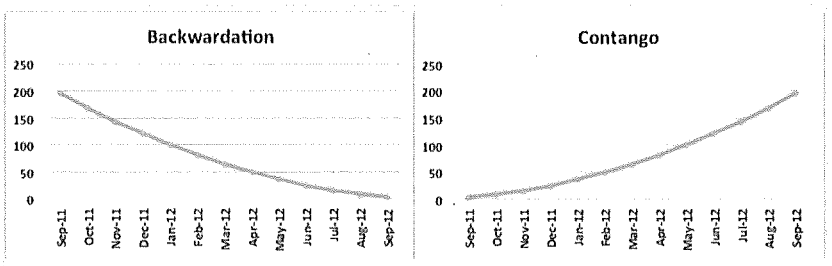
Historically, price curves in the commodities futures markets have been predominantly "backwardated;" *i.e.,* longer-dated contracts are most often priced *lower* than shorter-dated contracts.[19] This is a logical price curve structure because of physical storage costs, interest costs, and other factors arising from deferred sale of physical commodities. During the observation period, however, the predominance of backwardated price curves gave way to a far greater incidence of price curves which are in "contango;" *i.e.,* curves in which longer-dated contract prices are relatively *higher.*

interpolated as they relate to energy derivatives in order to be useful because the categorization is incomplete. The newer swap dealer "survey" data ("Index Investment Data") have only been available for 3 years, and for 2 of those years data were only gathered quarterly, though monthly reports have been required for the last year. There are also some significant compliance issues that must be considered in using this new survey data. The analysis in this paper is based on data that is not subject to either of those vexing issues.

[18] Buying and holding actual physical commodities would be prohibitively complex and expensive for many institutional investors. Hence, to facilitate and promote commodities transactions, banks and other swap dealers use a derivative of a derivative (a total return swap on the settlement prices of commodity futures contracts), to synthesize the returns of the physical product, so that holding the physical inventory isn't necessary for the institutional investor. This idea is reminiscent of a similar concept that facilitated institutional investment in derivatives of mortgage derivatives (it allowed institutions to gain exposure to mortgages, without having to actually directly lend people money with which to buy houses), a practice that ended up in the center of the recent financial crisis.

[19] Hotelling, Harold (1929), "Stability in Competition", *Economic Journal* 39 (153).

Chart 1 – Backwardation vs. Contango



Historically known as "normal" backwardation, the default shape of the forward curve for most commodities is downward sloping due to "convenience yield" that is priced in.

Market participants discount this convenience yield, and therefore do not interpret a backwardated curve as a signal that prices will go lower (prices "roll up" as longer-dated contracts become current).

Traditionally seen during periods of temporary short-term supply gluts, contango refers to an upward sloping forward price curve for a commodity.

Market participants interpret this as a signal that prices will increase in the future (they will not "roll down" as longer dated contracts become current). This provides an incentive to hoard supplies and delay production. This may show up in higher inventories, or in lower-than-expected supply.

Price curves in contango work to increase physical commodities prices in two important ways:

- The signal given to the market is that prices are going higher, consistent with the upward sloping price curves. Therefore, producers and owners of commodities see a greater advantage in delaying delivery of supplies (as long as the slope of the curve is sufficiently high to offsets storage and other costs). Similarly, consumers are incented to buy product now for use later (again, as long as the contango is steep enough to offset storage costs). Thus, as product is held off the market in the face of inflated demand, spot prices must rise in order to balance the new higher demand and lower supply.

- The role of futures markets as a price benchmark is embedded in many formal pricing structures, such as indexes, standard form contracts and auctions. These structures then become direct transmission conduits for the price signals derived from price curves in contango. As near month futures expire, the next month contracts become the new price benchmark. The spread between the expiring contract and the new contract that replaces it is therefore directly added to the price paid under linked physical contracts that use the prompt (or near) month futures price as the benchmark. In fact, this is another key link between commodities futures prices and their spot market counterparts.

Because price signals - unique to the Roll- are generated by CITs acting according to programmed trading activity, *they are not based on fundamentals.* However, there are no observation techniques that allow market participants to transparently discern between what are programmed trading-generated signals vs. what is supply and demand-generated. Inevitably, the artificial nature of these synthetic price signals become apparent (often as the result of the availability of new fundamental based information), *ultimately* returning physical prices to a supply and demand-based level. However, in the meantime, the cycle for this process engenders greater price volatility and also higher than necessary absolute price levels, *which is a direct cost to the public.*

CIT History and Structure

The commodities index fund concept, dating originally from 1991, has been heavily promoted by swap dealers in the recent past so that "investors" from the much larger capital markets could synthetically own a market basket of physical commodities.[20] Thus the institutional investor synthetically "owns" physical assets for a long duration period without (in theory) having to be concerned about physical possession costs, such as storage and transportation. The presence of commodities index funds in the marketplace has increased rapidly since 2004, when a swap-dealer sponsored academic work suggested that these commodity derivative-based products could provide institutional investors with portfolio diversification and other investment benefits.[21] In fact, the size of commodities index fund-related participation in the futures markets is the clear source of a large percentage of the increase in commodities futures volume and open interest in the period since then. (As will be described below, it is very likely that the opportunity to trade opposite commodities index fund sponsors has attracted substantial activity by volatility traders, thus accounting *for almost all of the recent increased speculative volume*). The following chart illustrates this phenomenon for the case of CBOT wheat.[22]

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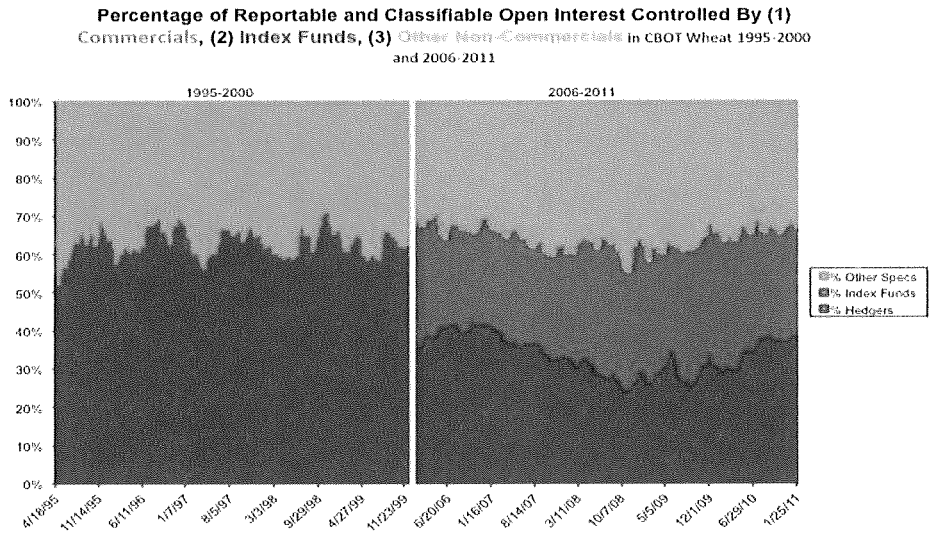
[20] See note 15, *supra*. Importantly, the concept of an "investor" in commodities is a relatively new one. These participants are technically a form of "speculator" (because they neither produce nor consume commodities). However, they do not provide liquidity in the way that a traditional speculator would. Indeed, because of their monthly need to roll, they are often net liquidity *takers*.

[21] The paper in question was Van Rowenhorst, G., and Gorton, G., *Facts and Fantasies About Commodity Futures*, 2004 (funded by AIG Financial Products). The increase in index fund popularity is detailed in Basu and Gavin at pages 43-44.

[22] Calculated from CFTC CIT Reports. For detailed methodology, see Better Markets, "Position Limits Comment Letter", *supra* note 4.

Chart 2 (CIF/Spec/Hedger Market Shares)



Commodity Index Funds have a unique structure in which large volumes of futures market trading occurs at specific times *without regard to price considerations*. The unique structure and absolute size of these investment vehicles clearly pose the potential to impact the commodities markets over the period of analysis, and this potential is considered.

The indices that these index funds replicate are based on the long futures prices for notional quantities of multiple commodities. The proration of the notional amounts is a function of the specific strategy underlying the index; this balance is adjusted periodically by the index provider. [23] The index is intended to be perpetual to accommodate long duration positions for targeted institutional investors. This poses a structuring challenge to a fund's promoter since futures contracts, by definition, expire. Thus, expiring contracts must be replaced continuously by longer-dated contracts in order for an investor to perpetuate the index. Therefore, the actual index price is based on the assumed liquidation of expiring long futures contracts and simultaneous buying of longer-dated contracts during specified periods of the futures contract cycle. If each contract referenced in the index calculation reflects actual prices experienced for the underlying commodities, then theoretically the index will accurately reflect commodities price movements over time.

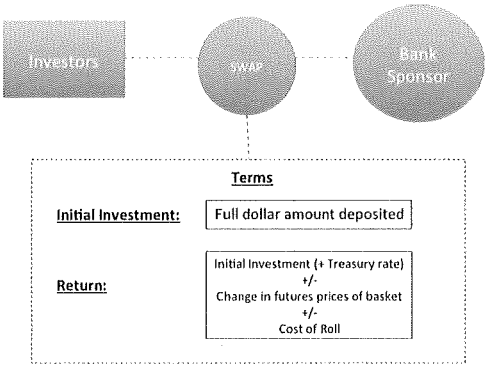
The liquidation and replacement periods are colloquially referred to by traders as the Roll. Because the indices must be objectively determinable, the Roll for an index is based on *pre-determined rules* that are made by index providers. Importantly, these rules include the

[23] An index provider (such as Standard & Poors) simply calculates and publishes the index. This is distinct from the Index Fund sponsors, who then provide investors with total return swaps and other forms of exposure to the index.

exact time period in the futures contract cycle during which a contract Roll will occur. Often, certain Commodity Index Funds are a large enough presence in the marketplace that the Roll *constitutes the dominant event* each trading month for commodities included in the index.[24]

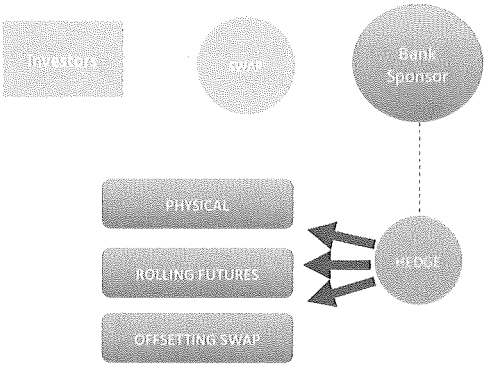
There is an intriguing conceptual issue here. While the use of derivatives is meant to avoid the costs of having to store physical commodities, it is also supposed to avoid impacting their prices (buying and holding the physical inventory would constitute "hoarding", and would therefore raise prices). Hence, the idea is that investors can "passively" receive the benefits of commodity exposure without facing the costs or creating negative externalities. Such a "free lunch" would indeed be an efficient and impressive achievement. However, as the data analysis below shows, neither of these propositions may be true. If the very act of investing in physical commodities via derivatives impacts prices (as the data suggest it does), then investors may simply end up interpolating the costs of physical storage into their contracts (paying "synthetic" storage). And if investing via derivatives pushes up physical prices over time (as again, the analysis suggests it is likely to), then hoarding by other participants with access to physical storage becomes a low-risk arbitrage strategy. In such a scenario, the price rise would precede the "hoarding," but the net effect would remain the same: storage costs paid by investors, and negative externalities generated in the form of higher prices and hoarding.

Institutional investors engaging in replicating commodities index-based strategies typically enter into total return swaps with a sponsor (who is a swap dealer).[25] The investment institution begins by transferring funds to the swap dealer equal to the price of a notional quantity of commodities included in the index. The swap dealer sponsor then pays interest at the treasury rate on cash transferred. The institutional investor is then credited with future increases to the index value (and decremented for decreases in value) over time, less any fees due to the swap dealer for managing the swap. Thus, to the extent that the index accurately reflects price changes for the constituent commodities, an investor theoretically experiences the same consequences as one who would have owned the corresponding commodities over the period of investment, and then selling them at the end of the period. Hence the moniker "total return swap".



[24] E.g., in summer 2008, index funds were greater than 50% of open interest according to the CFTC's CIT reports (*see* Better Markets, "Position Limits Comment Letter," *supra* note 4.

[25] Exchange traded funds or "ETFs" differ from commodities index funds in that the investors receive equity shares instead of the total return swaps. The value of the shares structurally parallels the value of the total return swaps. For purposes of this analysis, the effects on the markets of ETFs and commodities index funds are not materially different.



From the perspective of the institutional investor, the total return swap constitutes a kind of synthetic, long duration ownership of a market-basket of physical commodities, the value of which changes in tandem with price index movements.

The swap dealer facilitating the institutional investor's exposure must offset its client exposure to index movements under the total return swap (except to the extent that it elects to trade speculatively against the exposure under the total return swap, as described below). The swap dealer does so by taking long futures positions and rolling to mimic the index. Gains and losses on the Roll do not affect the sponsor adversely; *rather they are passed on directly to the investor*. Importantly, swap dealer intermediaries holding client commodity index swaps can also offset risk *by owning physical assets corresponding to total return swap notional amounts* or by entering into other swaps.[26] These alternative hedges may be less liquid and potentially expose the swap dealer to cash market basis risk. In fact, these trades can be a significant source of additional proprietary profit or loss for the swap dealer who chooses to speculate on the basis risk. The swap dealer sponsors are classified as "CITs" who engage in market trading associated with Commodity Index Funds. Because Roll trading of futures is consequential to the institutional investor principals, rather than the swap dealer agents, the programmatically required trading volume and direction of CITs during the roll is largely done in a *price insensitive manner* (as long as the swap dealer facilitates the trading in order that it directly mimics the specific commodities index).[27]

Moreover, there is a substantial profit opportunity available to a CIT swap dealer by closely managing its hedge portfolio with respect to the shape of the forward curve. The standard total return swap terms stipulate that the investor must pay (or receive) the cost (yield) of the putative Roll of a number of futures contracts equivalent to the notional value of their investment during a certain pre-defined period of time. So, by holding physical inventory rather than futures contracts in a contango market, not only does the CIT swap dealer

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26 Offsetting swaps are a relatively minor part of the hedging books of most sponsors. *See* CFTC's *Index Investment Data Reports*, available at http://www.cftc.gov/MarketReports/IndexInvestmentData/index.htm

27 E.g. The GSCI mandates a 5-day period for the Roll to take place each month. On each day, 20% of contracts are assumed to be rolled at the daily closing price. As long as the swap dealer is rolling 20% of contracts per day at or around the daily closing price, he will track the index closely. To the extent he is able to roll at a better price, he retains 100% of the profits generated. Traders have also pointed out that under this arrangement, swap dealers could profit by "banging the close". This practice (technically illegal, though never prosecuted in commodity futures markets) involves placing a large order for the longer-dated contracts right before market close, thus pushing up the price at which the index level is calculated, and creating a wider profit margin for the swap dealer.

sponsor receive the hypothetical cost of the Roll from the investor, but it also captures the corresponding appreciation in the price of its owned physical assets.[28] Thus, by *holding physical commodity inventories directly*, rather than futures contracts that represent physical inventories, a swap dealer receives a paper profit roughly equal to the spread between the two contracts involved in the Roll, less the cost of carry (the investor pays the cost of the "Roll that didn't happen," while the dealer receives the value of the appreciation of his physical holdings). In recent years, author calculations show that this strategy would have provided annual equity-like returns on the portion of the portfolio hedged with physicals.[29] It is worth emphasizing that this profit accrues directly to the CIT swap dealer sponsor, and *critically not to the institutional investor*. Indeed, it represents *a direct transfer of wealth* from the institutional investor principal to the swap dealer agent.

Finally, the CIT swap dealer can also position a spread trade ahead of the Roll, benefiting from the market price movements occasioned by the force of the Roll (in which shorter-dated futures are sold and longer-dated futures are bought, in substance for the account of the investor). Other traders can do the same, but in a Roll Period the CIT sponsor has a *superior market information advantage*, by knowing directly client-specific information (this can be individually, at the aggregate level, or both) about the size of the CIT's swaps with investors and the specific size of rolled futures positions as well as physical and swap hedge positions. Given the information asymmetry enjoyed by the CIT swap dealer vs. other market participants, their agent knowledge offers a significant information-based profit opportunity. Superficially, one could assume that CIT swap dealers' hedging for clients are a futile effort since after all the CIT swap dealer is in effect front-running its own necessary trading activity; however, *in this case the critical issue is that all the profits and losses of the Roll trades go to the account of the Commodity Index Fund investor, not the CIT swap dealer sponsor*. So the practical effect of institutional investors engaged in commodity indexing strategies is that the CIT swap dealer sponsor, acting as agent, is able to synthetically trade ahead of its counterparty principals on all indexed total return swap products. Therefore, if such market activities affect price spreads in such a way as to *disadvantage* the counterparty (i.e. if spreads are widened by this activity), *then the strategy effectively constitutes another direct transfer of wealth from the index fund investor to the CIT swap dealer*. Given the above, it now becomes all the more important to ascertain precisely when spreads are widened during the Roll Cycle. For this reason, the authors of this paper chose to look not just at the 5-day official "Roll" period (from which index fund investor returns are calculated), but also at the 2 days prior to the Roll, when CIT swap dealer sponsors could theoretically "front-run" their counterparties.[30]

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[28] As has been widely publicized, banks have been buying large quantities of storage capacity over the last few years. While some observers have been puzzled by this large investment in the traditionally low return-on-equity storage business, some of the attraction becomes clearer when it is understood in the context of managing the hedge book on a commodity index total return swap. *See*, e.g. http://ftalphaville.ft.com/blog/2011/05/24/576501/the-uk-is-concerned-about-banks-that-warehouse-commodities/

[29] Author calculations (unpublished).

[30] E.g. suppose a CIT opens a large spread position 2 days before the Roll. This adds 5 cents to the spread, so that by the time the 5-day window opens, spreads are 5 cents higher than they would otherwise be. The CIT then rolls the contracts used to hedge his total return swap exposure. This widens the spread a further 5 cents. The investor pays a Roll yield of 10 cents (plus whatever the base level of the spread was), reflecting not only the price impact of the rolled hedge, but also the price impact of the CIT's anticipatory spread position. The CIT then profits by the 5 cents that were added to the spread when he rolled the hedge

The analytical work described herein was prompted by a number of observations regarding commodities index funds and trading activity of CIT swap dealers:

- An independent, global concern is that synthetic ownership of commodities might be misinterpreted by other market participants as actual ownership. Specifically, if the hedging activity is similar to the hedging activity that a market participant might employ if he or she actually owned physical commodities, the associated price signals given off to the markets could suggest hoarding activity and attendant rising prices.

- CIT swap dealer hedging activity in the market in response to investment inflows and outflows is *price insensitive* since the timing and amounts are compelled by the actions of the investors and the terms of their swaps, rather than any directional view on individual commodities. It has previously been shown that over certain time periods, the cumulative effect of CIT activities is more closely correlated to commodity price movements than is the effect of fundamental supply and demand changes.[31] The logical implication is that price-insensitive CIT swap dealer hedging activity may influence prices *away* from fundamentals-based levels. These findings also suggest that arbitrageur response to restore fundamental equilibrium is either ineffective or that these artificial and momentum-based price movements create costly and risky volatility which affects prices, or both. CIT activity during Roll Periods is also price-insensitive and is very large. This also strongly suggests that Roll Period trading activity might affect prices.

- Research has shown that a trading strategy in which, just ahead of a Roll, a speculator temporarily takes a long position in the spread between current and next succeeding futures contract prices in products that are constituent elements of the GSCI, and then closes the position over the course of the Roll Period, would have had significant and consistent profitability in recent years.[32] Said another way, betting just before each Roll on a more upward sloping price curve for every product in the GSCI, and then closing the position during the roll, would have paid off consistently. Another significant issue is whether market activities by CITs swap dealers and other speculators trading in anticipation of (or in response to) the roll also affect the price of the next succeeding futures contract relative to the current one. If so, this could be the source of the notional profits identified in the respective research. But importantly, it would indicate a

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contracts (minus the cost of unwinding his position). The investor paid an extra 5 cents in roll yield above what he would have had the CIT not placed the anticipatory spread trade, and the CIT profits by 5 cents.

31 Singleton, K., "Investor Flows and the 2008 Boom/Bust in Oil Prices, July 22, 2011, available at http://www.stanford.edu/~kenneths/

32 Mou, Y., "Limits to Arbitrage and Commodity Index Investment: Front-Running the Goldman Roll", November 19, 2010, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1716841.

systematic change for the commodities futures price curve based on *causes that are not fundamentals-based.*

Methodology

The present study isolates the Roll Period for 6 commodities contained in the GSCI, the most popular index used for commodity index trading.[33,34] The study isolates the contracts actually used in the roll, in contrast to many previous studies on commodity index funds that only studied near-month futures contracts *despite the fact that these contracts are rarely bought or sold by index funds.*[35] It measures the price impact of the roll, measured by the price spread between the contract sold by the CIT and the longer dated contract bought by the CIT. It then compares this against a benchmark of all other 5-day periods outside of the "Goldman Roll" period and critically also against the equivalent "Goldman Roll" period before index investing became popular (pre-2003).[36]

Because an entire "ecosystem" of speculative traders has sprung up around the CITs, the authors also seek to measure the impact of those traders who aim to "front-run" the roll.[37] These traders tend to position themselves in front of the CITs a day or two prior to the roll, going long the spread – *i.e.,* taking a short position in the near month contract and a long position in the longer-dated contract (seeking to profit from the widening of this spread that they believe the programmed and price insensitive index fund roll will cause),[38] and then closing out any remaining positions over the course of the Roll Period. To measure this, the authors look at the change in spread during the two days prior to the roll, and compare it with the change in spread during the two days following the roll. We interpret the widening of the spread prior to the Roll to indicate the presence of front-running as traders position themselves, and a narrowing of the spread following the roll to indicate the presence of front-running speculative traders closing out long spread positions which have not yet been closed out during the Roll. This trading pattern would be logical for a trader who is disinterested in fundamental causes of a price curve spread, but is simply seeking to profit from the non-fundamental price effects of the roll. Importantly, this activity is not designed to arbitrage out price moves that are not based on fundamentals. The activities of both the CITs hedging activities and the speculative front-running trader activity clearly disregard fundamentals.

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33 Irwin and Sanders, OECD Food, Agriculture and Fisheries Working Paper No. 27, "The Impact of Index and Swap Funds on Commodity Futures Markets," 2010, *available at* http://www.oecd.org/dataoecd/16/59/45534528.pdf.

34 Standard & Poor's, S&P GSCI, *available at* http://www2.standardandpoors.com/spf/pdf/index/SP_GSCI_FAQ_Web.pdf

35 Irwin and Sanders, *Op. Cit.*

36 Since the analysis focuses on the Goldman Roll, the prices analyzed are those for contracts directly affected by the Goldman Roll. Contracts affected by other indices, such as the DJ-UBS index, overlap but are different. An analysis which combines all major indices may provide further insights.

37 *See* Mou (2010) Op. Cit., in which a repeated front-running strategy was simulated over an extensive period which produced substantial and consistent simulated profits.

39 OECD, "Commodity Price Variability: Its Nature and Causes," March 1993, *available at* http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(93)71&docLanguage=En

Distributions of commodity price returns are generally considered non-normal.[39] The authors run a K-S normality test on all relevant data sets, and our results confirm the orthodox view. Consequently, when testing for statistically significant increases in spreads a non-parametric Mann-Whitney U-Test is used. Summary statistics can be found in Appendix A. Authors also use a Hodges-Lehman median estimator to give an estimate of the magnitude of the contango bias where it occurs. This is generally considered superior to a simple comparison of median values, though tables 1-6 (below, pp22-24) also include simple median comparisons.[40]

General Analytical Approach

The authors' approach has been based on several inquiries:

- We have identified new and substantial market practices engaged in by CIT swap dealers and their correlation with changing market price dynamics to determine if causal relationships between such market practices and changing dynamics might exist.

- We have closely examined market structures to better understand how highly correlated market practices and price level and volatility may be structurally related. In particular, we have focused on specific practices – the rolling of futures contracts by CITs – and their impact on futures markets price curves (which signal increasing or decreasing physical prices) and physical prices.

Futures Markets

The fundamental purpose of commodities futures markets is to allow businesses that are exposed to future commodities price risks (producers, manufacturers and processors and others) to hedge that risk. A short hedger makes the implicit decision that he or she is at least indifferent between the potential gain from higher prices in the future and the potential loss from lower prices, each compared with the synthetically fixed price established by the futures contract, net of transaction costs. A long hedger's decision involves the opposite logic. To fulfill this purpose, the futures markets must provide predictive prices based on understandable and appropriate factors; in other words, future prices should reflect current, commodity-specific supply and demand conditions, and expectations about future changes to those conditions. This describes the theoretical price discovery function that measures how well the futures contract hedging mechanics are achieving their primary purpose.

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[39] OECD, "Commodity Price Variability: Its Nature and Causes," March 1993, *available at* http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(93)71&docLanguage=En

[40] Oja, Hannu (2010). *Multivariate nonparametic methods with R: An approach based on spatial signs and ranks.* Lecture notes in Statistics. **199.** New York: Springer. pp.xiv+232.

Working properly, then, the market should effectively process available information to allow participants to price futures contracts based on analysis of the fundamental elements of price: supply, demand, and costs along the production and supply chain (costs of production, transportation and storage). To the extent that futures market pricing deviates from this process, pricing can appropriately be described as distorted. That is to say, at this point futures prices are no longer logically related to available information concerning fundamentals. Thus, the futures market is not then providing reliable price discovery, a kind of market failure.

Classically, in a properly functioning market, market participants with adequate information should be able to eliminate pricing distortions through arbitrage. Arbitrageurs trade so as to force prices back to levels suggested only by information based on current and future fundamentals. However, in reality, there are limits to their ability to act.

- First, price distortions may be so large and frequent that arbitrageurs do not have the capital necessary to sustain arbitraging activity in order to eliminate price distortions. For example, a force that significantly distorts the market may recur often enough so that the arbitrageurs experience intolerable short-term losses or margin calls that reduce cash to levels that pose liquidity risks to their operations.

- Second, the consequences of distorting forces constitute information that must be processed together with *other information*, such as views of perceived fundamentals. Persistent pricing that is not supported by available information suggests to a trader with a different futures price view that his or her information may be inadequate or misleading (since it seems that others in the market are willing to continuously engage in trading destined–according to the original trader's view– to produce losses). Thus, the trader comes to believe that others with apparently different views must be behaving logically based on different, and likely better, information. This can lead to ongoing price distortions if the persistent trading activity is random (noise trading) or motivated by forces other than profits and losses (e.g. price-insensitive CIT market activity). Other non-rational phenomena like "herding" have been extensively explored in the behavioral finance literature. [41]

Distortions that are not easily susceptible to correction by arbitrage are obvious points of interest to researchers in determining whether a market is functioning properly. CIT activity and the activity of speculative market participants trading ahead of this activity, which is large, recurrent, and motivated primarily by investment mandate, is precisely the type of trading which could minimize the effectiveness of arbitrage forces that are supposed to act to restore the relationship of futures pricing to supply and demand-based fundamentals.[42] Further, CITs can hedge with physicals and swaps as well as futures. Thus, the precise size of the roll is an unknown quantity to all speculators without direct client

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41 *See* Shefrin, H, *Beyond Greed and Fear: Finance and the Psychology of Investing*, Oxford (2000) for a good synopsis of the classic behavioral finance theory.

42 *See* Frenk, D. and Masters, M. *Anthropic Finance: How Markets Function* (2010)

specific knowledge, which clearly obscures the market source of these price movements. So, arbitrageurs may not be able to perform efficiently because of the size of the activity, the unpredictability of the tactics employed around the roll by swap dealers, and also the difficulty of discerning between the roll effect and fundamentals-based price moves.[43] A thorough analysis of this activity and its relationship to high price volatility and levels by appropriate regulators would likely be very helpful in allowing a better understanding of the full scope of these trading activities, which are propagated before, during, and after Roll Periods.

ANALYSIS

Hypothesis

The broad hypothesis tested is that, during the Roll Cycle (described below), the activities of CITs and other speculative traders, over and above fundamental considerations, induce contango price curves in traded commodities.[44] This result would be expected because of several factors:

- The volume of trading during the Roll Cycle;
- The fact that CITs trade during the Roll Cycle to fulfill structural requirements rather than to profit based on price fundamentals; and
- The systematic short trades by CITs for the futures contracts that they hold and are expiring and the systematic long trades for the next-maturing futures contracts.

If the hypothesis is confirmed, it must be concluded that the Roll Cycle trading activity constitutes a force that biases the relevant commodities futures price curves in the direction of contango.

More specifically, the analysis tests three formal hypotheses:

1) The Roll Cycle displays greater contango bias since the rise of index funds in 2004;

2) The Roll Cycle displays greater contango bias than non-Roll Periods; and

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[43] Moreover, the trader(s) in charge of the roll at a given CIT swap dealer sponsor have a strong incentive to keep their activities as opaque as possible (within the parameters allowed), so as to avoid being front-run on the large trades they must necessarily execute.

[44] Other studies have examined different trading activities by CITs, specifically the increase in long positions occasioned by cash inflows into and out of commodities index fund investments. While certain studies (*e.g.,* Irwin and Sanders) have been unable to discover futures price consequences, a more recent study (Singleton) examined the cumulative effect of inflows and outflows on futures prices curve. The structure of the Singleton study better reflects the consequences that are suggested by market structures as the result of actual CIT practices. As a result, the findings of the cash-inflow/outflow studies are best viewed as consistent with each other and suggestive of a strong relationship between inflows and outflows and longer-dated futures contracts prices (significantly stronger than fundamentals). These studies are discussed in detail in Appendix A of the Better Markets Position Limits Letter (*supra*, note 4).

3) The 2 days immediately prior to the Roll display greater contango bias than the 2 days immediately following the Roll.

The authors find statistical evidence in favor of all three hypotheses, indicating that CIT activity and related speculative activity is likely to cause distortions in the price curves of traded commodities.

Importantly, unless the market efficiently recognizes that the resulting contango bias is simply a direct function of the Roll Cycle trading activity, this index replication-caused bias will likely be interpreted to mean that market participants now view fundamentals as suggesting higher prices in the future. The greater contango will constitute an artificial price discovery signal that related commodities prices will be increasing. Logically, this can lead to a vicious cycle, in which more financial participants are attracted to invest in commodities markets by the appearance of rising long-term prices, which in turn correspondingly leads to an amplification of *those* price signals. Quite aside from any direct impact of Commodity Index Trader flows on spot prices, therefore, a boom/bust dynamic can theoretically be caused purely by the speculative trading activities inherent in the Roll.

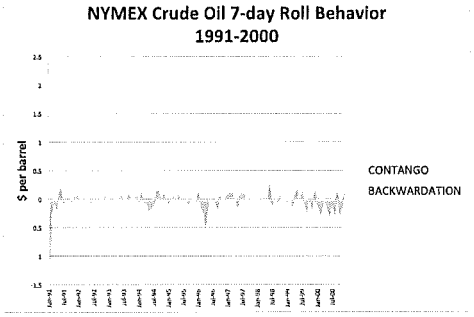
The charts on the next page(s) show the intuitive validity of the approach. They compare the behavior of price spreads for NYMEX WTI Crude Oil futures during 7-day Roll Cycle to other 7-day periods. They show this behavior before the rise of CITs and after the rise of CITs. While there is no discernable difference between the Roll and the non-Roll prior to the CIT era (up to 2004), there is a large difference after this time. Before the appearance of CITs, both Roll and non-Roll alike displayed no bias towards either contango or backwardation. *However, since the rise of CITs, contango events are both more frequent and of greater average magnitude during the Roll, while backwardation events are more frequent and of greater average magnitude during the non-Roll.* The charts show average and count, time series, and density function analysis for NYMEX WTI Crude Oil futures. [45]

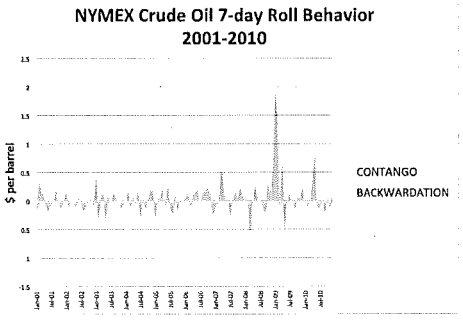
[45] Density function is calculated as frequency ratio x average magnitude x 100. E.g. in the pre-CIT period (1996-2003), the roll displayed contango effects 40 times out of 84 observations. The average contango magnitude was $0.12. So, the density function is 40/84 x 0.12 x 100 = 5.71.

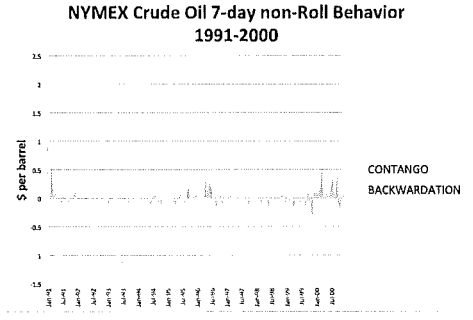
Summary Tables: 1) Average And Count 2) Time Series 3) Density Function

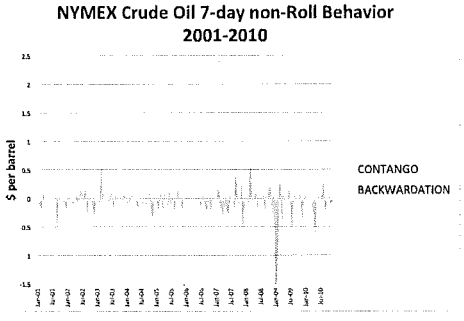
		Roll	
		CONTANGO	BACKWARDATION
Jan 1996 - Jan 2003	AVERAGE	0.12	-0.14
	COUNT	40	44
Jan 2004 - Jan 2011	AVERAGE	0.27	-0.18
	COUNT	55	28

		Non-Roll	
		CONTANGO	BACKWARDATION
Jan 1996 - Jan 2003	AVERAGE	0.13	-0.11
	COUNT	65	65
Jan 2004 - Jan 2011	AVERAGE	0.16	-0.26
	COUNT	63	75

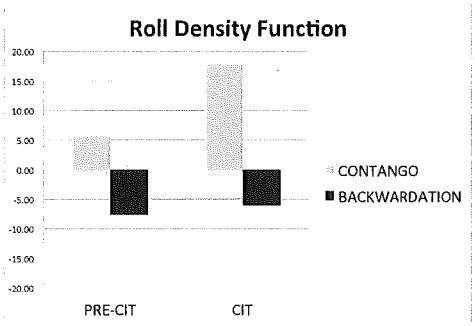


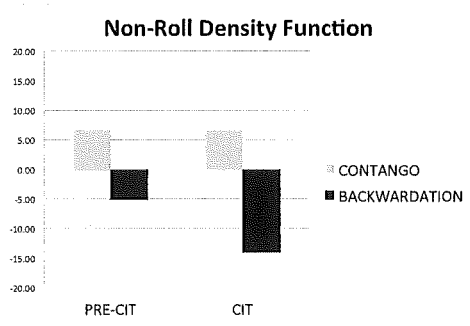


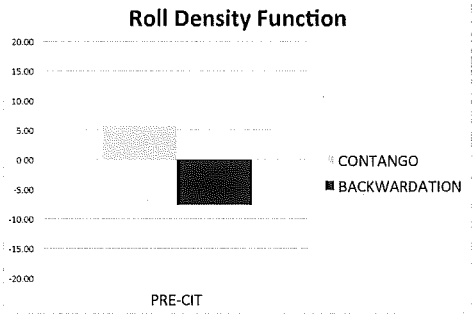


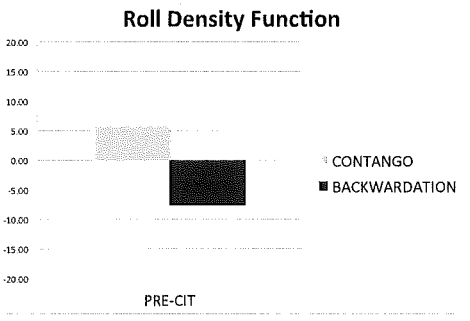


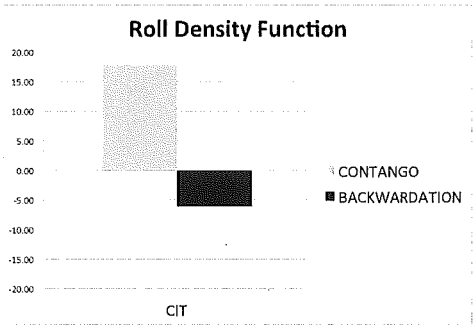
The density function is a measure of the typical profile of a Roll or non-Roll event. It is a scaled measure (see note 44 *supra*). Therefore, it allows for an apples-to-apples comparison of different time periods. As is clear from the charts below (for NYMEX WTI Crude Oil), whereas the roll and non-roll were almost indiscernable prior to the rise of the CITs, they have subsequently displayed radically different price behavior. Also apparent from the charts is the fact that the magnitude of the backwardation bias in the non-Roll Period (since the CITs appeared) is insufficient to offset the contango bias in the Roll Period.

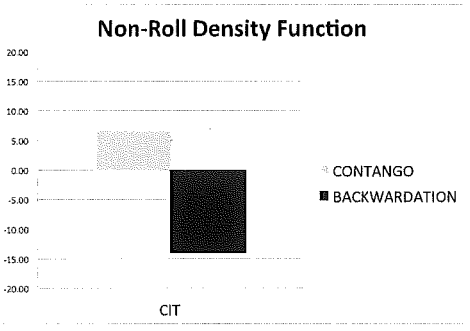












As is clear from the above presentations of the NYMEX WTI Crude Oil data, the market has changed significantly since the appearance of CITs. The remainder of the analysis derives summary statistics for the other commodities surveyed and uses the Mann-Whitney U-Test

and Hodges-Lehmann Estimator to give an estimate of the magnitude and statistical significance of the CIT Roll effect. Histograms of the NYMEX WTI Crude Oil data are also available in Appendix B at the end of this paper.

Structure of Analysis

The analysis examines each of the commodities futures markets included in the GSCI over a period from January 1983 to June 2011.[46] Trading months are divided into four periods:

- The Roll Cycle is defined to include three periods:
    - The "Roll," or the five trading day period in which CITs trading with respect to the GSCI must roll out of maturing futures contracts and into longer dated contracts;
    - The "Pre-Roll," or the two trading days immediately preceding the Roll in each trading month; and
    - The "Post-Roll," or the two-trading days immediately following the Roll each trading month.
- The "5-Day Control Period" is defined as every other trading day in every trading month apart from the Roll, and is sliced into 5-day units for comparison with the Roll. The "7-Day Control Period" is defined as every other trading day in every trading month apart from the Roll and the Pre-Roll, and is sliced into 7-day units for comparison with the Roll-and-Pre-Roll combined.

The analysis examines five "Measured Periods" for each trading month: (1) the Roll Cycle as a whole; (2) the Pre-Roll; (3) the Roll; (4) the Post-Roll; (5) the 5-Day Control Period; and (6) the 7-Day Control Period.

Bias toward contango or backwardation is measured by the change in the difference between the daily settlement prices for the contract sold during the CIT roll and that for the contract bought during the CIT roll.[47] During each of the Measured Periods, if the difference in prices reflects a relative increase in the longer-dated contract price, a bias toward contango is displayed. And if the difference in prices reflects a relative decrease in the longer-dated contract price, a bias toward backwardation is displayed. Bias toward contango and backwardation does not mean that the price curves displayed those slopes, nor does it necessarily suggest that prices were at any particular absolute level or were more or less volatile. As discussed elsewhere, over the entire period, price curves were persistently in contango and prices were on average more volatile and higher in level, each

[46] In the case of Heating Oil, data was only available from 1986, when NYMEX began trading the contract.

[47] See Stoll and Whaley (2010) for a breakdown of which contracts are involved in each roll. Price data is taken from Bloomberg.

compared with historical norms. [48] The analysis presented below measures whether the forces biasing the market toward contango were in fact concentrated in the Roll Periods.

The analysis examines each futures market for the commodities that are included in the GSCI. These commodities are set forth below, together with the target weighting to be used by GSCI index sponsors as of January 2011.[49]

	Jan 2011 % Weighting
Wheat (CBOT)	3.00%
Wheat (KBOT)	0.69%
Cocoa	0.39%
Coffee	0.76%
Corn	3.37%
Cotton	1.24%
Soybeans	2.36%
Sugar	2.25%
Feeder Cattle	0.44%
Live Cattle	2.59%
Lean Hogs	1.59%
Natural Gas	4.20%
Brent Crude Oil	15.22%
Gasoil	6.30%
Heating Oil	4.66%
RBOB	4.67%
WTI Crude Oil	34.71%
Copper	3.66%
Aluminum	2.70%
Nickel	0.82%
Zinc	0.72%
Lead	0.51%
Gold	2.80%
Silver	0.36%

[48] Better Markets, "Position Limits Comment Letter," (supra, note 4)

[49] Standard & Poor's, "S&P GSCI Methodology," March 2011, available at http://www.seemore-indices.com/assets/files/commodities/pdf/Methodology_SP_GSCI_Web.pdf.

During each of the measured Periods, the relative change in the price curve is assessed and bias toward contango or backwardation is measured. Comparisons are then made between Roll and non-Roll, Pre-Roll and Post-Roll, etc. A detailed description of the methodologies employed is set forth in Appendix A.

RESULTS

General Results

The analysis of the Control Periods for each of the commodities futures markets analyzed shows that during non-Roll Periods, there is a mild bias toward backwardation in Crude Oil and Corn, no discernable bias in Heating Oil, and a mild contango bias in Wheat. The following table summarizes these results:

Table 1 - Control Period results

Commodity	5-day Mean	5-day Median	7-day Mean	7-day Median
Crude Oil	0.00	0.02	-0.10	-0.02
Heating Oil	-0.01	0.04	-0.04	0.03
Wheat	0.12	0.00	0.41	0.00
Corn	-0.02	0.00	0.00	-0.17

In contrast, the Roll Cycle displays a persistent bias toward contango for all four commodities. The strength of this relationship is extraordinary and is strongly suggestive of causation. The following table summarizes these results.

Table 2 - Roll Period results

Commodity	5-day Roll Mean	5-Day Roll Median	7-day Roll Mean	7-Day Roll Median
Crude Oil	0.05	0.1	0.13	0.07
Heating Oil	0.06	0.06	0.11	0.07
Wheat	0.33	0.5	0.47	0.5
Corn	0.25	0.25	0.33	0.25

Remarkably, there is not one case in which the Control Period displays more contango (/less backwardation) bias than the Roll Period. The table below summarizes the magnitude of this overall bias (bias during Roll minus bias during Control):

Table 3 – Differential Between Roll Period results and Control Period results

Commodity	5-day Mean	5-Day Median	7-day Mean	7-Day Median
Crude Oil	0.05	0.08	0.23	0.09
Heating Oil	0.07	0.02	0.15	0.04
Wheat	0.21	0.50	0.06	0.50
Corn	0.27	0.25	0.33	0.42

Authors used a Mann-Whitney U-Test to measure the statistical significance of our findings. The results are summarized below. As expected, the results were strongest for Crude Oil and Wheat, and weaker for Heating Oil and Corn:

Table 4 – Mann-Whitney U-Test and Hodges-Lehmann Statistics

	5-Day			7-Day		
	p-value	Median Diff	H-L	p-value	Median Diff	H-L
Crude Oil	0.0445**	0.04	0.06	0.00226***	0.09	0.1
Heating Oil	0.57345	0.02	0.04	0.14655	0.04	0.1
Wheat	0.35177	0.5	0.25	0.03627*	0.5	0.5
Corn	0.13343	0.25	0.25	0.12667	0.25	0.25

Pre-Roll vs. Post-Roll

An examination of the components of the Roll Cycle provides a further and important insight. The trading activity in each of the components of the Roll Cycle is different. By looking at the Pre-Roll, Roll, and Post-Roll separately, information relating to the bias toward contango and also the specific trading activity can be discovered.

During the Pre-Roll, non-CIT traders are preparing to take advantage of the high-volume, price-insensitive, and predictable trading during the Roll. They seek to position themselves to profit from the CITs going short the front month contract and long the next nearby contract in size.

During the Post-Roll, the trading markets experience echo effects from the Roll. Non-CIT traders inevitably will have overshot or undershot the actual events of the Roll in their preparation during the Pre-Roll.

The following table sets forth the results related to the Pre-Roll and the Post-Roll for each of the futures markets analyzed.

Table 5 Pre-Roll vs. Post-Roll

	Pre vs. Post		
	p-value	Median Diff	H-L
Crude Oil	0.0845*	0.02	0.04
Heating Oil	0.10328	0.03	0.08
Wheat	0.0071***	0.5	0.5
Corn	0.00734***	0.25	0.25

It is remarkable that in every case, price spreads display the exact pattern predicted by the model in which traders position themselves ahead of the roll and thereby generate a contango bias. In Heating Oil, the bias was marginally too small to meet the standards for statistical significance, as measured by the Mann-Whitney U-Test. In all other cases, the bias was statistically significant.

Historical Comparisons

Others who have looked at the Roll Cycle have noted that the appearance of systematic price dislocations during this time period coincided with the rise of Commodity Index Trading. We therefore compared the Roll Cycle in the period 2004 onwards against a historical control period beginning when NYMEX WTI Crude Oil futures began trading in 1983 (or the earliest available date for commodities that started trading later, such as Natural Gas), and ending in 2002.[50] The results were broadly consistent with Mou (2010) in that the bias grew rapidly from 2004 onwards, with Crude Oil displaying the most striking increase.

Storability vs. Non-Storability

Several observers of commodity markets in 2007-8 noticed that non-storable commodities like livestock and natural gas did not experience price bubbles of the same magnitude as storable commodities like energy and grains.[51] Consequently, the authors extended their analysis to Live Cattle and Natural Gas to see if it was also the case that the Roll effects described above were absent from those commodities. The theoretical framework outlined above implies that if the Roll has an effect on prices, it takes place in two ways: first, by creating higher prices in the contracts that are rolled into, which do not subsequently depreciate, given limits to arbitrage; second, by sending a signal to producers and consumers to delay production/bring forward consumption due to the cost/benefit implications of contango price curves. So, given that there was no observed price bubble in livestock or natural gas, two possibilities could be suggested. First, there may have been a contango impact of the Roll, but due to the lack of storability of the commodities in question, this may not have led to higher prices as producers could not delay production. Second, the contango impact may have been absent altogether. In this latter scenario, the implication may be that the contango impact of the Roll is dependent on *interactions between* CITs, other speculators, *and* producers and consumers with storage capacity. Or, alternatively, it could simply be the

[50] 2003 was excluded from either sample, for reasons explained on p36 below.

[51] E.g. http://www.voxeu.org/index.php?q=node/5859

case that, because Index Trading is relatively small in natural gas and livestock as compared to the other commodities surveyed, there may not have been enough index investing to have a large effect, especially net of arbitrage. Further research is required to tease apart these various possibilities. The results of this initial analysis are summarized below:

Table 6 Live Cattle and Natural Gas

	Pre vs. Post			Roll vs. Old		
	p-value	Median Diff	H-L	p-value	Median Diff	H-L
Live Cattle	0.10480	0.17	0.15	0.61883	-0.05	0.05
Natural Gas	0.86142	-0.05	0.01	0.85046	-0.01	-0.01

	5-Day			7-Day		
	p-value	Median Diff	H-L	p-value	Median Diff	H-L
Live Cattle	0.07161*	0.13	0.25	0.46613	0.08	0.1
Natural Gas	0.87220	0	0.01	0.29438	-0.14	-0.09

Live Cattle displayed some evidence of contango bias during the Roll Cycle, with a statistically significant contango bias in the 5-day tests. Natural Gas showed no evidence of bias towards either contango or backwardation. These tests therefore proved inconclusive, though they are *prima facie* consistent with the hypothesis that storable commodities behave differently from non-storable commodities when index trading is present.

Boom and Bust

During the period of observation, commodities prices rapidly increased and decreased in cycles that were reminiscent of other historical speculative "boom and bust" periods. Authors also investigated whether the contango tendencies described above show up differently during periods of "boom" versus during periods of "bust". We tested this periodicity by identifying a "boom" period for each commodity, starting from the date on which the lowest price occurred in 2007 until the date on which the highest price occurred in 2008, and also a "bust" period that elapsed from the high price point of 2008 until the point in 2009 at which the downward trajectory of price movements stabilized. Different commodities peaked or troughed at roughly different points, but on the whole the "boom" period tended to run from spring 2007 to spring/summer 2008, and the "bust" period from spring/summer 2008 to spring 2009. Therefore this time frame captures the general contours of the commonly recognized "boom and bust" of 2007-8, and is consistent with other quantitative methods of determining the price cycle. Because of the relatively small number of data points (e.g. there were only 5 rolls for wheat during the boom and 6 during the bust), it is harder to draw firm conclusions. However, there was amplification of the identified contango bias effects for various commodities during either the boom or bust periods. In some cases, the amplification was very large (especially during the bust). Since

research into this amplification effect is ongoing, preliminary results are not presented here. Rather, we briefly describe some observations that we believe shed light on the propensity of some commodities to display amplified contango bias during the Roll when the market as a whole is in either a boom or bust scenario.

The effect of the Roll on the price curve, analyzed above, logically might be related to boom and bust market cycles. The bias toward contango is a signal to market participants that prices are more likely to be higher over time than the price levels that are suggested from all other information sources. The price curve is formed by a collective calculation of probabilities, and the non-fundamental Roll signal forces a discounting of the other supply and demand focused data. It is one among many signals, *but it is definitively one that is unrelated to supply and demand forces*. As such, its essential effect is to obscure the reliability of objective fundamental-type data in the price formation process.

Logically, one would expect to find that the obscuring force is strongest at times when the price curve is closer to theoretically "correct" levels, since it is easier to believe that the fundamental forces are expressed more credibly in the price formation process. But the more distortion of the price curve, the weaker the effect until supply and demand forces are simply overcome by the "Roll force."

This begs the separate but related question: whether the bias is stronger during a boom or a bust cycle. During a bust cycle, the contango bias is working against a general market sentiment that prices are declining, while during a boom cycle, the bias is harmonious with such sentiment. As a result, the bias toward contango associated with the Roll is more likely to stand out in contrast. Furthermore, the relative lack of liquidity in a bust scenario is also likely to amplify (or fail to cushion) the inefficiencies generated by Roll activity.

Some commodities displayed the opposite effect: an amplified contango bias during the Roll Period in the boom. One explanation may be an increase in momentum-strategy capital, which is typically trend-following in nature, deployed during this time.

The differences associated with the various components of the Roll Cycle and the Boom/Bust cycles for each of the components of the GSCI suggests strongly that the specific futures price effects vary among the individual futures markets based on the characteristics of the respective futures and cash markets. For example, grains can be relatively easily and inexpensively stored and value is not as sensitive to delivery time, compared with energy products. As a result, "cash and carry" tactics in response to price signals (which, according to the present analysis are *misleading* signals) are more easily carried out by swap dealers or others. These distinctions suggest that further study into the behavior of specific market participants around the Roll Periods would yield even better information regarding the mechanics behind the correlation of the Roll Cycle with a contango bias. Such an analysis could feasibly be conducted only by the CFTC, given its reliance on sensitive non-public data, which only the CFTC has access to.

The authors also found some evidence to suggest that the magnitude of the impact of the Roll on the curve is related to the number of contracts held (and therefore rolled) by Index Funds. However, the evidence also suggested that in times of stress, market liquidity conditions are the biggest determinant of the magnitude of the roll impact. *Taken as a whole, these results suggest that even in normal times, markets are unable to arbitrage out the impact of Commodity Index Traders, and that in times of stress this inability becomes even more pronounced.* This implies that Commodity Index Traders create volatility in

commodity price curves, especially when markets are already under stress. This raises the question of why CITs should be tolerated in the commodities futures markets by bona fide hedgers, as there seems to be a direct cost borne by hedgers in exchange for CIT participation.

Commodity-Specific Results

Crude Oil

All the crude oil tests demonstrated statistical significance. All but one (pre-roll vs. post-roll) were significant at the 99% level. Hodges-Lehman median estimator gives a 10 cent contango bias for the roll-and-pre-roll combined versus 7-day periods during which there was not any index fund rolling taking place. The average (mean) contango widening was $0.27 per roll-and-pre-roll. On three occasions a single roll-and-pre-roll added more than a dollar of contango, and on one occasion it added more than 2 dollars in a single roll ($2.08 in Jan 2009), followed by another large contango of $1.66 in Feb 2009. Interestingly, the neighboring non-roll control periods showed the opposite tendency, generating a large backwardation of -$2.91 and -$1.22. Patterns like this one suggest there can be a high degree of volatility that is generated by the back-and-forth process between the roll generating contango and the subsequent arbitrage driving the curve back towards normal backwardation. In combination with the fact that for smaller contango events, the subsequent expected offsetting backwardation event *did not* occur, these results further suggest that significant arbitrage may *only* be triggered when the dislocation caused by the Roll is sufficiently large to allow for relatively low-risk profits, while at other times *market participants deem it too risky to engage in arbitrage strategies*. This has obvious implications for broad commodities market liquidity.

The net impact of roll-and-pre-roll days over the entire sample period was a contango of $11.20. The net impact of non-roll days over the entire sample period was a backwardation of - $14.00 (spread between the contract sold during the roll and the longer-dated contract bought during the roll). A typical Roll-and-Re-Roll over the observed period would generate a contango roughly 1.7 times the size of the backwardation generated during a non-Roll 7-day period. This has clear and significant implications with respect to efficient pricing. If one assumes a baseline scenario of no change in the shape of the curve (so that all the contango yield added during the Roll Period is a function of artificial index fund activity rather than supply and demand fundamentals), this implies it takes 11.7 trading days to restore the curve to its "true" underlying shape. Therefore, based on this ratio, one could make the observation that for 18.7 trading days per month (out of a total of around 20) the curve remained distorted, *with arbitrage only just reinstating fundamental value in time for it to be distorted anew by the next index fund roll.*

Heating Oil

The tests displayed the same basic shape of results as crude oil, however in all cases the magnitude of the Mann-Whitney U-Test statistic was insufficient to be statistically different from zero. Interestingly, however, the Hodges-Lehman median estimator gave the same high 10 cent value for contango bias for the roll-and-pre-roll combined versus 7-day periods during which no index fund rolling was taking place. When summed, the net impact of roll-and-pre-roll days over the entire sample period was a contango of $9.69. The sum of the net impact of non-roll days over the entire sample period was only a backwardation of - $6.56 (the spread between the contract sold during the roll and the longer-dated contract bought during the roll).

Wheat

Wheat also showed strong results, with significance at the 99% level for the pre-roll vs. post-roll test, and significance at the 95% level for the roll-and- pre-roll combined test. The Hodges-Lehman median estimator gave a median value of 50 cents contango bias for the roll-and-pre-roll combined versus 7-day periods during which no index fund rolling was taking place. The average contango spread widening was $1.09 per roll-and-pre-roll, though this rose to as high as $1.50 per roll during the "boom" period of Q2 2006 - Q2 2008. Interestingly, much of the contango effect for wheat occurred during the 2-day pre-Roll Period, suggesting the presence of powerful front-running speculative forces. This was reflected in the fact that the 7-day tests showed significance at the 95% level, while the 5-day tests just yielded results that were not significantly different from zero. Consistent with the thesis that speculative forces play a more prominent role in the wheat market, the ratio between a typical roll contango and a typical non-roll backwardation was 0.61 (compared with 1.7 for crude oil). This implies, assuming a baseline scenario of no change to the curve, that it takes only 4.3 trading days for the Wheat curve to return to a fundamentally derived shape, versus 11.7 days for crude oil. Thus, while in crude oil, the roll could be considered to distort the curve for almost the entire calendar month, in Wheat it distorts the curve for roughly half the month (the 7 trading days of the Roll Cycle, and the 4.3 trading days following it).

Corn

Corn showed weaker results than wheat, showing significance at the 99% level for the pre-roll vs. post-roll test, but narrowly failing to meet the 90% threshold for the 5-day and 7-day tests. However, the Hodges-Lehman median estimator did give a median value of 25 cents of contango bias for the roll-and-pre-Roll Periods combined, versus 7-day periods during which index fund rolling was not taking place.

Interestingly, as in the case of wheat, the contango impact of the roll in corn markets since 2004 showed no statistical difference from the contango impact of the roll prior to 2004. This strongly suggests that for these commodities, speculative arbitrage and/or momentum effects before and after the roll may have a larger effect on the shape of the curve than during the actual 5-day Roll Period itself.

CONCLUSIONS

Trading activity during the Roll Cycle causes greater contango in commodities price curves than is justified by supply and demand fundamentals.

There is a strong bias towards contango during the Roll Cycle. This is particularly pronounced in the crude oil market, and can become amplified during periods of extreme price volatility.

This bias is an artifact of the roll itself. It did not exist prior to the rise of CIT trading, and is not present outside of the roll window. The persistence and strength of bias toward contango during the Roll Cycle, together with the absence of such bias during the Control Period, strongly indicate that it is the trading activity during the Roll Cycle that is causing the contango bias.

During the observation period, futures price curves have reversed historic relationships so that the curves have remained persistently in contango. A significant reason for this has been the CIT-related trading activity during the Roll Cycle.

The absence of bias toward contango during the Control Period indicates that forces other than those associated with the Roll Cycle generating contango have been weak. The forces generating contango are largely limited to the Roll Cycle, a period that is defined primarily by speculative trading activity rather than typical supply and demand forces.

CIT trading activity has impaired the price discovery function of futures markets.

Price curves in contango signal rising prices and thus *de facto* encourage hoarding activity. Commodities index funds are promoted and structured by swap dealers in order to mimic the conditions associated with the condition of owning and storing physical commodities for institutional investors. Therefore, the signals generated are consistent with the synthetic investment. As a result, behavior by other participants in the market is influenced by these practices as to be consistent with hoarding, which then induces *actual* hoarding behavior by other market participants in order to take advantage of perceived rising prices (as reflected in the forward commodities futures price curve).

In fact, there are no transparent mechanisms for other market participants (especially those not privy to customer-specific Roll requirements) to discern that the bias towards contango is only generated by Roll-related trading activity, rather than some supply and demand force. As a result, the futures markets now provide information that is derived from an artificial financial source. Unfortunately, this false signal becomes misinterpreted by many market participants as a sign that higher prices in the forward shape of the curve are due to commodities fundamentals, rather than from the direct activities of the CIT ecosystem.

While market participants undoubtedly sense that the CITs cause price distortion, many strong advocates of the belief in efficient markets, functioning in the context of widely shared information, continuously opine that prices are *only* affected by fundamentals. This falsehood then serves to *reinforce* the artificial and misleading price signals generated around the Roll Cycle.

Trading activity by CITs causes prices for physical commodities to be higher during periods in which the misleading price signals of contango are seen as credible.

Several prior works have described how the price level of the next maturing futures contract are transmitted to related physical prices through contracting practices and physical price indices using that futures price as a reference.[52] So long as the signaled rising price in the futures market is seen as credible, these commodities will be priced against the futures reference price (plus basis, which will reflect local delivery-point conditions).

Furthermore, the misleading price signals (again, which really just reflect the synthetic hoarding of physical commodities by institutional investors adhering to the Commodity Index Fund structure) induce a perceived value into the market that encourages more hoarding. In fact, under these conditions, *the price required to induce supplies to meet current demand must be higher than if the misleading price signal did not exist.*

Trading activity by CITs also causes prices for physical commodities to be higher as a result of increased volatility.

It is demonstrated that CIT-related trading activity affects futures prices in a persistent manner that is not immediately and fully rectified by arbitrageurs. In this case, the misleading price signals are so strong, and also reinforced by consistent fundamentals-based analysis by market professionals, that the associated price signals also suggest the existence of additional or misunderstood supply and demand information to market participants. This situation is made more acute because the capital required (and attendant liquidity risk) for arbitrageurs to overcome the CIT trading forces is a very high bar, especially during times of market stress.

In fact, CIT-created price volatility makes the affected markets *more* attractive for speculative volatility traders whose strategy focuses on price swings rather than fundamentals. It is also particularly well suited for algorithmic and high frequency speculative trading strategies. Thus the increased participation by more speculators employing such strategies increases the amplitude of price moves, creating a kind of volatility feedback relationship.[53]

As a consequence, the futures markets become less able to function based on fundamentals-based information in a reliable enough manner so that they can achieve maximum practical efficiency and better resource allocation. Prices for affected contracts also vary greatly from levels that would be experienced if information were transparent. These conditions of uncertainty and non-fundamental forces cause prices to vary significantly from a corollary marketplace that does not have these embedded practices.

Moreover, this associated price volatility in effect constitutes a market tax that is borne by hedgers. It is a cost of business, whether expressed in the need for larger sources of liquidity to fund margin or simply the risk of doing business in an environment rendered more uncertain by the opaque impact of non-fundamental forces. As a result, prices

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[52] Position Limits Comment Letter (*see* footnote 4, *supra*); Masters and White, "The Accidental Hunt Brothers," available at www.accidentalhuntbrothers.com.

[53] When enough traders trade volatility, the very fact of their doing so will tend to increase volatility. *See* De Long, J. Bradford *et al.*, 1990, "Positive Feedback Investment Strategies and Destabilizing Rational Speculation," Journal of Finance, American Finance Association, vol. 45(2), pages 379-95, June.

required to induce supply must increase more in a market endemic with CITs, versus a market without them.

This analysis, viewed in conjunction with Singleton (2011), suggests that increasing volumes rolled during the Roll Period also increase the size of the contango bias, which in turn measurably increases futures prices. The possible interaction of the findings in this analysis combined with the Singleton study warrant further inquiry.

Singleton (2011)[54] has demonstrated that CIT crude oil trading activity in the form of increased long futures positions in order to hedge risk arising from investment inflows into commodity index funds measured over 13-week periods is strongly correlated to increases in futures contracts prices. He further demonstrated that this correlation is far stronger than the correlation between relevant fundamental factors and such price increases.

These findings are more intriguing when considered in conjunction with the conclusions stated above. Investment inflows affect the size of the Roll on a delayed basis. This is especially true to the extent that the CIT buys the second expiring contract to hedge inflows rather than the contract which expires at the end of the current month, thereby effectively skipping a Roll Cycle rather than hedging for such a brief period. Furthermore, the longer measurement period would also capture building Roll volumes in a directional market during which investment quantities are accreting. Since commodities index funds are almost always long only, this situation may coincide with boom cycles.

All of this could reinforce the authors' conclusion that the Roll Cycle tends to increase price levels and also generate added price volatility. It certainly seems logical to assume that the larger a Roll is (in terms of percentage of total trading or open interest), the greater effect it has on furthering contango. A future research effort which combines the lines of inquiry pursued by Singleton and the present analysis could be greatly illuminating.

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[54] Singleton(2011), see note 20, *supra*.

APPENDIX A

Methodology

Data was taken from Bloomberg, except where otherwise noted. All calculations were performed manually in Excel and checked using StatPlus, except for Hodges-Lehmann median estimators, which were simply inspected manually. To identify the Roll Period, an algorithm was developed that calculated the 5th-9th business day of each month, using a list of non-settlement days (holidays) from each of the exchanges, again taken from Bloomberg. This was checked against the simpler method of simply taking the 5th through 9th data points for each month of the Bloomberg daily settlement price data.

To identify the Pre-Roll and Post-Roll, an algorithm was developed that calculated the 2nd-4th business days and 9th – 11th business days, in similar fashion to the above. This was checked against an analogous simple method to that used to check the Roll Period algorithm.

For the 5-day Control Period, all dates included in the Roll Period were eliminated from the data set, and the remaining dates were arranged into consecutive (non-overlapping) 5-day groups. Similarly for the 7-day Control, all dates included in the Roll Period and Pre-Roll Period were eliminated, and the remaining dates sequenced into 7-day groups. The algorithms were inspected manually.

Robustness

In drawing historical comparisons, it was not immediately obvious whether to include 2003 as part of the "Index Fund Era" or as part of the "Historical Control". While there was an appreciable rise in commodity index investment in 2003 versus the other years of the Historical Control, it was not yet close to the elevated levels of 2004 onwards, which we classed as Index Fund Era. Therefore, for our primary analysis we omitted 2003 entirely. Including 2003 in either the Control period or the primary data set did not significantly change the results, though in both cases it tended to slightly weaken them, consistent with

the hypothesis that Index Funds had a small impact in 2003 and a large impact once their presence reached a critical mass in 2004-5

Kolmogorov-Smirnoff tests were applied to all of the data sets to test for normality, with the null hypothesis of normality rejected in all cases. This is consistent with the findings of several other analyses.[55] Consequently, the authors used the non-parametric Mann-Whitney U-Test, which compares distributions non-parametrically, and gives a statistical measure of the degree to which the median price change in the Roll sample differs from the median price change in the Control sample. That test was then supplemented by a Hodges-Lehmann estimator, in order to gauge the size and direction of the difference. Simple median differences of the two samples were also calculated. In general, using the simple median difference did not change the sign, though it generally gave a slightly lower estimate of the magnitude of the difference between Roll and Control. This was supplemented with a simple mean difference, which in almost all cases did not change the sign, and which also tended to give a slightly higher estimate of the magnitude between Roll and Control. We followed other authors in taking the Hodges-Lehmann estimator to be the most reliable indicator of the sign and magnitude of the difference in distribution medians.[56]

In some commodities, especially grains, a few extreme events dominated the data. In theory, the Mann-Whitney and Hodges-Lehmann non-parametric approach should mitigate this situation. Authors also tested various smoothed data sets, and found that this approach did not change the basic shape of the results, though it strengthened the p-value for both wheat and corn 5-day and 7-day tests, suggesting that occasional extreme contango events outside of the Roll window may distract market observers from the more consistent, but less extreme, contango events that regularly occur during the Roll window. However, since the contango events during the Roll are not arbitraged out, the cumulative effect over time proves to be larger (and potentially far more damaging) than isolated temporary contango effects occurring outside of the Roll (that soon revert to the mean).

We also found some evidence to suggest that the magnitude of the impact of the Roll on the curve is related to the number of contracts held (and therefore rolled) by Index Funds. However, the evidence also suggested that in times of stress, market liquidity conditions are an even bigger determinant of the magnitude of the roll impact. Taken as a whole, these results suggest that even in normal times, markets are unable to arbitrage out the impact of Commodity Index Traders, and moreover, that, in times of stress, this inability becomes even more pronounced. *This implies that Commodity Index Traders create volatility in commodity price curves, especially when markets are already under stress.*

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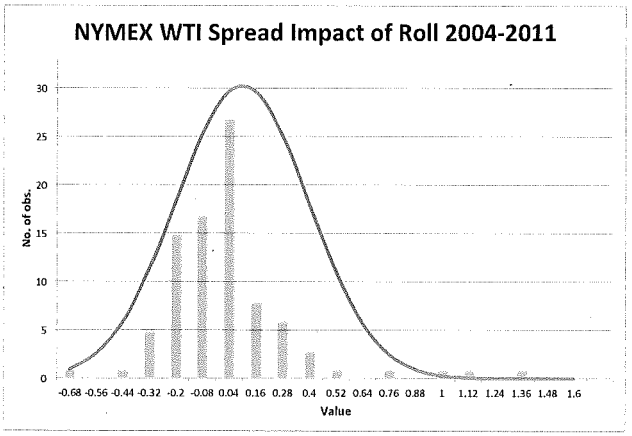
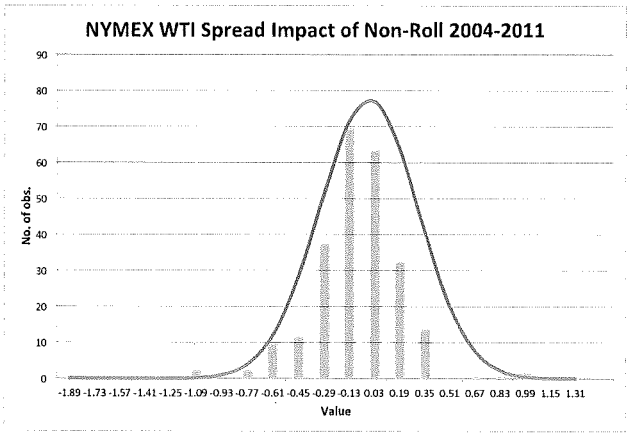
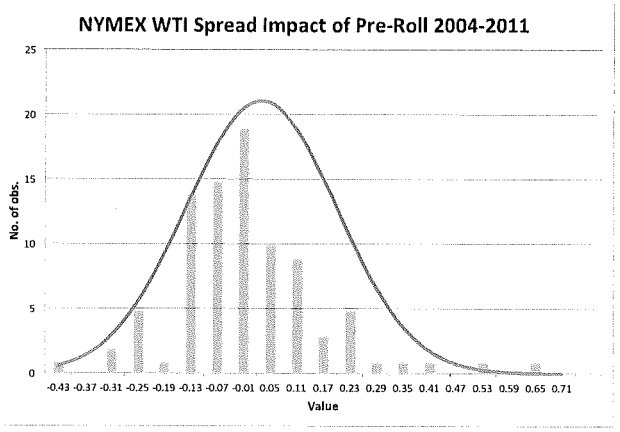
[55] *See* note 35 *supra*.
[56] *See* note 36 *supra*.

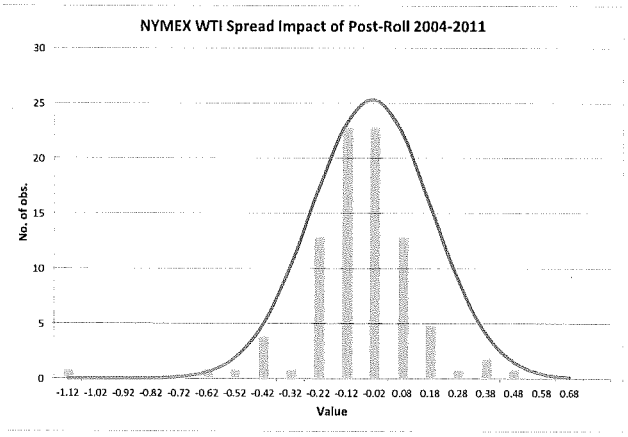


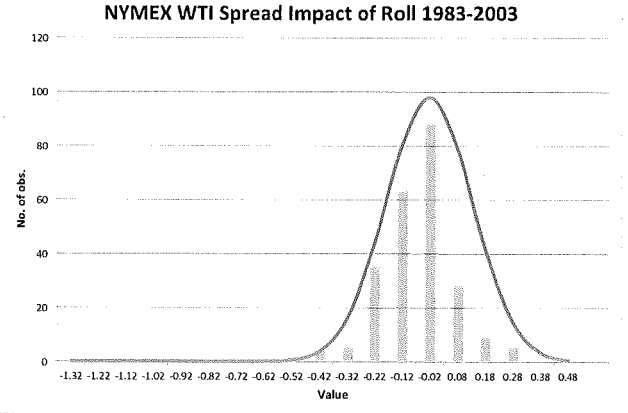
APPENDIX A

Histograms




NYMEX WTI Spread Impact of Pre-Roll 2004-2011
No. of obs.
25
20
15
10
5
0
-0.43 -0.37 -0.31 -0.25 -0.19 -0.13 -0.07 -0.01 0.05 0.11 0.17 0.23 0.29 0.35 0.41 0.47 0.53 0.59 0.65 0.71
Value


NYMEX WTI Spread Impact of Post-Roll 2004-2011
No. of obs.
30
25
20
15
10
5
0
-1.12 -1.02 -0.92 -0.82 -0.72 -0.62 -0.52 -0.42 -0.32 -0.22 -0.12 -0.02 0.08 0.18 0.28 0.38 0.48 0.58 0.68
Value


NYMEX WTI Spread Impact of Roll 1983-2003
No. of obs.
120
100
80
60
40
20
0
-1.32 -1.22 -1.12 -1.02 -0.92 -0.82 -0.72 -0.62 -0.52 -0.42 -0.32 -0.22 -0.12 -0.02 0.08 0.18 0.28 0.38 0.48
Value

BETTER MARKETS
TRANSPARENCY · ACCOUNTABILITY · OVERSIGHT

March 28, 2011

Mr. David A. Stawick
Secretary
Commodity Futures Trading Commission
Three Lafayette Center
1155 21st Street, NW
Washington, DC 20581

Re: Position Limits for Derivatives
(CFTC RIN 3038-AD15 and 3038-AD16)

Dear Mr. Stawick:

Better Markets, Inc.[1] appreciates the opportunity to comment on the above-captioned proposed rules (the "Proposed Rules") of the Commodity Futures Trading Commission ("CFTC"), the purposes of which are to establish position limits for certain physical commodity derivatives, as required by and pursuant to provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act").

INTRODUCTION

This letter demonstrates, with extensive analysis and empirical data, the following facts:

- speculation in commodity markets has dramatically increased and is excessive;
- excessive speculation has caused increased volatility and increased prices in the futures markets;
- price increases in the futures markets directly affect physical market prices and, thereby, have increased prices in the underlying commodities;
- while increased volatility and prices have increased the need for hedging by physical producers and purchases, the increased costs to such hedgers as a result of the above have caused physical producers and purchasers to hedge less;

[1] Better Markets, Inc. is a nonprofit organization that promotes the public interest in the capital and commodity markets, including in particular the rulemaking process associated with the Dodd-Frank Act.

- much of this, but certainly not all, has been caused by the creation and explosive growth of commodity index funds;
- those commodity index funds are liquidity takers and not liquidity providers while depriving bona fide hedgers of sufficient market liquidity; and
- those commodity index funds have disrupted the commodities futures and physical markets in ways that distort price discovery.

In sharp contrast to much larger capital markets, commodity markets exist for the purpose of providing a venue for producers and purchasers of physical commodities to hedge their risks. Financial speculators are tolerated as commodity market participants solely to ensure that physical hedgers have sufficient liquidity. Historically, when commodity markets have worked well (i.e., when there is sufficient liquidity and meaningful price discovery for all physical hedgers who want to hedge), physical hedgers have constituted about 70% of the market and financial speculators have been about 30% of the market.

However, since deregulation a decade ago and Wall Street's creation, marketing and sales of so-called commodity index funds (now with an estimated $300 billion invested in the commodity markets) and other financial derivatives that allow institutional investors to speculate in the commodity markets, those circumstances have been turned upside down. Today financial speculators have overwhelmed the commodity markets and driven out bona fide physical hedgers. The percentage participations have reversed in many markets with speculators now accounting for about 70% or more of the open interest in these markets while physical hedgers have fallen to only about 30% participation (and much lower in some markets). These facts (as set forth above and demonstrated below) require the CFTC to take action now to restore the commodities markets to their intended purpose.

The only way to do that effectively, and to fulfill its statutory duties (imposed by the requirements of the Dodd-Frank Act and the Commodities Exchange Act), the CFTC must strengthen its Proposed Rules by imposing aggregate position limits on excessive speculation, including in particular applying such limits to commodity index funds as a group or class (as specifically provided for in the law).

The statute requires the CFTC to establish such limits on the size of futures and options positions and swap positions held by "any person, including any group or class of traders," to achieve four express purposes:

(i) to diminish, eliminate, or prevent excessive speculation as described under this section;-

(ii) to deter and prevent market manipulation, squeezes, and corners;

(iii) to ensure sufficient market liquidity for *bona fide* hedgers; and

(iv) to ensure that the price discovery function of the underlying market is not disrupted.[2]

Congress also gave the CFTC broad new authority to implement position limits to achieve these goals. These provisions represent a Congressional intent to revise and expand regulatory control over the excessive speculation that is currently predominant in the commodity futures markets.

While the proposed rules adequately deal with the purpose of the statutes regarding deterring and preventing market manipulation, squeezes and corners (purpose ii above), they are totally inadequate in achieving purposes i, iii and iv. To satisfy the statutory obligation, the CFTC must impose robust position limits and to do so in a manner set forth below.

SUMMARY

The comment letter is divided into sections as summarized here.

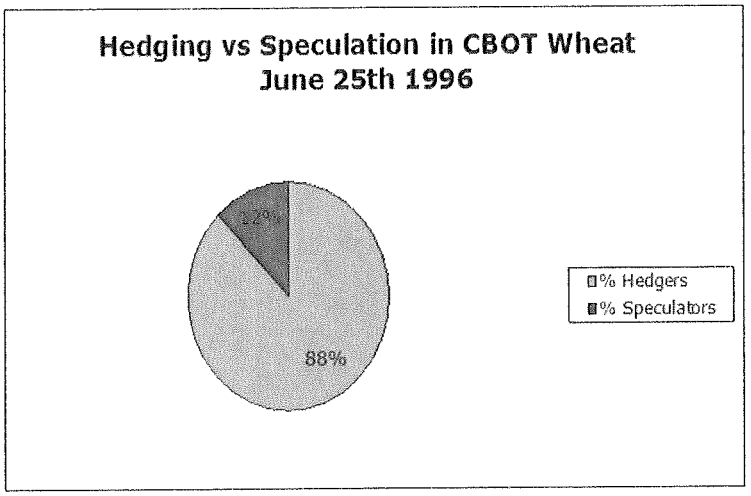
1. Speculation has Dramatically Increased and Has Reached Excessive Levels

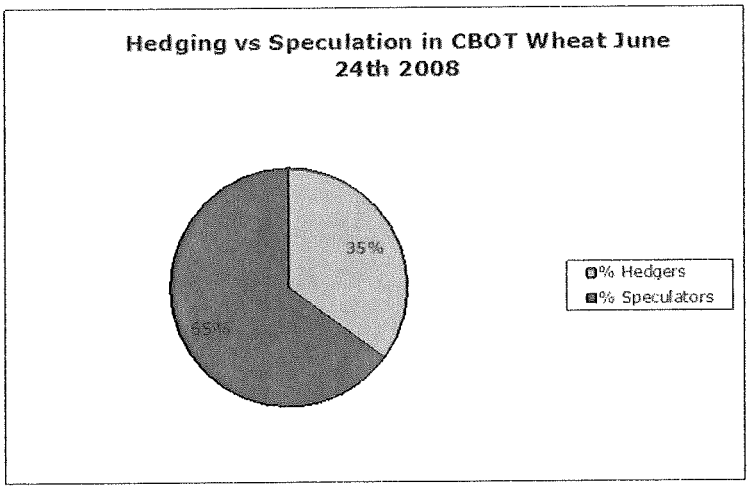
In support of the expansion of the Proposed Rules to limit excessive speculation as well as concentration, we show how specific trading activities in the futures markets directly affect commodity prices. In addition, we demonstrate that current levels of speculation are excessive, and that as a result, the fundamental purposes of the commodities futures markets, as venues for hedging prices of essential products and price discovery, are not being fulfilled. We also show that by interfering with the hedging function of the futures markets, excessive speculation is causing commodity prices to rise, thereby driving up the prices of consumer goods such as food and energy.

This comment letter examines academic works and historical data. It applies knowledge developed independently and by academics to specific market structures and trading strategies, as well as the motivations of categories of participants in the commodities futures markets. It reaches several important conclusions:

[2] Dodd-Frank Act, Section 737(a)(3)(B).

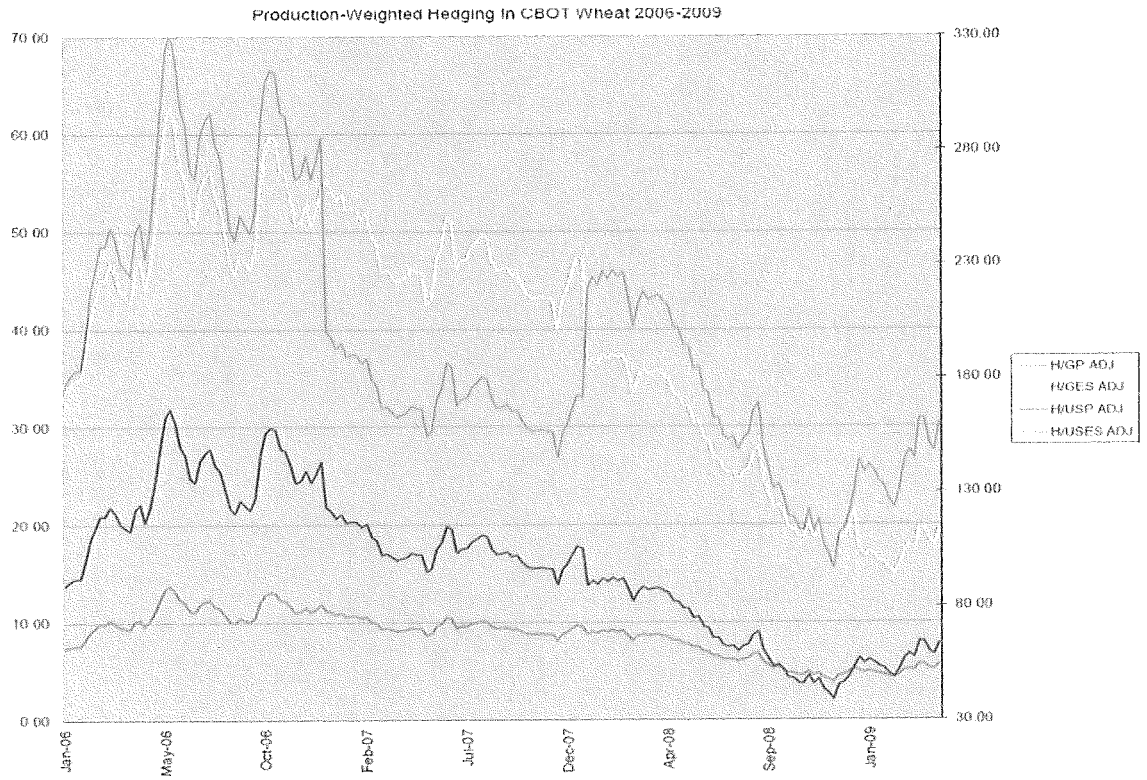
Various commodities markets have experienced periodic and sporadic large net cash inflows, largely deployed to speculative financial trading, compared with earlier periods, as demonstrated by CBOT wheat in the following charts:





There is a strong and demonstrable relationship between futures market volatility and the level of speculative inflows and associated new trading in those markets. This additional speculative trading far exceeds amounts necessary to provide liquidity for hedgers and, as a consequence, has increased price volatility in these markets.

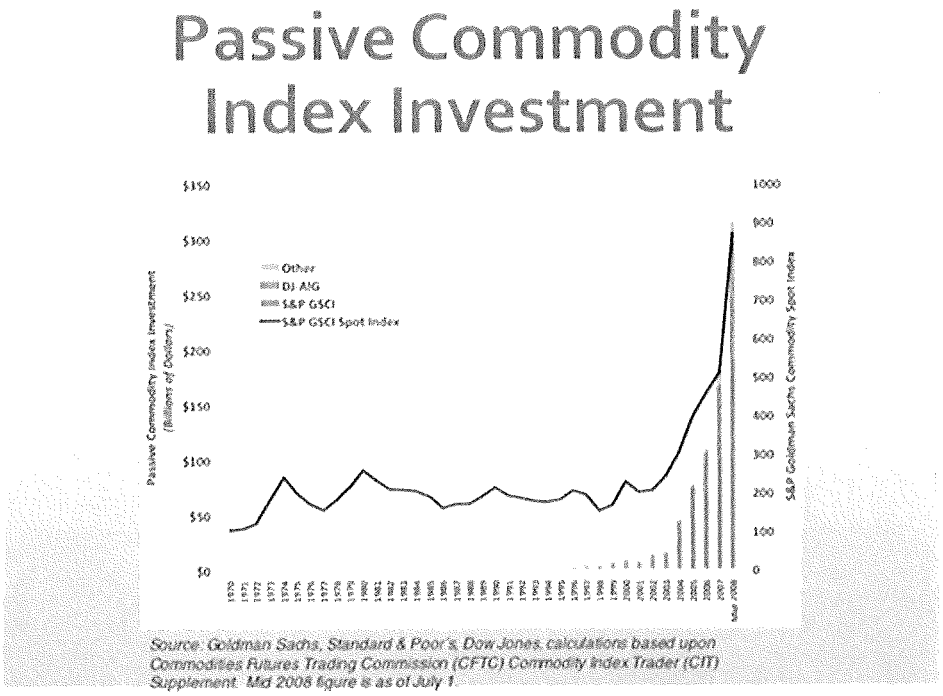
Hedging as a percentage of production has been decreasing for years. Hedgers report that the reason for their reduced hedging activity is the increased costs. Futures price volatility, which is strongly related to margin requirements, is the major source of this increased cost. As margin levels increase sharply because of futures price volatility, hedgers cannot afford the additional cost and are forced to abandon management of their price risk by hedging in futures markets. Just one example is the chart below which shows the drop of physical hedging in the CBOT Wheat market from 2006 to 2009:



1825 K Street, NW, Suite 1080, Washington, DC 20006 TELEPHONE (1) 202.618-6464 FAX (1) 202.618.6465 WEBSITE bettermarkets.com

- The increased cost of hedging has increased the cost of doing business for hedgers. For those who are no longer able to hedge because of costs, the price risk that they bear as a result is an indirect cost. Because producers are much more likely to hedge than commodity purchasers, and because the demand for essential commodities is relatively inelastic, these costs are passed along to consumers.

This letter also focuses specifically on index funds and index-based institutional strategies (collectively, "commodity index funds"), including their growing presence in the commodity futures markets, which cannot be overstated as shown in this chart:



In addition, we identify the specific, structural attributes of commodity index funds that influence commodity futures prices and, as a consequence, physical commodity prices as well. Generally, the trading motives associated with commodity index funds do not include the price effects of commodity-specific supply and demand factors and, as a consequence, disrupt price discovery and tend to de-link futures prices from fundamentals. In addition, the periodic roll of positions inherent in their structure, biases these futures markets to a contango forward curve. This increases prices through widely used delivery price-setting mechanisms. The following conclusions will be shown:

- Commodities index funds do not provide liquidity; in fact they are ***liquidity takers.*** Because commodity index funds consume and compete for liquidity, their activity has contributed significantly to futures price volatility.

- Futures prices over time have persistently been in a state of contango over an extended period for a majority of commodities. Commodity index fund investment has been a significant portion of futures trading activity during this period. A structural feature of commodity index fund market activity is the ongoing need to roll expiring futures contracts into futures contracts of greater duration near the end of each trading month. This practice bids up the price for longer duration futures. The commodity index fund roll has contributed significantly to fostering a contango forward curve in many commodities futures markets.

- In many markets, contracts for the physical purchase of commodities are indexed to nearby futures price.

- As a result of excessive speculation in general, and commodity index funds in particular, the forces behind convergence of futures prices to fundamental prices are less effective, which reduces the value of futures contracts as hedges. As a result, the costs of production have subsequently increased because hedging futures are less valuable as risk-mitigating instruments.

- With the futures prices of many commodities elevated significantly by excessive speculation and also with the forward price curves in a persistent state of contango as a result of commodity index fund activity, ***the prices of physical commodities have been structurally pushed higher.***

2. The Harmful Impact of Excessive Speculation

Excessive speculation is contributing to dramatic and unnecessary increases in the price of commodities such as food (wheat up 79.8% in 12 months), energy (heating oil up 47% in 12 months) and textiles (cotton up 140% in 12 months), which people depend upon not only for a decent quality of life, but for survival as well. For the vast majority of Americans, already beleaguered by years of deep and persistent recession, these price increases are a

heavy burden. For people in underdeveloped countries, many of whom already live on the verge of starvation, these price increases are a matter of life and death. It is therefore imperative that excessive speculation be brought under control through the establishment of effective position limits.

3. The Ample Statutory Authority and Specific Statutory Requirements

In the Commodity Exchange Act of 1936, Congress recognized that excessive speculation causes "sudden and unreasonable fluctuations or unwarranted changes" in commodity prices, resulting in "undue and unnecessary burdens on interstate commerce." For that reason, Congress charged the CFTC with establishing position limits to curb excessive speculation and its burdensome consequences.

However, the position limits that the CFTC implemented under the authority of those statutory provisions have proven to be wholly inadequate to contain excessive speculation, especially in the form it has taken over the past decade. To address this problem, Congress, in the Dodd-Frank Act, gave the CFTC new tools for establishing effective position limits, including the authority to set limits for "any group or class of traders." Moreover, Congress mandated that the CFTC use those tools to achieve four objectives, top among them being to "diminish, eliminate, or prevent excessive speculation." Unless the Proposed Rules are enhanced to take full advantage of the new authority granted to the CFTC in setting position limits, Congress's mandate will not be fulfilled, commodity markets will continue to be dysfunctional, and consumers will suffer the hardship of dramatic inflation in the cost of essential products ranging from gasoline to groceries.

4. The Proposed Rules Must be Changed to Impose Robust Position Limits

The Proposed Rules do nothing to, diminish, eliminate, or prevent excessive speculation, which is the first priority under the Dodd-Frank Act. They also fall short of accomplishing two of the other stated objectives in the Dodd-Frank Act, which are directly related to the consequences of excessive speculation: ensuring adequate liquidity for hedgers and preserving the price discovery function of the market. As described below, excessive speculation, especially indexed-based vehicles and tactics, materially affects levels of liquidity needed to provide physical hedgers with sufficient liquidity and dramatically impairs price discovery.

Therefore, the CFTC must make a number of specific changes to the Proposed Rules. Above all, the rules must impose a new regime for limiting excessive speculation generally and commodities hedge funds specifically, which will overlay the concentration limits in the Proposed Rules. In addition, the CFTC must strengthen the Proposed Rules in the following ways:

- Aggregate position limit rules on excessive speculation must be applied immediately to the futures markets. There is no reason to wait for additional data on swaps markets.

- Concentration position limits applicable to the futures markets must be applied immediately as well. The Proposed Rules call for separate position limit regimes for futures, swaps and the two combined. Information from large swaps dealers may be needed for swaps and swaps/futures combined. The CFTC must implement the futures regime first and immediately, which do not require any such information.

- Commodity index fund investor positions must be aggregated because they are "acting pursuant to an expressed or implied agreement or understanding," ***as specifically provided for in the statute.***

- The "look-through" exclusion of positions offsetting swaps entered into with a customer who is entering into a bona fide hedge is a huge and unjustifiable loophole and must be deleted.

- The measurement of compliance must be more frequent.

- The standards included in the definition of a "referenced paired futures contract, option contract, swap or swaption" must be amended to more accurately reflect market practices and realities.

5. Appendix

The relationship between excessive speculation and commodity price increases is supported not only by the weight of empirical evidence but also by a large group of respected experts who have done studies on the subject. Nevertheless, some academics have contended that excessive speculation has not been responsible for the sharp commodity price increases witnessed in recent times. To put this debate in a fresh perspective, the Appendix reviews the extensive literature supporting the relationship between excessive speculation and commodity price increases and also examines some of the principal arguments advanced by those who discount the existence of this relationship. All of the authorities and studies cited in the Appendix and elsewhere in this comment letter are incorporated herein by reference as if fully set forth herein.

Table of Contents

Part 1. Speculation Has Increased Dramatically and has Reached Excessive Levels

Section I: Data Show That Commodity Markets Have Undergone A Radical Transformation

Commodity Markets Exist For Producers and Purchasers to Hedge Risks

The current state of commodity markets must be viewed in the context of the purposes for which these markets exist.

The Commodities Exchange Act statutorily establishes the purpose of commodities markets:

> (a) Findings. The transactions subject to this chapter... are affected with a national public interest by providing a means for managing and assuming price risks, discovering prices or disseminating pricing information through trading in liquid, fair and financially secure trading facilities.
>
> (b) Purpose. It is the purpose of this chapter to serve the public interests described in subsection (a) of this section....[3]

Any speculation in the commodities futures markets must serve, and certainly must not harm, the public interests as described above. Speculation is not acceptable to the extent that the central goals of providing hedges to manage risk and price discovery are impaired or, even worse, if the people intended to be benefited are harmed. ***Commodities futures and over-the-counter markets do not exist to provide speculative financial investment opportunities for institutions and individuals so that they can profit from trading.***

There are two primary reasons that futures markets for physical products exist. Producers and buyers of commodities can benefit from hedging price risk. Hedging can reduce future price uncertainty in their businesses. In addition, wide availability of information from a broad marketplace devoted exclusively to benchmark futures pricing based only on fundamental supply and demand helps to facilitate discovery of the most efficient price for a commodity.

Properly functioning commodities futures markets help *bona fide* hedgers to hedge price risk, which ultimately reduces the cost to the public at the supermarket, the gas station and in other transactions. In fact, when futures markets are working correctly, efficient

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[3] CEA, Section 5

hedging and price discovery by hedgers can help foster broad economic growth and stable employment. The value of futures markets to the society is measured by how well they serve these goals.

Recent years have seen a persistent coincidence of:

- Large increases in the flow of money for speculative purposes into the futures markets, well beyond the demand of hedgers for counterparties.
- The rise of investment vehicles with large amounts of money under management and very specific trading strategies which are completely unlike those historically employed in futures markets.
- Significant increases in the volatility of futures prices.
- Persistent state of contango in many commodities futures markets forward price curves.
- A steady decline over much of the last decade of the use of hedging by producers and purchasers of commodities to manage the price risks in their businesses, measured by contracts held by short hedgers vs. production, and contracts held by long hedgers vs. consumption.
- Historically high prices for commodities, mitigated only by the contraction in business activity following the recent financial crisis.

As the markets became more accessible and automated in the decade following enactment of the Commodity Futures Modernization Act of 2000 ("CFMA"), decreased regulation allowed them to mutate in many ways. In the futures markets, the level of speculative trading had historically been in the range of 15-30% the total market.[4] As indicated by the charts below,[5] this relationship began to change dramatically, as the percentage of speculative activity increased.

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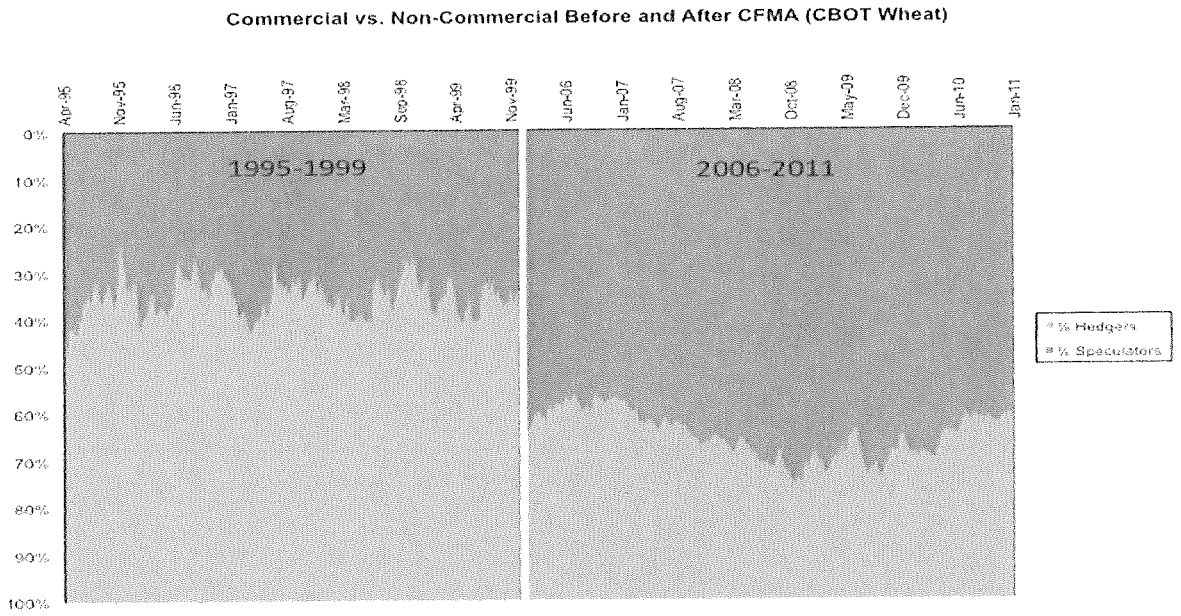
4 *See* e.g. Working (1960), Peck (1981).

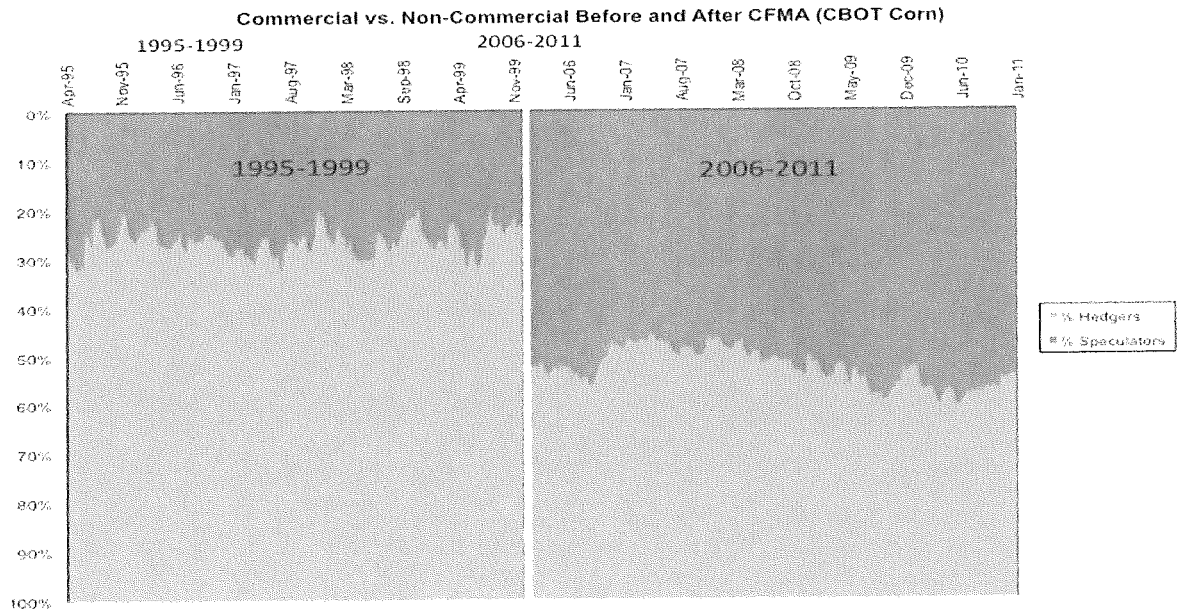
5 Pre-CFMA percentages are calculated from the CFTC COT report as commercial vs. non-commercial. Post-CFMA percentages are calculated from the CFTC CIT report as [CIT + Non-Commercial No CIT] vs. Commercial. The charts below are intended as a representative sample, but calculations have been run for all commodities in the CIT report. The percentages are highly robust across all commodities for which data is available, and do not change dramatically if spreads are included or not. The full data set is accessible online at www.bettermarkets.com.

Hedging and Speculation Before and After CFMA

The charts below show how open interest (including spreading) has changed since CFMA, with speculators now controlling a far greater proportion of the market than in the past. For both wheat and corn, the dominant category of participant has reversed: non-commercial speculators have gone from around 30% of the market to around 70% in wheat, and from around 25% of the market to around 5% in corn.

Source: CFTC COT Report for pre-CFMA and CFTC CIT report for post-CFMA.

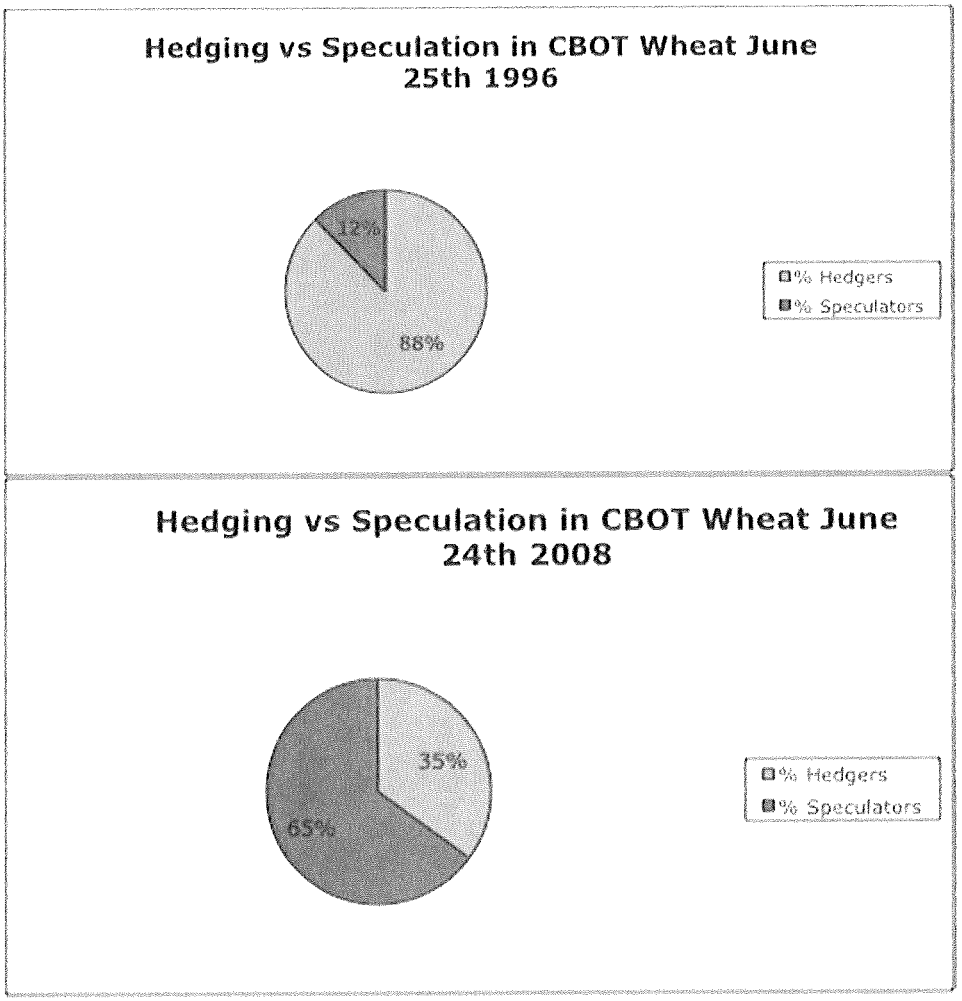


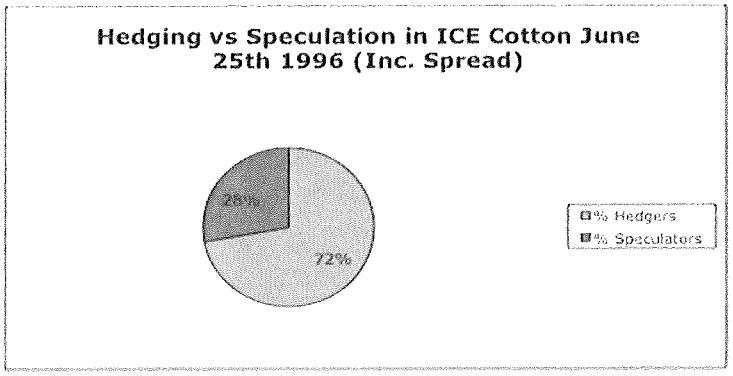


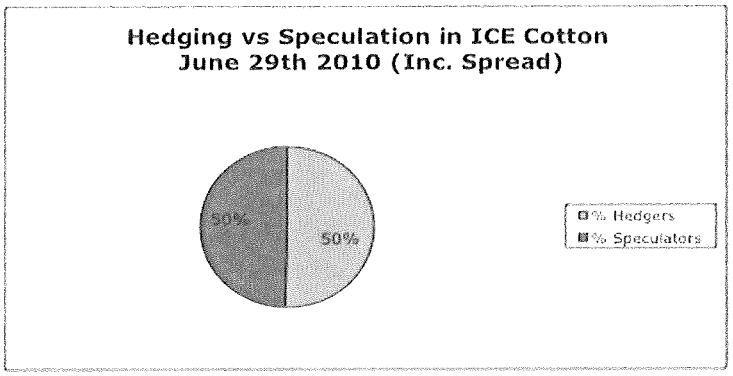
Hedging and Speculation Before and After CFMA

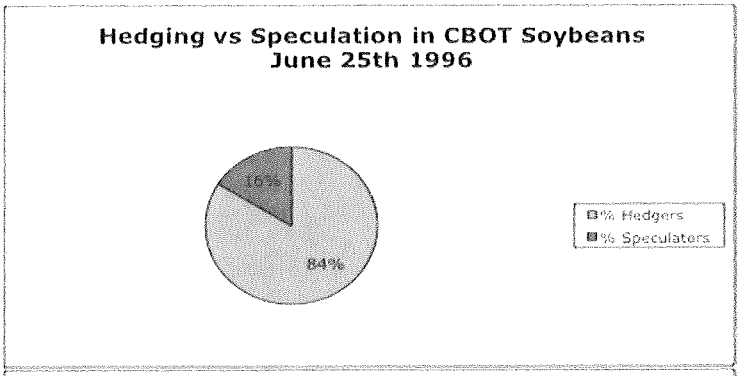
The pie charts below show how open interest has changed since CFMA for a wider range of commodities. As with wheat and corn, the change is dramatic for all commodities studied. The results are robust whether spreading is included or not. Therefore some commodities are shown with spreading included, and others without.

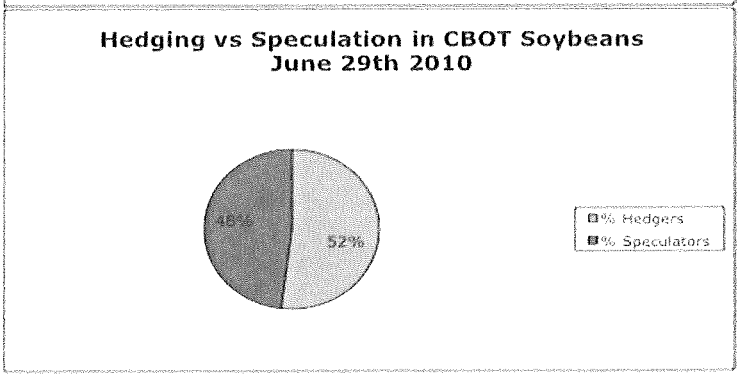
Source: CFTC COT Report for pre-CFMA and CFTC CIT report for post-CFMA.

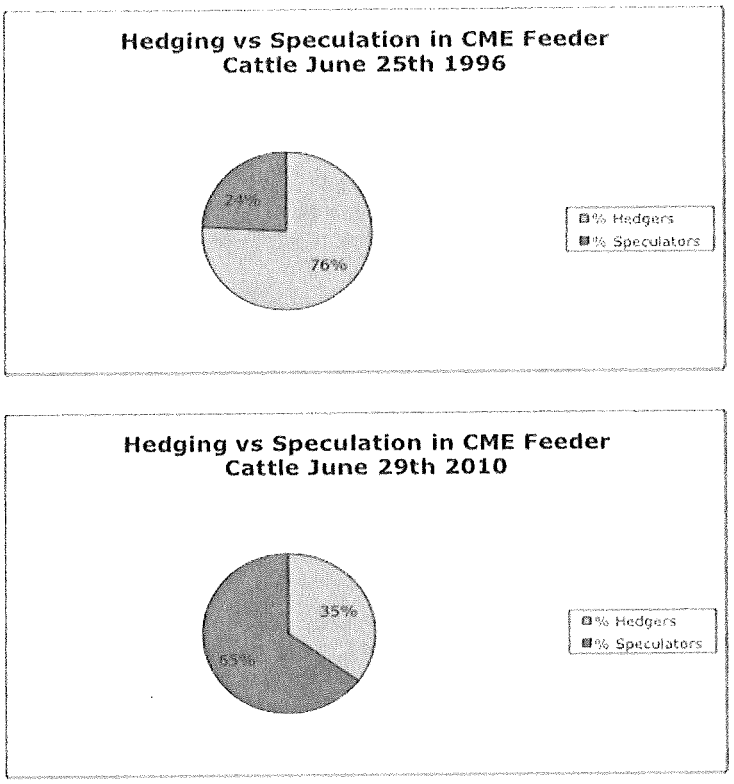



Hedging vs Speculation in ICE Cotton June 25th 1996 (Inc. Spread)
28%
72%
% Hedgers
% Speculators


Hedging vs Speculation in ICE Cotton June 29th 2010 (Inc. Spread)
50%
50%
% Hedgers
% Speculators


Hedging vs Speculation in CBOT Soybeans June 25th 1996
16%
84%
% Hedgers
% Speculators


Hedging vs Speculation in CBOT Soybeans June 29th 2010
48%
52%
% Hedgers
% Speculators



Commodity Index Funds: A New and Powerful Category of Market Participant.

The dramatic shift during these years from hedgers to speculators happened at the same time as the rise of the commodity index fund. Commodity index funds hold long-only positions which are rolled into longer duration positions before they expire every month. The "innovation" was to create a new asset class for investment which continuously reflects a market-basket of physical commodity futures. In the search for a securities-like asset based on commodities prices, Wall Street actually created commodity index funds as a new pseudo- "asset class" which they then could sell to large investors. The following box describes the salient characteristics of commodities index funds.

Sufficient Levels of Liquidity

The primary benefit of speculation in commodity futures market is that it provides liquidity for hedgers and, by arbitraging futures prices which diverge from fundamentals thereby causing them to converge, price discovery. A threshold question in analyzing excessive speculation is how much speculation is required to achieve these benefits.

The concept of liquidity in commodity markets entails two basic categories of participant: (net) liquidity takers and (net) liquidity providers. The first group generally consists of those participants whose need to transact as a function of their underlying business. For commodity markets, this most obviously includes producers, merchants, processors and refiners of a product. The second group includes those participants who do not "need" to transact in the same sense as the first group. Instead, the second group chooses to trade because there is profit to be made either from facilitating the trading of the first group (market making, which is similar to intermediation between long and short liquidity takers), or from trading among themselves, profiting from price moves. In commodity markets, this category most obviously relates to traditional speculators.

The classic picture of a commodity futures market consists of net short hedgers demanding liquidity, and net long speculators providing that liquidity. Even though short speculators do not directly provide liquidity to short hedgers, the group of speculators as a whole does, in fact, do so, and does so more effectively as a result of the presence of the short hedgers.

The hallmark of a market provisioned with *adequate* liquidity is an environment of low and steady bid-ask spreads. This, in turn, should reduce "artificial" price volatility arising from futures market imperfections, so that the only volatility that remains is "natural" volatility arising from information flows concerning fundamental supply and demand for the underlying commodity.

Clearly, liquidity and volume are not equivalent. Bid-ask spreads are narrowed by liquidity providers who extract profit from the bid-ask spread; but if additional speculative volume causes higher overall price volatility, there is a trade-off between narrower bid-ask spreads and higher price volatility. Optimum liquidity is therefore not equivalent to maximal volume. The role of speculative position limits is to ensure speculation reaches a point where it provides sufficient liquidity, but does not become so dominant that it drives excessive volatility, and thereby pushes up costs for hedgers, the markets' primary constituency.

The Changing Composition of Commodities Futures Markets Participation and its Consequences.

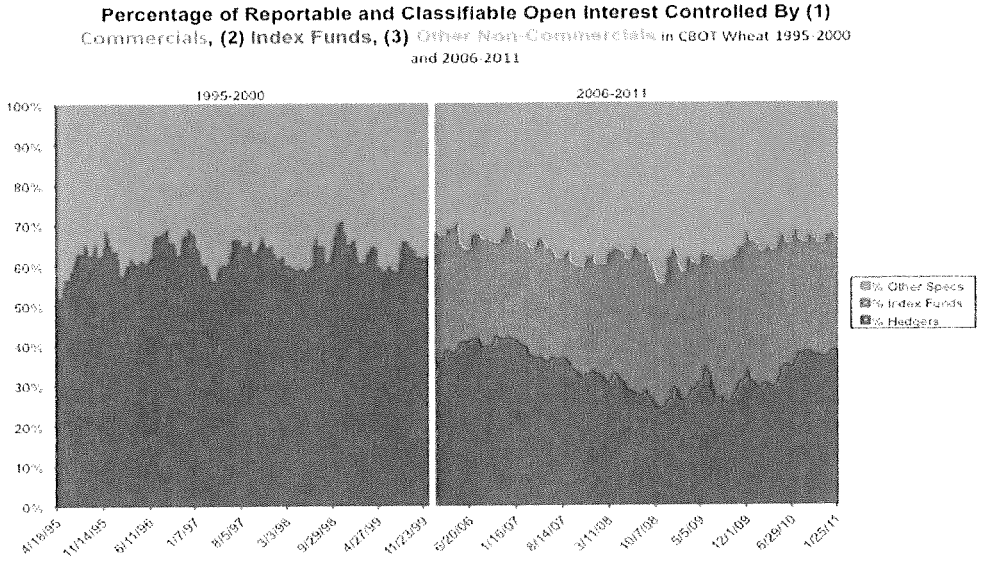
Commodity index funds existed from the early 1990's, but starting in 2004-2005 investment levels grew significantly, climbing to more than $300 billion according to some estimates. In large measure, this was a result of the promotion of commodity index funds as an asset to include in investment portfolios which also included equity positions. While

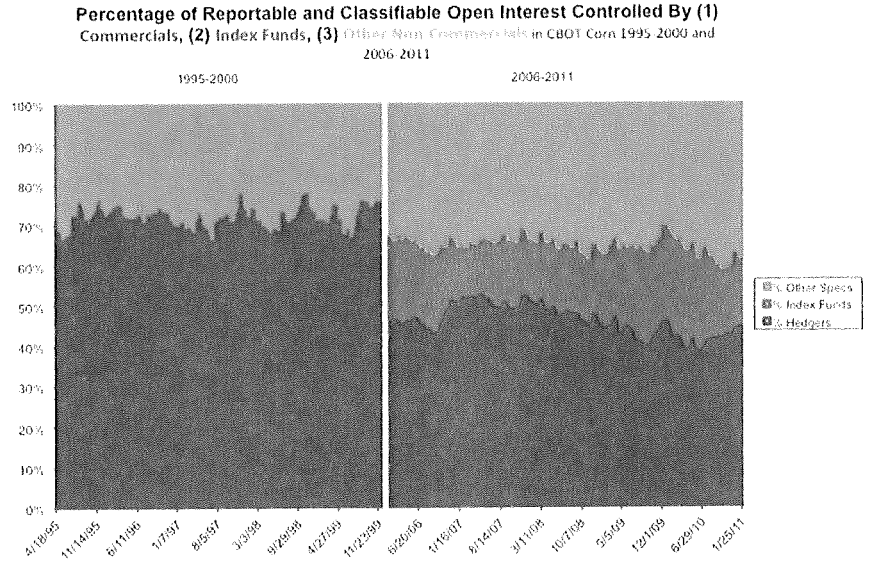
the validity of this assertion has been challenged, institutional investors continue to hold large commodity index fund positions.

The following chart illustrates the change in one of the physical commodity markets resulting from commodity index funds, from the years before significant investment in commodities index funds to the years following the 2005 breakout.

Hedgers, Commodity Index Funds and Other Speculators in Wheat Futures Markets.

The charts below show the role that commodity index funds have played in shifting open interest from commercial to non-commercial participants in wheat and corn. They have been the primary driver of this shift. The same results are evident across a range of other commodities. Source: CFTC CIT Report.





The observations of participants in the markets regarding these new speculative flows provide an insight into the effect they have experienced. Many hedgers have concluded that the performance of the futures markets since the commodity index funds have been such a large factor have substantially increased the absolute price levels and the volatility of prices for commodities. The following are just a few examples:

- "We are now in a bubble for all commodities, and the bubble will burst for sure"

  Andrea Illy CEO of IllyCafe, March 2011[6]

- "I think it's artificial. I think financial speculation has really stepped into the market."

  Howard Schultz CEO of Starbucks, March 2011[7]

- "The commodity industry finds itself in the middle of distorted prices and meaningless relationships between futures and cash. Money flowing into the market creates excessively high prices."

  Joe Nicosia President of American Cotton Shippers Association, January 2009[8]

- "[Y]ou have a new set of players in a market who believe there will be a greater payout in taking a long position...We really have lost the relationship that is core to the price discovery mission of the futures market."

  John Heimlich Vice President of Air Transport Association, August 2010[9]

- "The only thing that I'm concerned about is the pressure exerted by speculators, analysts and some investors in the futures market on prices to push them up or down away from market fundamentals"

  Ali al-Naimi Saudi Arabian Oil Minister[10]
  January 2011

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6 http://www.businessweek.com/news/2011-03-17/illycaffe-ceo-sees-coffee-up-to-50-overvalued-on-bubble-.html

7 http://www.bloomberg.com/news/2011-03-18/coffee-speculation-inflates-price-hurts-demand-starbucks-says.html

8 http://www.cotton247.com/cia/?storyid=343

9 http://www.risk.net/energy-risk/feature/1728077/aviation-bears-brunt-fuel-price-gyrations-rules#ixzz1H5qxrTSd

10 http://in.reuters.com/article/2011/01/24/idINIndia-54357620110124

- "We would respectfully suggest that the underlying function of a futures market is to allow market practitioners to mitigate risk in the physical market through the means of hedging. [From] the moment a market becomes purely a vehicle for speculation, it loses its usefulness. The cocoa industry [cannot] continue to trade on a futures market that is not offering [hedging value]."

  Letter from coalition of cocoa producers and processors to NYSE Liffe July 2010[15]

Given that the commodity markets exist for these physical market participants to hedge, the remedy provided in the CEA is for the CFTC to require position limits on excessive speculative trading activity in aggregate, across market participants.

It should not be surprising that this issue has raised intense interest among political leaders, public interest groups and the financial sector. To date, more than 3900 comment letters have been submitted to the CFTC from industry, the financial sector, public interest groups and interested individuals. The stakes are very high. Speculative trading which increases costs of basic necessities, especially in times of stagnating and declining incomes and high unemployment, is intolerable. It is the equivalent of a tax disproportionately levied on American families. As an example, a single dollar increase in the price of jet fuel increases one airline's cost by $100 million.[16] Ultimately, the price is paid by the traveling public in ticket prices and the airline workers in jobs.

This shows that the profit from speculative trading is enormous. If position limits eliminate excessive speculation, windfall profits will be lost by financial institutions and other speculators, exchanges and clearinghouses. With so much at stake for their narrow business interests, it is to be expected that the discussion by statutory imperative to end excessive speculation. Opponents of position limits are aggressive, but they are also inconsistent with the facts, and the purpose of commodity markets.

Speculation in the Deregulated Commodities Markets.

During the commodity index fund era, the commodity markets changed fundamentally. Hedging today is a much lower percentage of market activity, with percentages of open interest falling from around 70-90% (depending on the specific market) only around 10 years ago to around 30% today.

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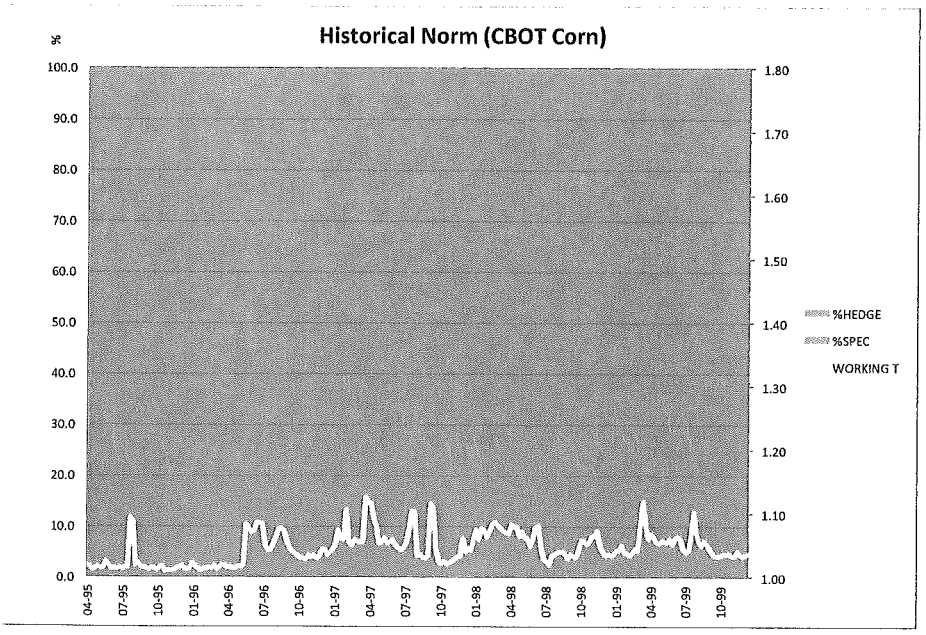
15 Letter available at http://www.ft.com/cms/s/0/fa802828-94af-11df-b90e-00144feab49a.html#ixzz1HMAnsNFF It should be noted that this particular letter relates to manipulation rather than excessive speculation, taking place on a London futures market rather than a U.S. market.

16 *See* ATA Comment Letter to CFTC April 23rd 2010 available at: http://www.airlines.org/PublicPolicy/Agency/Documents/SpeculativeLimitsNPRM-ATA%20Comments%20-%20Final.pdf


Historical Norm (CBOT Corn)
%
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1.80
1.70
1.60
1.50
1.40
1.30
1.20
1.10
1.00
04-95
07-95
10-95
01-96
04-96
07-96
10-96
01-97
04-97
07-97
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01-98
04-98
07-98
10-98
01-99
04-99
07-99
10-99
%HEDGE
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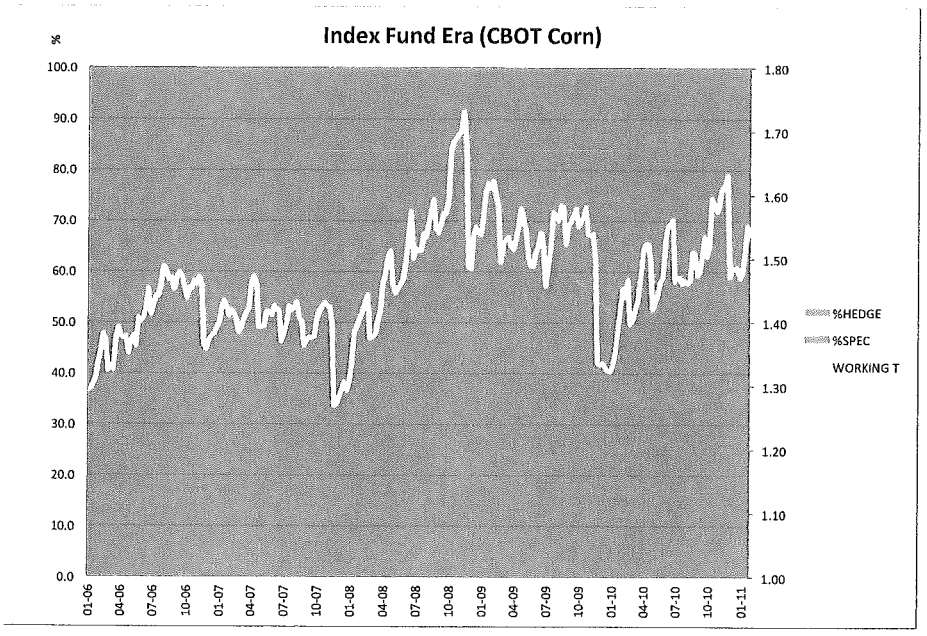
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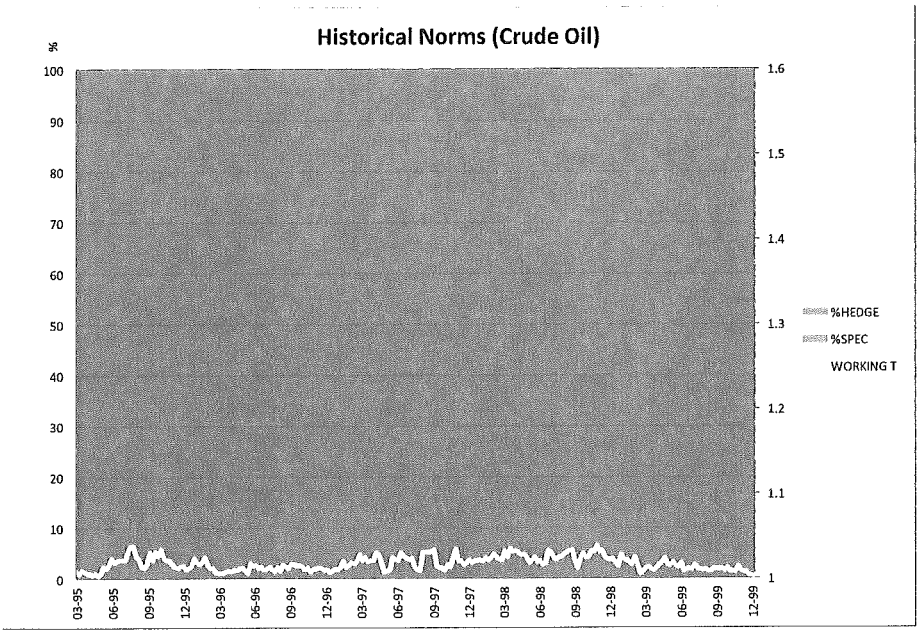
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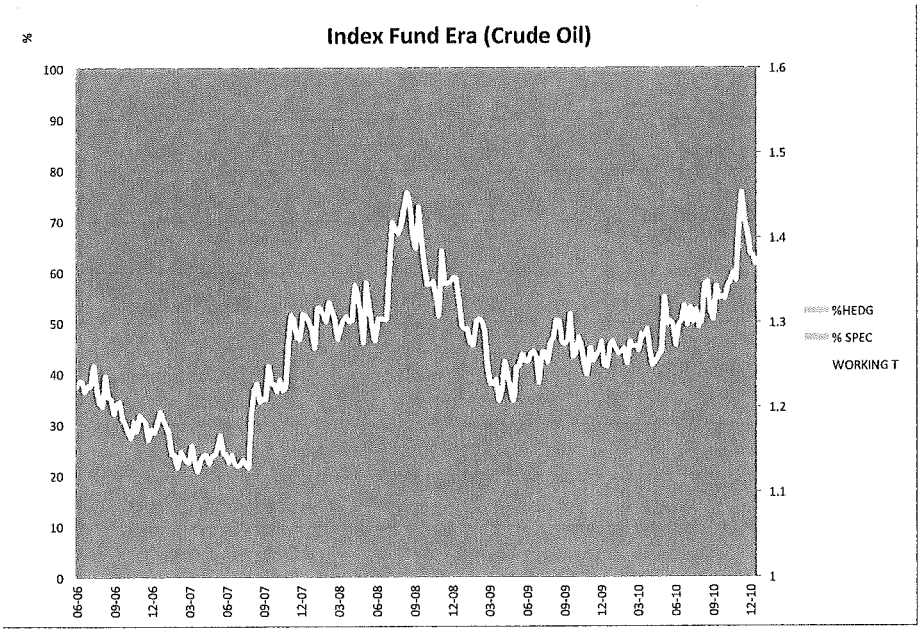
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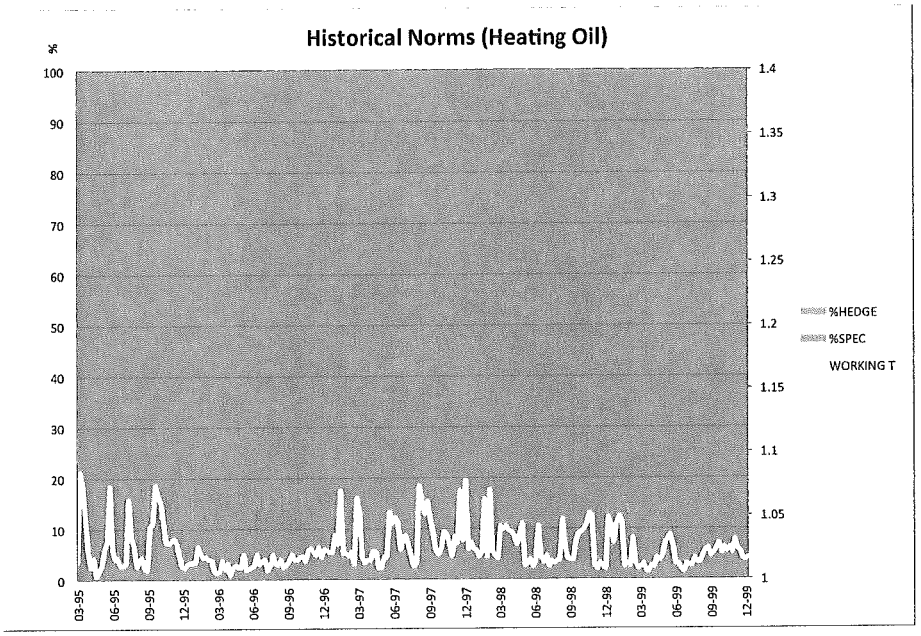
Historical Norms (Heating Oil)
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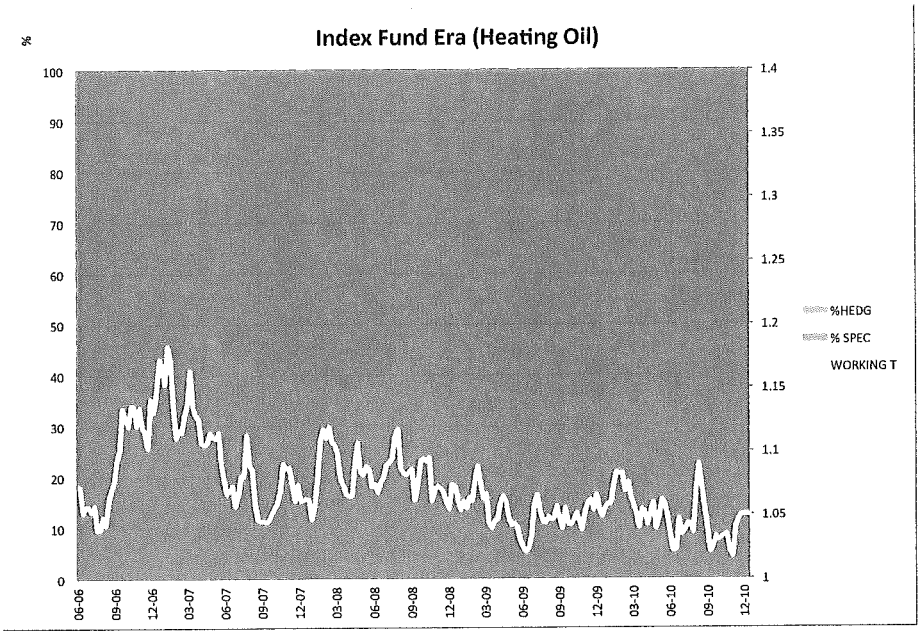
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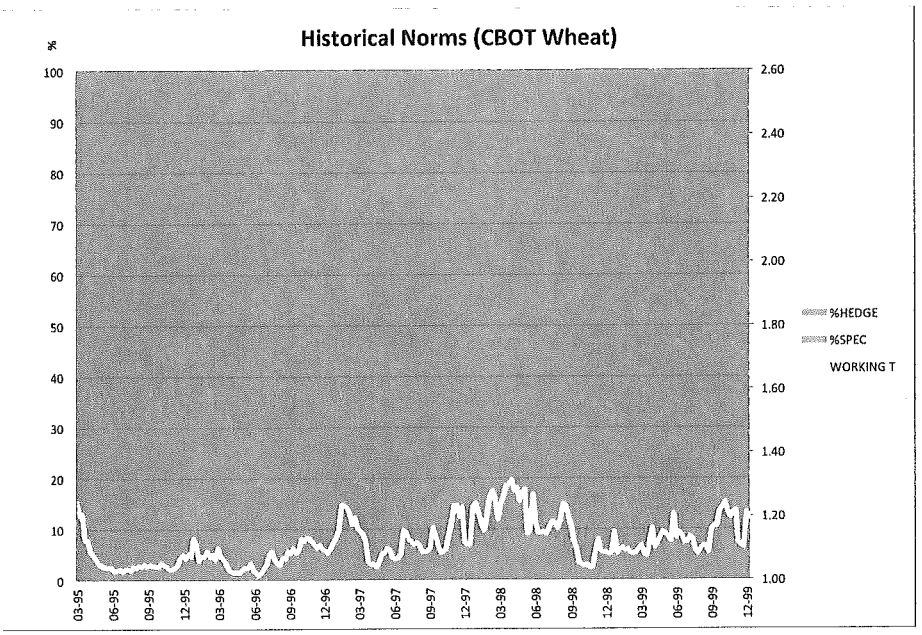
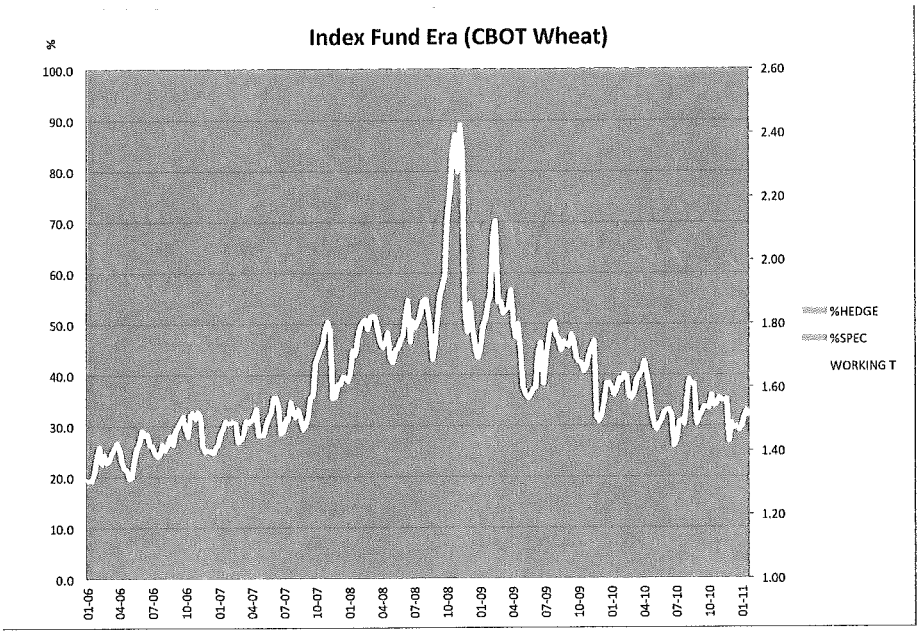




Use Of These Measures For Position Limits Algorithms

It would be tempting to think that position limits could be dynamically computed using Working's T-Index. However, the algorithm is far less stable than the basic open interest breakdown. It is therefore not easily adapted as an operational algorithmic basis for a position limits regime, which requires relatively stable limits to function effectively. In addition, the T-Index does not take into account spreading positions, an increasingly large proportion of speculative positions in futures markets, and a type of position that has been shown to have statistically significant relationship with prices.[18] On the other hand, the historical level of 30% of open interest held by speculators incorporates spreading positions and is consistent with Working's T-Index. It is a dependable and stable benchmark upon which a successful position limits regime can be based.

Section II: Data Show That Speculation and Volatility Have Risen Sharply

This letter demonstrates that the unprecedented rise in the volume of speculative trading on commodity futures prices has increased costs for hedgers, and ultimately harmed consumers. The most damaging development in futures markets has been the introduction of commodity index funds. These funds have become so large that they are now often the dominant market participant. [19]This new breed of speculator has not only made futures prices more volatile, it has also pushed them structurally higher in price. These higher prices are then transmitted from futures to physical markets via various mechanisms described below. Consequently, commodity index funds have directly pushed up prices of food, energy, and other essential commodities not only for American consumers, but also for the world's households.

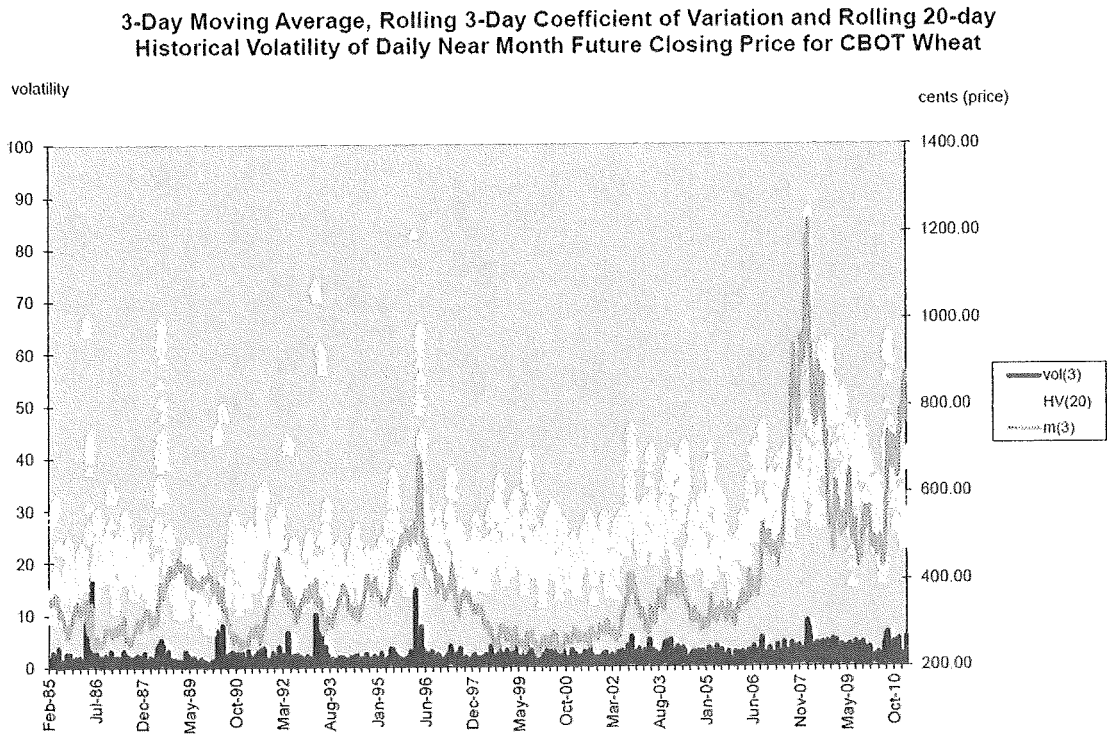
Physical Price Volatility Has Increased

There is little doubt that commodity price volatility in both futures and physical prices has increased over the last decade.

For example, since 2000, grains have witnessed a steady increase in price variation, by several different metrics:

[18] Singleton (2011)
[19] *See* Masters and White (2008), Frenk and Masters (2010)

Volatility of Wheat Prices
(Source Bloomberg)



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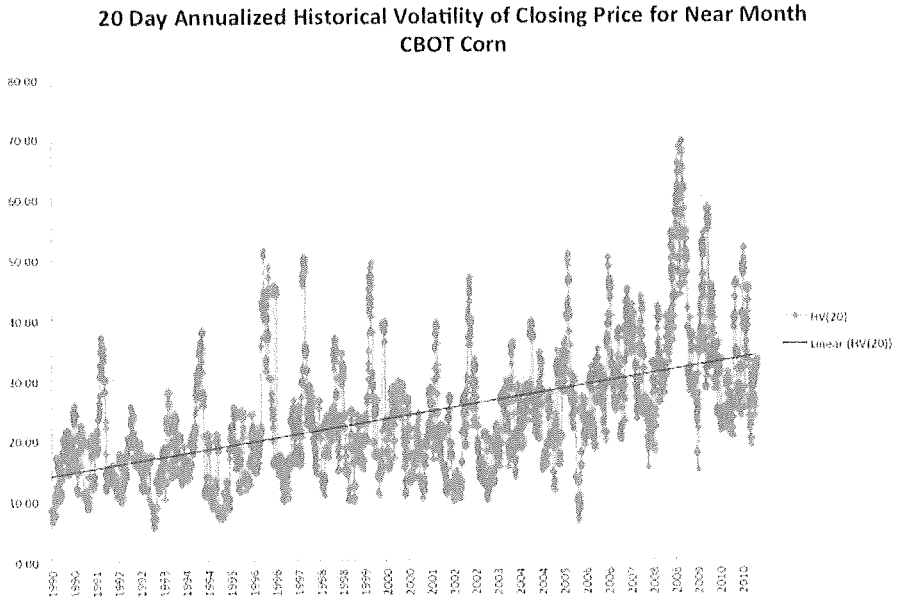
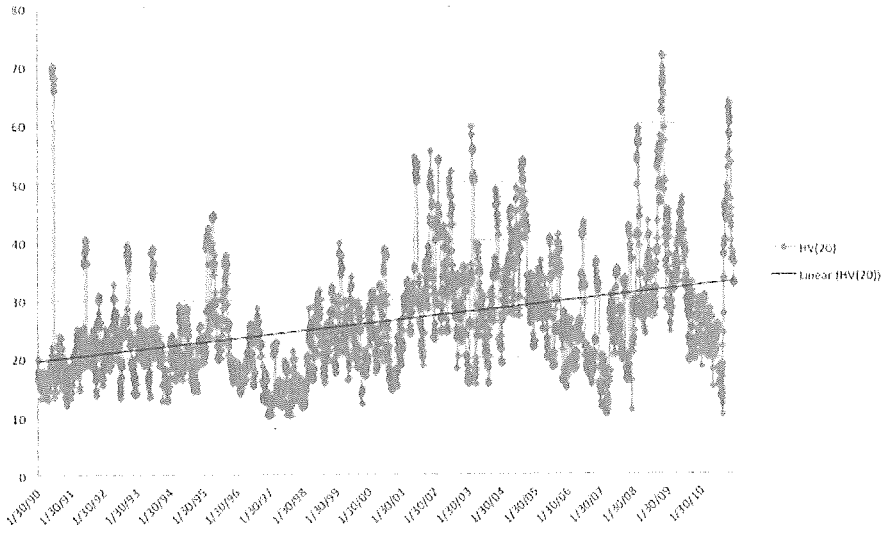
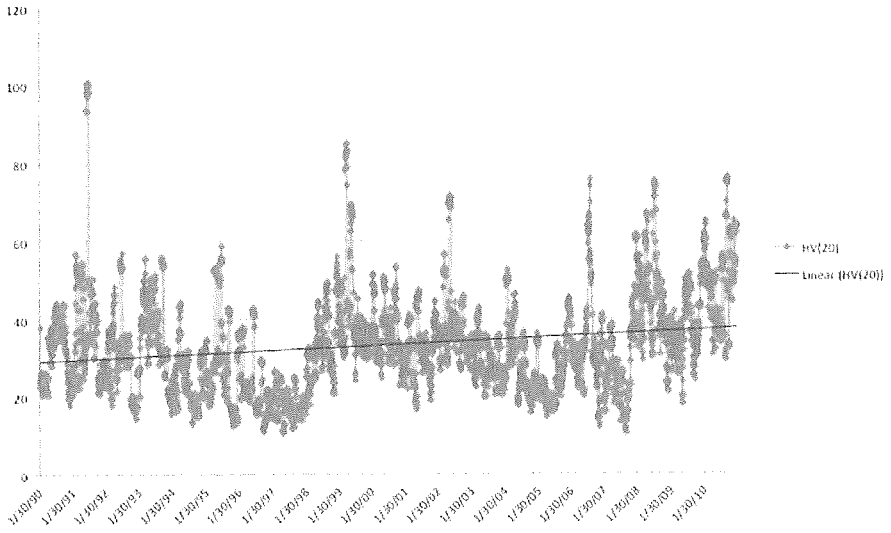
Volatility of Corn, Cotton, Sugar and Live Cattle Prices
(Source Bloomberg)

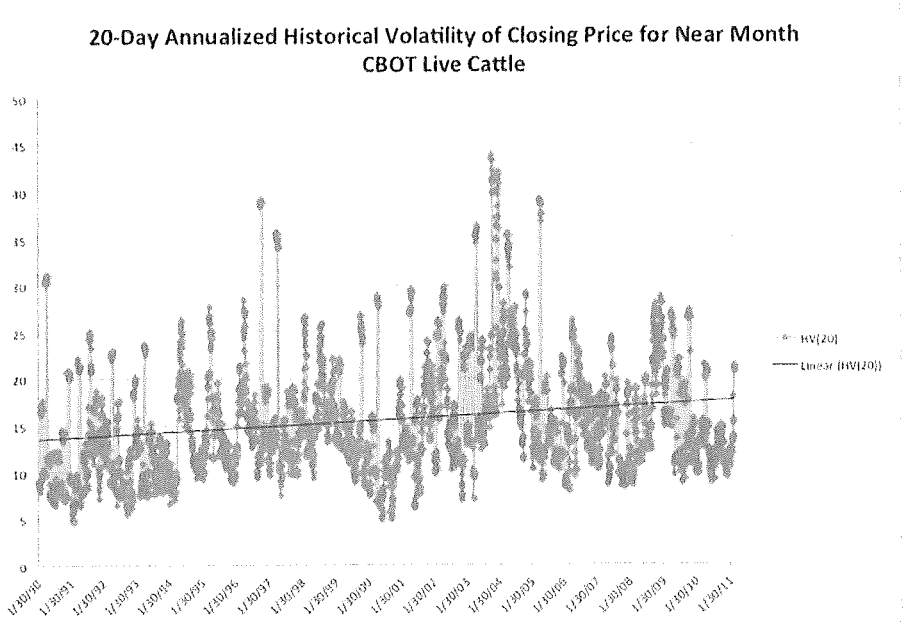


20 Day Annualized Historical Volatility of Closing Price for Near Month
CBOT Cotton



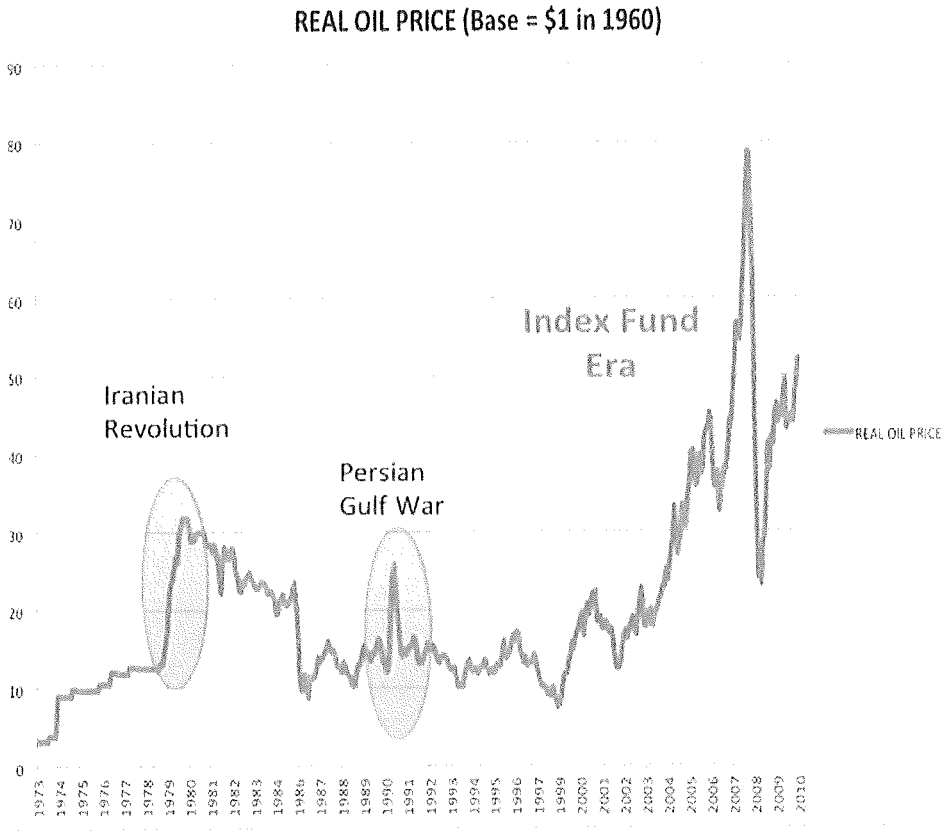
20-Day Annualized Historical Volatility of Closing Price for Near Month
CBOT Sugar





The same is true for energy commodities, as illustrated below. Note *that even the volatility caused by the 1973 oil embargo, the Iranian revolution or the Persian Gulf War, each of which threatened to slash the world's supply of oil was not of comparable magnitude to the price volatility of the years following 2005.*

Volatility of Crude Oil Prices
Source: St. Louis Fed FRED Database (adapted from Babak (2008))



The Role of Speculation in Physical Price Volatility

The analysis set forth herein details the adverse impact that excessive speculation has on commodities prices. *Importantly, the Dodd-Frank Act does not require the CFTC to find that these conditions exist before acting to curb excessive speculation.* Nevertheless, much has been written and said about the existence of relationships between futures and swaps markets and commodity prices. In one recent prominent example, Terrence Duffy, Executive Chairman of the Chicago Mercantile Exchange Group, Inc., contended (in a hearing of the Senate Committee on Agriculture, Nutrition and Forestry) with respect to speculators: "There is no evidence that they have anything to do with the effect of price, whether it comes from an academic or it comes from a government study or anyone else."[20]

20 U.S. Senate Committee on Agriculture, Nutrition and Forestry, Oversight Hearing: Implementation of Title VII of the Dodd-Frank Wall Street Reform and Consumer Protection Act, March 3, 2011.

Mr. Duffy (and others who have made the same assertions) is simply factually wrong. T***here are numerous academic studies showing that speculation affects commodities prices.*** A list of several is included in Appendix A (each of which is incorporated herein by reference.)[21] Moreover, there is strong evidence that large scale and highly structured speculation has increased commodity price levels and volatility, independently of fundamental supply and demand factors. This is not to suggest that the forces of supply and demand have no effect on prices. But the independent effects of excessive speculation are substantial and must be eliminated from commodities markets.

Because statements like Mr. Duffy's have been made on many occasions and from many sources, the relationship between speculation and commodities prices is described in this comment letter. An informed understanding of this interaction helps provide an important foundation for the implementation of the requirements of the Dodd-Frank Act to adopt meaningful position limits.

A number of academics have examined the relationship between futures speculation and commodities prices. A representative sample of these works is discussed in Appendix A below. *One thing is certain: there is a large and well-reasoned body of academic literature in support of the connection between futures prices and commodities prices.*

There are also academic studies that conclude that no causal relationship can be found. Some need to be read understanding that they are closely associated with self-interested industry advocates which have strong economic interests at stake. Many of the writers which do not have such an association nevertheless are deeply influenced by the "efficient markets hypothesis" ("EMH") theory, which was considered by many economists to be a kind of absolute law until the occurrence of the recent financial crisis showed it to be little more than an anachronism.

Common sense would suggest little doubt about the connection between increased commodities market speculation, growth of commodities index funds, and associated increases in commodities price volatility. Yet, efficient markets hypothesis hardliners can only believe that markets are always informationally efficient, and as a corollary they can only allow that fundamental supply and demand forces play an exclusive role in commodities price formation. Therefore, it is only expected that these studies are dominated by discussions of conditions affecting fundamentals, but limit the analysis of futures prices and commodities index funds to statistical devices which by design only measure causation in systems far less complex and volatile than commodities markets.

Predictably, these studies fail to find causal relationships between futures markets and commodities prices; but yet they do not conclude that there is no causal relationship.

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[21] For an in-depth discussion of market-based relationships between excessive speculation and commodities prices, *see* Michael Masters and Adam White, "The Accidental Hunt Brothers," available at accidentalhuntbrothers.com.

However, because of the influence of the efficient markets hypothesis on their analysis, they can only find results that fit their theory. The analogy about looking for lost keys under a streetlight because it's too dark to look for them where they were actually lost certainly seems appropriate.

The studies which support the existence of a relationship are different. While some notable studies, such as Singleton (2011), find direct statistical evidence of speculation driving prices (commodity index funds, as well as managed money spread positions), a majority of studies adopted an indirect approach. Recognizing the reality of using conventional regression techniques to demonstrate a causal relationship between investment flows into futures markets and historically high and volatile commodities futures prices, some of these studies analyzed the emerging characteristics of the commodities markets, by comparing them with other markets. As described above, some studies have observed that commodities markets have begun to behave like securities markets (e.g. Tang & Xiong (2010), Philips & Yu (2010), discussed in *Appendix A*).

As financial market participants increasingly sought to characterize commodities as asset classes that are useful for speculative investment, these studies identified a new phenomenon - the repeated experience of speculatively driven price bubbles, which can be enormously disruptive and damaging to the economy.

The analysis in this comment letter incorporates the work of these academics, both those considered to be proponents of a causal relationship between commodities futures markets prices and volatility in commodities prices, and those whose methods have failed to prove a relationship[22]. It is based on the a demonstration that relationships between commodities futures markets and commodities prices can be better understood by more completely understanding market participants and their motivation.

This approach is the very antithesis of the "Efficient Markets Hypothesis." There is no marketplace in which perfect equality of information and total arbitrage actually exists. It may seem to be the case in large and uniformly speculative markets like the securities markets. However, even in those contexts, EMH is at best a hypothetical image of actual market reality, conjured up by those who are willing to ignore actual human behavior and institutional requirements.

Unfortunately, in the complex, highly segmented and structured world of the commodities markets, the promotion of EMH is not simply an ivory tower intellectual exercise. When market observers fail to really understand the myriad forces which impact their market, price formation is damaged, which leads to higher hedging costs, and ultimately damage to the larger economy. That is why regulators must look critically at market behaviors which a theory like EMH conveniently ignores.

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22 *See* Frenk and Masters (2010) and Frenk and Masters (2010B), for analysis focusing more intensely on the functions and structures of the realities in a marketplace driven by practices of market participants.

Section III: Other Indicators of Excessive Speculation

In addition to the evidence described above, there are several other indicators that strongly suggest that American commodity markets are currently in an ongoing state of excessive speculation. A few such indicators are briefly discussed in this section.

Persistent States of Contango in the Forward Curves of Many Commodities Futures Prices

Keynes' theory of normal backwardation is based on the principle that futures prices should reflect the cost of carry. According to this theory, prices should be lower in time the further out the forward price curve extends. Indeed, for much of the history of American commodity markets, prices tended to display clear backwardation a great majority of the time. However, since the index fund era began, this structural feature of the markets has mutated to the point where contango – higher prices further forward – has become the new normal state.

Commodity Index Funds Structurally Driving Contango

Futures markets for physical commodities have been characterized by a persistent contango since 2005. It is not coincidence that commodity index fund presence in the markets has increased at the same time. The constant rolling activity by institutional investors of pushing out expiring futures positions into longer duration positions continuously pushes futures prices to a contango state.

A primary mission of a commodity index financial product is to maintain investment in the required contracts. The roll of expiring contracts into longer dated positions may not increase the net open long positions in the market, but it constantly extends duration. Indeed, this may be the prime reason why most studies that aim to capture the relationship between changes in index funds' positions (measured in terms of open interest) and futures prices have failed to find statistical significance: they look only at changes in open interest, rather than changes in duration; ***they therefore miss the vast majority of index fund transactions.*** The only study to date that rigorously explores correlations between index fund activity and commodity price changes over longer durations (Singleton 2011) finds "statistically significant predictive powers of changes in the [long commodity index fund] and [managed money spread] positions on excess returns in crude oil futures markets."[23] In other words, "Increases in flows into index funds over the preceding three months [robustly] predict higher subsequent futures prices."[24]

The market participants who are on the other side of the roll have one incentive: to make the commodity index fund sell low and buy high. This is a separate force from fundamental supply and demand: it is entirely unrelated to real world specific commodity fundamental

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23 Singleton, K. "Investor Flows and the 2008 Boom/Bust in Oil Prices," (March 23, 2011) p23.
24 *Ibid.*

conditions. Therefore, it necessarily disrupts the price discovery function demanded by hedgers of the futures markets.

Moreover, the roll also continually biases the markets toward a contango state by placing a perpetual bid on longer-dated contracts and a perpetual offer on the near month. The exact impact clearly varies from month to month, depending on the number of index fund contracts being rolled and the behavior of those attempting to trade around the roll. For this reason, statistical tests aimed at capturing the effect of the roll must be carefully designed. However, a more important fact is that the presence and forcefulness of the index fund-driven bias towards contango is obscure to market participants. A signal is given that succeeding months' futures prices should be higher, and ***it is impossible for market participants to discern how much this signal is a function of the non-fundamental influence of the roll.***

The persistence of the mixed signals from the roll and persistent contango drive expectations of market participants, which undoubtedly affect current spot prices. However, prices are affected by contango for reasons well beyond expectations. Many physical commodities are priced using nearby futures contracts. If futures markets are in a state of contango, then when the nearest contract expires, spot prices are automatically dragged up, as their benchmark price moves to a new higher-priced futures contract.

Mou (2010)[25] has demonstrated convincingly that the effect of the commodity index fund roll is real and large. He characterizes it as "a significant and persistent market anomaly in the commodity futures markets".[26] By comparing excess returns around the dates of the rolls of futures in the GSCI (the most popular benchmark for commodity index funds) with those of futures not included in the GSCI, he shows that huge arbitrage opportunities (inefficiencies) have been generated by the "Goldman Roll". These inefficiencies did not exist before the GSCI product was sold to institutional investors, but have existed consistently since. Over the same time period, these opportunities simply *did not arise* in commodities not included in the GSCI. Moreover, Mou finds that the more index fund money flows into commodities markets, the greater these inefficiencies increase. Finally, he finds that when other speculators' positions increase, the inefficiencies tend to be arbitraged away to a greater degree.

This important study therefore provides convincing evidence that the roll disrupts price discovery. Significantly, it ***also implies that the roll may increase volatility***, by creating a back-and-forth battle between the index funds who must structurally roll futures ahead of the delivery month and the other speculators who wish to trade ahead of (front-run) them. This battle is a logical candidate for explaining the failure of futures prices to converge to spot, as discussed below. This is because a trader taking a short position in advance of the

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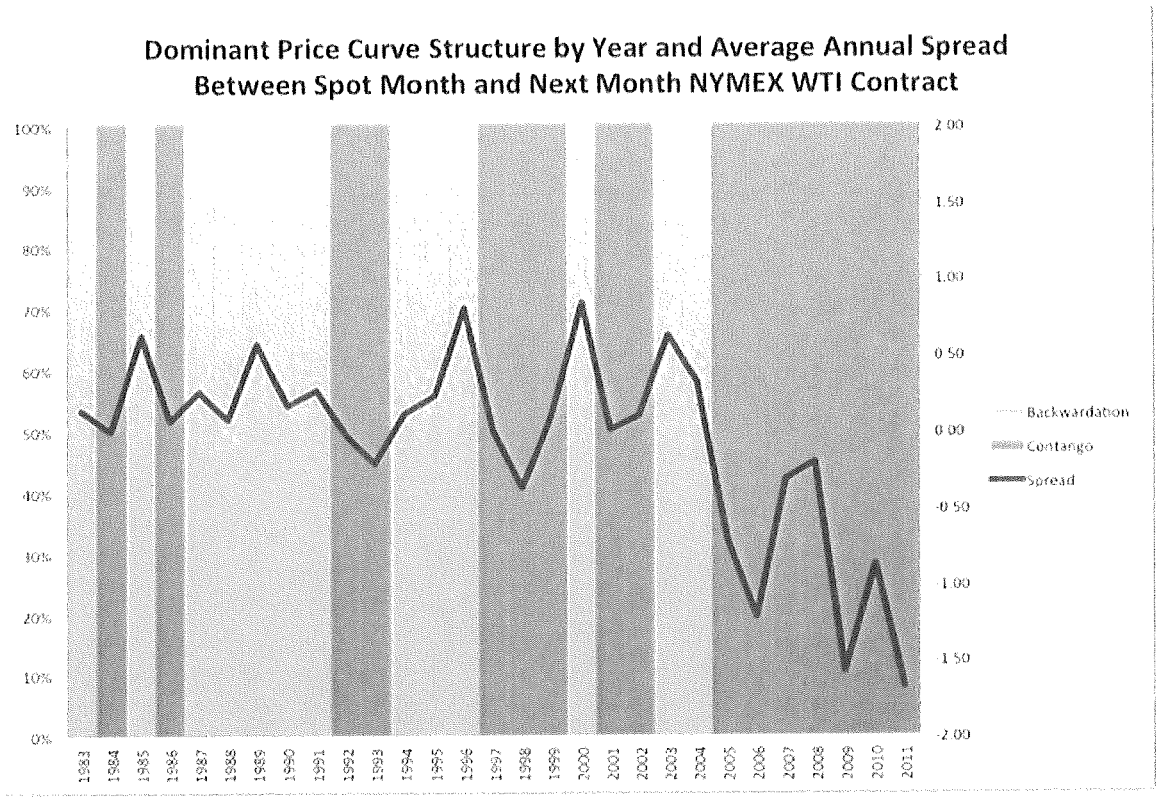
25 Mou, Y. *Limits to Arbitrage and Commodity Index Investment: Front-Running the Goldman Roll* (Columbia University 2010) http://www.nhh.no/Files/Filer/institutter/for/seminars/finance/2011_spring/180211.pdf

26 *Ibid.*

roll, should he find himself unable to unwind that position fully during the roll (i.e. if front-runners as a whole overshoot), would then be left in the unenviable speculative position of holding a short contract with very little time before expiration. He would therefore be required to liquidate the position under extreme time pressure or face the prospect of taking delivery of the underlying commodity. The typical outcome of this synthetic short-squeeze would be for futures prices to be bid up above the spot price as the contract expires.

Backwardation and Contango in Crude Oil Pre- and Post-CFMA

The chart below shows that since the index fund era began, the historical proportion of days in contango vs. days in backwardation has reversed, and that the contango we see today is far steeper than in the past. (Source: Bloomberg)



Backwardation and Contango in Crude Oil Pre- and Post-CFMA
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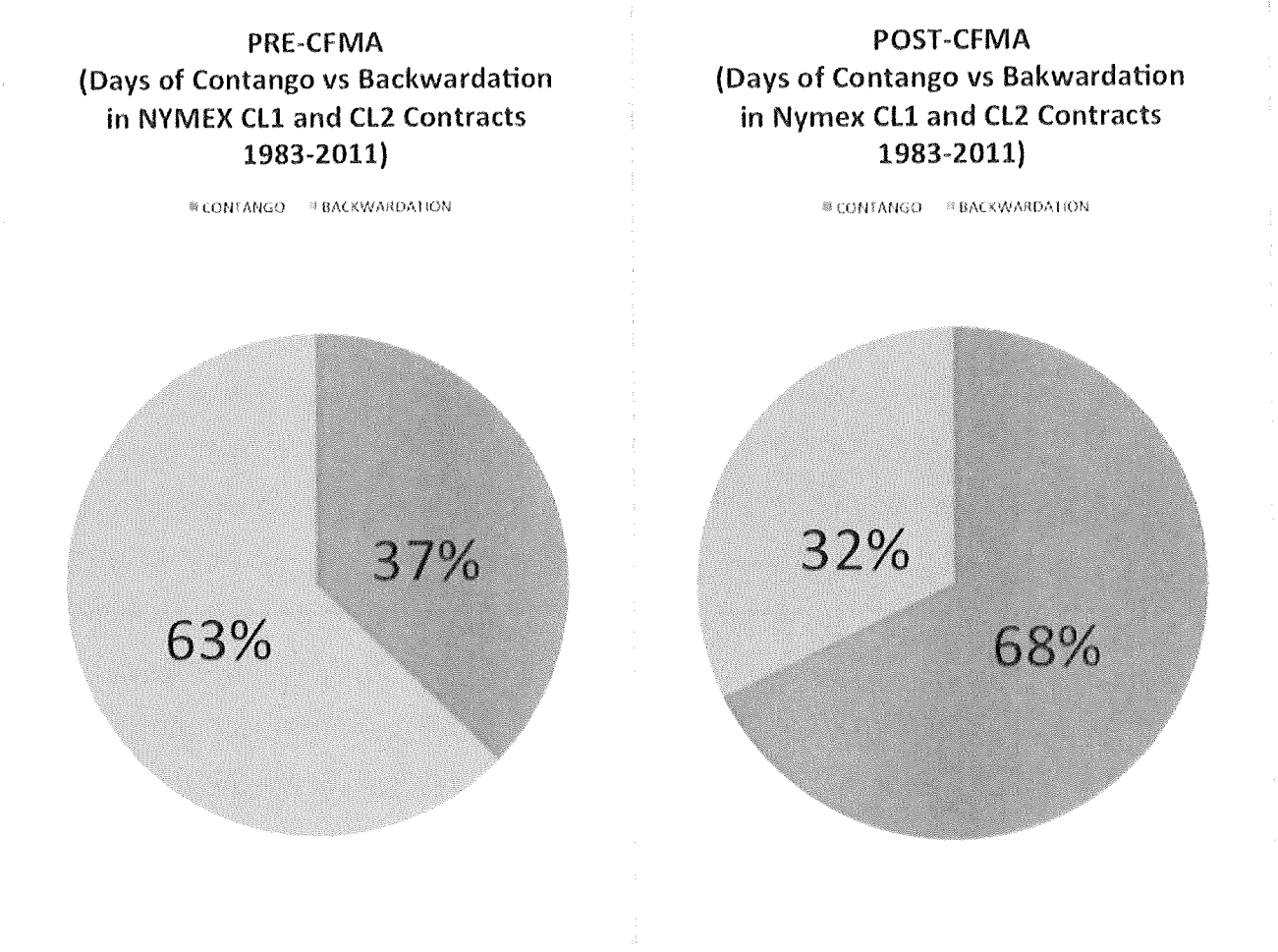

De-linkage and Non-Convergence between Commodities Futures and Spot Markets

The forces structurally connecting futures and physical markets each should cause prices to converge near the commencement of delivery, and to be closely related before that point. There are compelling, market-based reasons why these relationships should hold.

It is commonplace for futures market participants to trade across futures and physicals. As an example, if the price for copper in the spot market is $1,700 a ton and the price of the copper futures contract with three weeks to delivery is $1,900 per ton, then a copper producer could sell a futures contract, store the copper in a warehouse for three weeks, and deliver the copper against that contract. By doing this, the copper producer is taking this supply of copper off the spot market, which should cause spot prices to rise relative to the futures, while the equivalent sale of the futures contract would cause futures prices to come down.

Alternatively, a speculator could do the same thing by selling the futures contract, renting storage space, buying the copper on the spot market at $1,700, paying the storage costs to store the copper for three weeks, and then delivering the copper against the futures contract. In this case, their purchase of the copper on the open market should push spot prices up, while the equivalent sale of the futures contract would push futures prices down.

The net effect of this strong linkage between futures prices and spot prices is that historically, when futures prices rise, spot prices rise along with them (and vice-versa).

So, when commodity index funds or other speculators employing trading strategies drive futures prices higher, the effects are felt immediately in spot prices and the real economy.

Interestingly, recent history has seen substantial periods during which futures prices failed to converge to spot prices prior to expiration of the futures contract. For example, wheat futures experienced failure to converge repeatedly over the 2007-08 period. Previous episodes of non-convergence were always based on contractual flaws or specific delivery anomalies.[27] Neither of these existed in 2007-08, so the phenomenon had no historic precedent.

It has been reported that the non-convergence was related to the roll of commodities index funds.[28] We agree. Specifically, these events were most likely influenced by speculators who held short positions in anticipation of the roll to trade opposite commodities index funds. Excess short futures positions held after completion of the roll had to be reversed immediately before the expiration of the futures contract. This buying pressure was due to aggressive short covering bid up the futures price during this critical period.

De-linkage of longer dated futures from fundamentals also illustrates the pervasive and powerful force of the activities of the commodities index funds. Because of their dominant presence in the markets, commodity index funds can have a massive impact on futures prices when weightings of specific commodities futures markets which make up the index change. The shift in money among markets can be extremely significant. Moreover, the change in weighting is difficult to predict by those without expertise in the arcane and obtuse methods of index rebalancing created by index providers.

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27 See, e.g., the historical problems at Toledo, OH and the CBOT/CFTC dispute of 1997-8.

28 United States Senate Permanent Subcommittee on Investigations Report "Excessive Speculation in the Wheat Market" June 24th 2009 available at:
http://hsgac.senate.gov/public/_files/REPORTExcessiveSpecullationintheWheatMarketwoexhibitschartsJune2409.pdf

The WTI-Brent Anomaly

An extreme example is ongoing. WTI crude oil has historically traded at a premium to European Brent crude oil, because it is a superior grade. Occasionally, when stocks at Cushing, OK (the delivery point for WTI) get full, this relationship breaks down temporarily. Spot WTI becomes cheaper because there is a glut of it. This often also carries through into the first months in the futures price.

Recently, however, the price relationship broke down dramatically, with Brent moving to a huge premium to WTI, ***not only in the spot market but also across all future months.***

This is entirely unlike previous reversals of the WTI-Brent spread, which were short-term and concentrated at the front end of the forward curve.[29] The problems at Cushing are merely temporary, and yet the spread has reversed and subsequently widened beyond any historical measure. Moreover, this situation has persisted for close to two months at the time of this writing.

In part, there is a fundamental explanation. It is true that: (a) stocks at Cushing are currently at record highs, (b) Federal law[30] prohibits the shipping of WTI overseas, hindering direct arbitrage and (c) pipeline infrastructure prevents the surplus of WTI from being easily transported to non-PADD II refineries, hindering indirect arbitrage via refined products. However, the persistence of the Brent premium (it has gone on longer than ever before), the magnitude of it (it is higher than at any other time in history) and the time-structure of it (it is all along the curve) defy explanation based on fundamental factors alone.

This means that a value, unrelated to fundamentals, is embedded in one (or both) of the contracts and helping to drive price divergence. ***Interestingly, the emergence of this persistent breakdown of significant historical relationship coincided precisely with the annual rebalancing of the GSCI index,*** which reweighted significantly from WTI crude into Brent crude. From July 2009 to January 2011, the GSCI percentage weighting spread between WTI and Brent dropped from around 25 to around 21, (a roughly 16% change). Over the same period, the WTI-Brent near month price spread steadily narrowed and then reversed. In January 2011, the GSCI weighting spread dropped suddenly by over 5 points (25%). Immediately, the reversed WTI-Brent price spread trebled in the space of just a few weeks.

Given that (i) the GSCI is the most popular benchmark for commodity index funds[31], (ii) various estimates currently estimates in excess of $300 billion is invested in commodity index funds[32] and (iii) WTI was previously weighted at just over 1/3 of the GSCI, it is reasonable to assume that the 4% drop in the WTI weighting that occurred in January 2011 meant that close to $4 billion of invested money had to be withdrawn from WTI futures over a short period of time, ***equivalent to***

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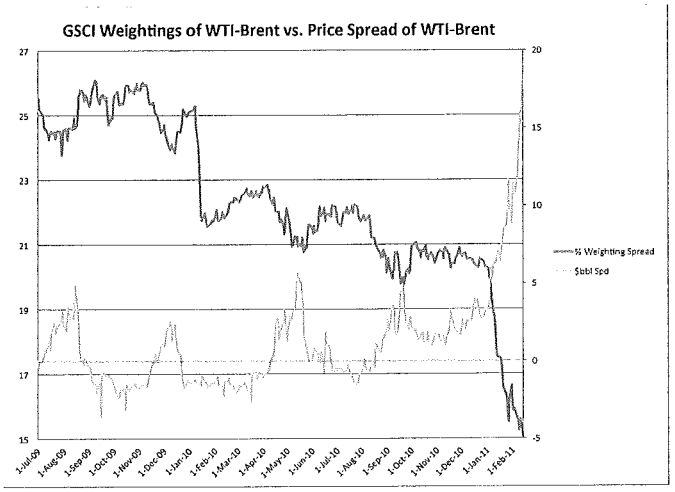
29 http://ftalphaville.ft.com/blog/2011/01/27/471961/a-record-wti-brent-spread-a-new-paradigm/
30 42 USC 6212
31 Hou (2011)
32 A similar figure can be reached by extrapolating from the CFTC's CIT reports to all indexed commodities.

the entire assets of the much-maligned USO ETF, which has widely been blamed for creating disruption in the WTI markets when it rolls its positions.[33] By the same token, large amounts of institutional capital *must have* flowed into Brent following the reweighting. ***Given these facts, it seems highly likely that the GSCI reweighting significantly boosted the breakdown in the historical WTI-Brent relationship and thereby disrupted price discovery.***

The facts suggest that, at a minimum, the reweighting significantly exacerbated the situation, perhaps by sending misleading signals to the rest of the market, or by crowding out correlation-trade arbitrageurs who were trying to trade the two grades back into relationship. The index reweighting itself had nothing to do with the Cushing supply situation. In this instance, it happened that the index changes coincided with the fundamental variables to add huge pressure to an already strained marketplace. Therefore, it is a clear case of financial investor requirements, in this case the unpredictable decisions of commodity index providers, causing significant disruptions in the commodities markets.

WTI vs. Brent

The diagram shows the relationship between GSCI reweighting and the WTI-Brent price spread. In Jan 2011, after the GSCI implemented a huge annual reweighting of WTI into Brent, the price spread moved from within its historical range to an unprecedented premium of Brent over WTI. (Source: Bloomberg and Standard & Poor's)



Increased Correlations Between Commodities And Financial Assets

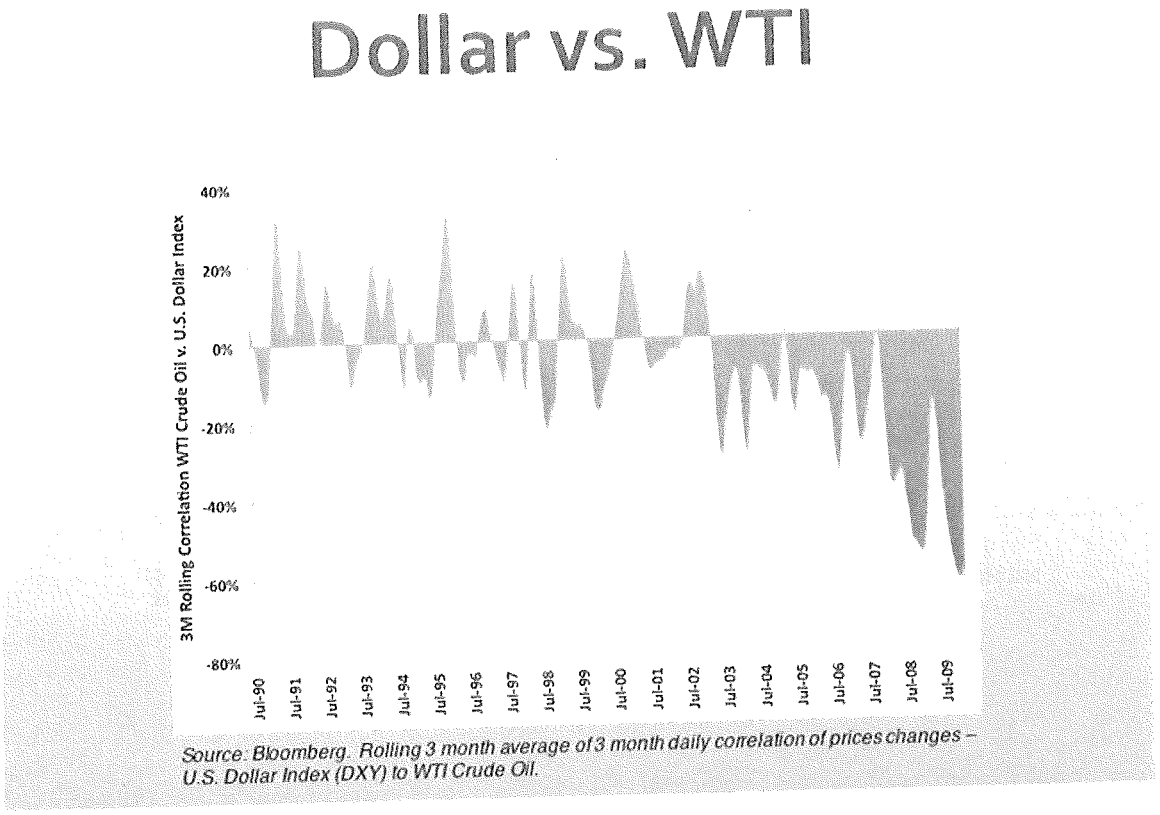
Tang & Xiong (2010) and others have pointed out steadily increasing correlations between commodity prices and financial assets since the appearance of large commodity index funds. While critics have pointed out that financial crises tend to create correlations across all asset classes, these latest correlations both pre and postdate the financial crisis of 2008-9.

This strongly suggests that the behavior of financial participants in commodities markets, rather than underlying supply and demand, is now driving prices to a far greater degree than previously.

33 *See* http://ftalphaville.ft.com/blog/2009/02/25/52879/a-self-propelled-pyramid/

Dollar vs. WTI

The diagram below shows the relationship between the Dollar Index and the near month WTI futures price on NYMEX. It shows that the correlations that exist today between oil and the dollar are a new phenomenon. (Source: Bloomberg)



Breakdown of Traditional Inventory Levels and Commodities Price Relationships

Additional evidence supporting the relationship of commodity index fund activity to commodity prices is found in the breakdown of traditional inventory relationships that persisted prior to the rapid growth in commodity index funds' assets in the early part of the 2000s.

Historically, in grain markets and in energy markets, prices had been strongly correlated with ending stocks and inventories: higher ending stocks meant lower prices, and vice versa. However, beginning in 2003, when institutional investors embraced the commodity index funds *en masse* (following the publication of the Yale/AIG paper cited herein and new promotion of commodities as an "asset class"), these prior relationships began to systematically break down.[34] This provides yet further evidence that a force other than only traditional supply and demand forces is driving commodity prices. The timing of these changes strongly indicates that this phenomenon is occurring because of the new entrants to the marketplace: the commodity index funds.

34 http://stopgamblingonhunger.com/wp-content/uploads/2010/11/response-to-CalSTRS-21Oct1.pdf

The first two connections have been the subject of much comment. This last connection, while often overlooked in the debate, is actually the most direct, and perhaps most important. Each connection will now be discussed separately. Together, they constitute the mechanisms by which the volatility and non-fundamental price forces arising from excessive speculation are transmitted to physical commodity prices.

Volatility in futures prices pushes up costs for hedgers, which changes physical supply and demand curves.

It is clear from many of the views expressed by hedgers that the decline in the use of futures to hedge commodity price risk described above has been caused by a decline in the net value of futures as a hedge. When producers and purchasers do not hedge, it means that the benefit of price risk avoidance is low, either that the hedge does not adequately mitigate the price risk or that the cost is too high. If price hedging is sufficiently valuable to justify its cost, producers and some purchasers (fewer because of relative price inelasticity) would actively engage in the practice.

The benefit of a hedge directly depends on the amount of price risk that is avoided by taking on the position. High commodity price volatility means that the risk of price change is also high, so hedging against this risk should have great value.

In fact, as described above, price volatility for producers and purchasers of commodities has been at historically and unprecedented high levels during the period since 2005 (*see* p26 *Supra*).

One possible explanation for the decline of hedging activity is that the quality of available hedges as risk mitigants has deteriorated. Indeed, the quality of futures as hedges has diminished during the index fund era. The most notable case was the failure of futures prices to converge to spot (discussed below) in several situations. There is little doubt that this was an important factor.

However, lack of convergence, though itself an indicator of severe market problems, did not affect all commodities and was therefore not the sole reason for declining hedging. Moreover, lack of convergence did not entirely eliminate the value of hedging, but merely reduced it somewhat. Therefore, this phenomenon cannot by itself explain the large change in behavior.

Alongside increased basis risk from a lack of convergence in certain markets, ***the clear leading cause of declining hedging across all commodities was cost, not value.*** Indeed, the U.S. Airways 2009 Annual report explained that they did not enter any new hedging transactions after 2008 "due to the impact collateral requirements could have on our liquidity".[35]

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35 Cited at http://www.risk.net/energyrisk/feature/1728077/aviation-bears-brunt-fuel-price-gyrations-rules

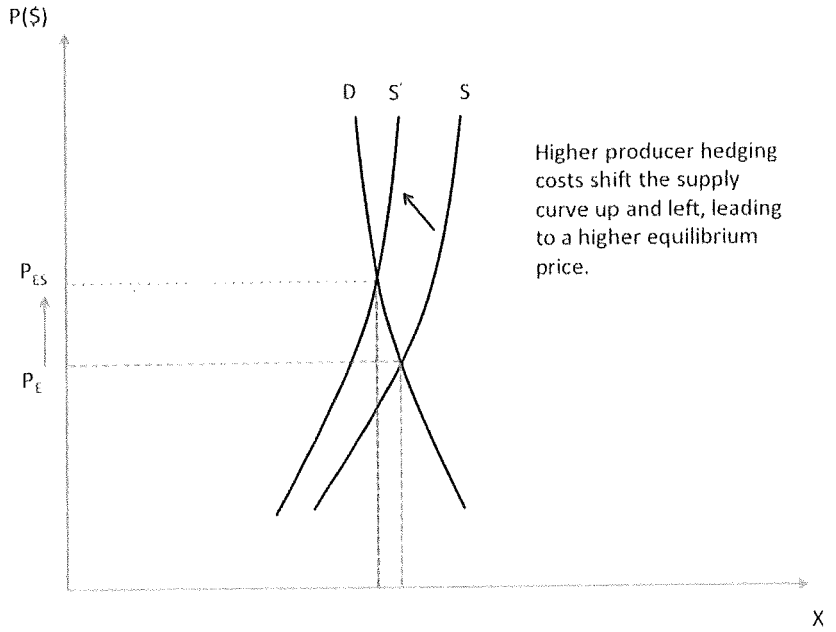
The cost, in other words, was funding the margin required for hedging futures. Maintenance margin increases for all short hedgers as futures prices increase. And, significantly, initial margin increases for all hedgers as market *volatility* increases. The cost during this period became so great that it overcame the value of hedging volatile commodities prices for many hedgers.

After a brief respite from these high-cost conditions, our commodity futures markets are in much the same situation today: high volatility and rising futures prices are mathematically increasing margin costs for hedgers. So, while there has been a recovery in hedging levels during the relative stability that characterized some of the period 2009-2010 (with notable exceptions), all the conditions are in place to expect hedgers to continue to leave the markets *en masse* until the CFTC fulfills its statutory duty, by imposing position limits and reducing excessive speculation to allow these markets to once again serve *bona fide* hedgers.

The higher cost of hedging (or indeed the higher price risk experienced by those producers and purchasers who elect not to hedge) means that the underlying costs of the hedgers' businesses have increased. It is axiomatic that this changes the supply/demand curve of the business, ***increasing commodity prices for everyone.*** The following chart depicts the fundamental principle of economics that a change in costs will shift the supply curve, changing the price equilibrium point at the intersection with the demand curve; and that the change in price is more pronounced where demand is relatively inelastic.

Higher Producer Hedging Costs Shift The Supply Curve

Higher producer hedging costs, the result of increased volatility, shift the supply curve up and to the left, leading to a higher equilibrium price.



Futures prices influence expectations, which, in turn, affect bids and offers in physical markets.

Futures volatility has a direct impact on producer hedging costs, increasing equilibrium prices for physical commodities. There is also an additional, indirect effect. Producers and consumers look to the futures markets for "price discovery," and use it as a benchmark from which to bid in physical auctions.[36]

Therefore, while more volatile futures prices change the supply curve of a commodity, higher futures prices alter the equilibrium price by changing the *perceptions* of supply and demand. A higher futures price leads to a higher starting point for bids and offers in physical auctions, leading ultimately to a higher physical price.

In many cases, physical prices are directly, contractually linked to futures prices.

Contractual practices have, increasingly in the last 15 years, ***explicitly linked commodities prices to futures prices.***[37] Many commodities are sold and purchased under forward delivery contracts in which prices are simply indexed to the first nearby futures contract.[38] This is reflected in publications from multiple agricultural product associations describing physical delivery contractual practices.[39]

Moreover, this is systematized in the Platts assessments used as indices in many physical delivery energy contracts. Under Platt's published procedures, the assessments refer to transactable values on NYMEX at 3:15 each day for light, sweet crude oil, New York gasoline and New York heating oil.[40] This is a direct consequence of the fact that futures markets tend to trade much higher volumes than physical markets, and therefore provide a more consistent source of price discovery.[41]

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36 Carver, F.C. "Wheat: Science and Trade" (pp. 544-8)

37 Paul Horsnell, Oxford Energy Comment. May 2000, available at http://www.oxfordenergy.org/comment.php?0005.

38 "The Structure of Global Oil Markets—A Backgrounder," Platts, A Division of McGraw Hill Companies, July 2007, page 5. http://www.platts.com/Resources/whitepapers/index.xml.Additionally, conversation with Tom Buis, President of National Farmers Union, June 10, 2008.

39 *See* e.g. http://www.grainservice.com/article1.htm, http://agmarketing.extension.psu.edu/Commodity/PDFs/UndrstdBasisRisk.pdf, http://ludlowcoop.com/contracts.php

40 *See* http://www.platts.com/IM.Platts.Content/methodologyreferences/methodologyspecs/usoilproductspecs.pdf

41 In 2008, for instance, the NYMEX WTI futures market was 12 times the size of the WTI physical market. *See* (Masters and White 2008)

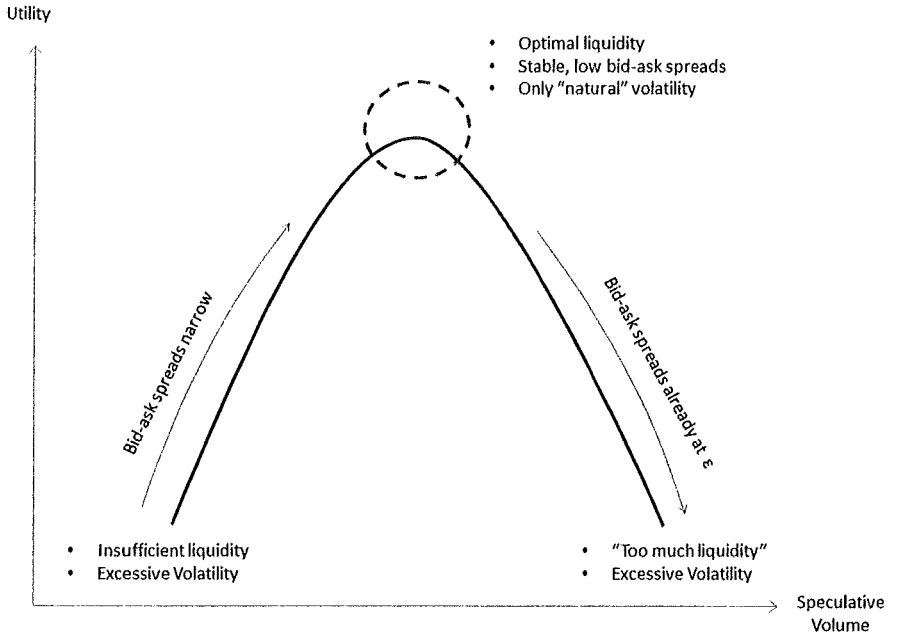
liquidity. Even though short speculators do not directly provide liquidity to short hedgers, a group of speculators who are both long and short are thought of as a more effective liquidity environment for short hedgers because of their ability to interact agnostically.

However, liquidity and volume are not equivalent. Bid-ask spreads are narrowed by liquidity providers who extract profit from the bid-ask spread; but at the point of sufficiency (denoted in the diagrams below as "ε"), the marginal benefit to hedgers (the "primary constituency" of the markets, as per the CEA) of further narrowing turns negative.

The point at which additional liquidity does not benefit hedgers is reached when the marginal benefit of narrower bid-ask spreads no longer outweighs the marginal cost of increased volatility generated by "uninformed" speculators (i.e., speculators having less accurate or timely information with whom other speculators can trade profitably). In addition to the "uninformed" speculators, such an environment attracts perfectly well informed speculators who employ strategies that intentionally profit by trading volatility. ***Importantly, when enough traders trade volatility, the very act of their doing so will tend to increase volatility.***[48] ***Thus, once ε is reached, costs for hedgers increase quite rapidly as volatility increases.***

[48] De Long, J Bradford, et al, 1990. " Positive Feedback Investment Strategies and Destabilizing Rational Speculation," *Journal of Finance*, American Finance Association, vol. 45(2), pages 379-95, June.

Optimal Liquidity
Once optimal liquidity is reached, at ε, additional speculative volume has negative marginal impact for hedgers.



Additionally, the increased use of electronic swap execution facilities, while adding immeasurably to transparency in the markets, provides additional opportunities and incentives for this latter type of speculative trading activity. Access to multiple futures and swaps platforms can in fact be exploited by moving funds rapidly among them to exploit differences in rules, procedures and volume rebates.

Quantifying Sufficient Liquidity ε

Holbrook Working's Speculative T-Index is regarded as the most famous research on this inflection point (ε). Working noted that because commodity hedgers (liquidity takers) tend to be predominantly short, one can then calculate how much long speculation is required to balance their needs. *Additional speculation only improves liquidity up to a point,* so that the perfect liquidity point would involve more speculation than was absolutely required to balance hedging. His index established that in the early 20th century this additional, beneficial speculation tended to vary between around 10% and 30%, depending on the specific commodity in question. Working contended that because markets would naturally tend towards ideal liquidity conditions, the actual historical data was close to optimal. In other words, he believed that this range was a good approximation of where the perfect point would be.[49]

[49] Working, H., Speculation on Hedging Markets, Food Research Institute Studies Vol. I, No. 2, 1960.

Some pundits have argued that speculation in today's commodity markets is not excessive because the ranges they compute for Working's Speculative T-Index are within historical norms. However, the interpretation of their results has been very convincingly disputed. For one thing, there are clear cases in recent years where the Speculative T-Index is far outside of its historical range. In CBOT wheat, for example, the T-Index hovered around 100% excess speculation for much of 2008, 2009 and 2010, an unprecedentedly high level. While facts like this provide strong evidence that there has in fact been excessive speculation in commodity markets over the past few years, there is an additional deeper point that goes to the very heart of the purpose of imposing speculative position limits to manage excessive speculation, which the CFTC has been mandated to do.

The point is that today's commodity futures markets are structurally different from those that Holbrook Working originally studied. In 1960, when Working first designed and published his index methodology, the only liquidity takers in the futures markets were hedgers. ***In contrast, today, a new class of liquidity takers has appeared.*** While Working's methodology is sound, its *use must appropriately take into account the presence of these new liquidity takers. This new class of speculators now outnumbers hedgers in several markets, and has therefore changed the entire dynamic of speculative liquidity provision and consumption.* This class of market participant is the ***commodity index funds.***

Commodity Index Funds and Liquidity

In the debate surrounding liquidity, commodity index funds have come to dominate much of the discussion. On the one hand, some have argued that these funds have helped move commodity markets toward the point of liquidity sufficiency; others have argued the index funds have far exceeded this point. It is illuminating to consider the remarks of Gary Cohen, COO of Goldman Sachs, in testimony before the Senate Energy Committee in 2008, where he mentioned that the original motivation for offering index funds (beyond generating profits) was a perceived need for liquidity on the long side of the market:

> Why you need the speculator in the market and why the commodity index was created many years ago is our industry, 20 years ago was a very difficult industry. We had only clients that wanted to sell future production forward. So we had many clients that wanted to go drill oil wells, but they needed some predictability of the price of oil they were going to receive out of the well to go borrow money. They tried to enter the market and sell the oil. There was no natural long in the market. The consumers are so fragmented that they don't amalgamate to a big enough position.
>
> So we actually, as a firm, came up with the idea in the early 1990s to create a long only, static investor in the commodity markets. We

> created the commodity index where we could allow people that were willing to commit large pools of capital into the market for a very long period of time to facilitate the actual producers and allow them to be able to hedge their production forward to increase their production.[50]

Cohen's explanation is based on the obvious point that because hedgers are net short, speculators must be net long for the market to be balanced (which, structurally, it must). If there are insufficient long speculators to fulfill this balancing requirement easily, two main problems arise.

- First, commodity prices are pushed down to artificially low levels because the selling pressure of hedgers causes a drop in futures prices, which then brings down spot prices via the mechanisms described elsewhere in this letter. The initial drop in futures prices occurs because for every buyer there must be a seller (and vice versa). So, when there are many more sellers than buyers, prices must drop to a level where new buyers are attracted by cheap prices; and conversely when there are many more buyers than sellers, prices must rise to attract new sellers.

- Second, when there is insufficient liquidity on one side of the market, bid-ask spreads widen because of a lack of counterparties willing to take the long side of the trade. This raises costs because individual participants are forced to trade at prices further from their valuation. It also reduces effective price discovery for the same reason, because if participants must transact further from their valuations, then the published prices of those transactions less accurately represent the fundamentals-based views of the participants.

It is clearly debatable whether there was in fact a lack of liquidity on the long side when the first commodity index funds launched in the early 1990s. Actually, there were no widely reported complaints to this effect from hedgers; nor had there been an obvious departure of liquidity providers from futures markets that had worked effectively for decades. However, there is an even larger problem with Cohen's characterization of commodity index funds, and with the entire discussion of index funds and levels of liquidity. Namely, *commodity index funds do not generally provide liquidity. Rather, they systematically demand liquidity.*

Commodity index funds are not liquidity providers. Liquidity providers are available when liquidity takers want to transact. In the case of commodity index funds, this may happen only when these entities either had capital inflows (or outflows), or when they structurally roll their positions into longer duration futures contracts. Moreover, even during these times, it's more likely that commodity index funds will actually *demand liquidity from the market* to accomplish their funding and roll objectives.

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50 Gary Cohen – Chief Operating Officer – Goldman Sachs & Co., Senate Energy Committee Hearing (S. Hrg. 110-654) Transcript, September 12, 2008, pages 84-85. http://frwebgate.access.gpo.gov/cgibin/getdoc.cgi?dbname=110_senate_hearings&docid=f:45837.pdf

Of course, there are some instances where commodity index funds actually provide liquidity: *however this is only incidental rather than systematic.* Other than these instances, rather than balancing the liquidity demands that already exist in the market, *commodity index funds create a new set of demands that must be met by new (speculative) participants.* This is especially true today, given that in many commodities they are among the largest class of participant.[51] Finally, the large growth in index fund participation in commodity markets has required a diversion of other speculative activity aimed solely at meeting (and profiting from) the liquidity demands of the index funds themselves.

So, there are two main reasons why *commodity index funds are liquidity takers* rather than liquidity providers.

- Unlike other speculators in the market, their buying and selling is completely unrelated to (i) current liquidity demands (as in the case of a market maker); or (ii) any view the fund manager may have on the current level or future direction of specific commodity prices (as is the case with other traditional speculators). This is a structural feature of index funds: they buy contracts because

  (a) new investment money flows in,

  (b) prices move sufficiently to require portfolio rebalancing, or

  (c) they have to roll an expiring contract into a further out month.

  And they sell because investors withdraw money, to rebalance with respect to their benchmark, or to roll. ***Commodity index funds are not primarily motivated to buy or sell because they think individual commodity prices are too high or too low, or for any other reason related to specific market pressures or fundamentals.*** In fact, their flows are completely agnostic to the supply and demand fundamentals for a given commodity; after all, they are buying an index. Therefore, if they happen to buy when a hedger needs to sell, it is only by accident; they are just as likely to buy when there is a temporary excess of demand for liquidity on the long side as when there is a temporary excess of demand for liquidity on the short side.

- The second reason why commodity index funds are liquidity takers is that they have become such a large part of the market that they can often outsize hedgers. As recently as January 25th of this year the total size of index fund positions, as reported in the CFTC's CIT report, was over two-thirds of the total size of commercial positions for a wide range of commodities, from wheat (69.2%) to lean hogs (67.2%). At certain points in 2008, index fund positions were over 100% of

[51] For instance, in the wheat market during 2008.

commercial positions for various commodities.[52] It is obvious that if commodity index fund money is such a large portion of the market open interest, they can place substantial liquidity demands on the marketplace over bounded time periods.

Since commodity index funds are liquidity takers and predominantly long, there is an *apparent* balance with net short hedgers. However, this ignores important differences between the two. The motives of commodity index funds are based on investment inflows and outflows and the need to roll existing positions, completely different from the motives of hedgers. They are not a *reliable* balance to short hedgers, *and moreover, generally compete directly with long hedgers for their own liquidity requirements.*

A further point worth consideration is that Keynesian reasoning suggests that when commodity index funds become sufficiently large, their trading will disrupt rational arbitrage due to the "beauty contest" phenomenon. As Townsend (1983)[53] and Singleton (1987)[54] have discussed, trading on the basis of predictions about the behavior of other participants rather than fundamentals is generally the optimal speculative strategy under asymmetric information (which is *de facto* the situation in a market where commodity index funds trade on the basis of institutional requirement rather than fundamentals).

Because these funds are liquidity takers they have a large collective market positional impact, commodity index funds disrupt price discovery. In addition, they increase volatility because they divert speculative activity that would be allocated to providing liquidity for legitimate hedgers. In fact, today many speculators, anticipating the widely publicized trading pattern of the index funds, trade based on the institutional investor driven supply of and demand for futures contracts themselves rather than the fundamentals underlying a given commodity. ***Commodity index funds detach a futures market from its anchor in the fundamentals and thereby disrupt price discovery.***

In summary, without commodity index funds, speculation at a level of 30% or below of the market is a reasonable historic level of sufficiency (as described in detail herein). But commodity index fund presence only incidentally balances net short hedging, competes with long hedging, and operates in a manner that deemphasizes real world commodity supply and demand factors. Given the above, it is clear that commodities derivatives markets would be far better served by greatly limiting the index fund class through a strong class based position limit scheme.

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52 *See* Masters and White, *The Accidental Hunt Brothers* (2008) available at www.accidentalhuntbrothers.com

53 R. Townsend. Forecasting the forecasts of others. Journal of Political Economy, 91:546–588, 1983.

54 K. Singleton. Asset prices in a time series model with disparately informed, competitive traders. In W. Burnett and K. Singleton, editors, New Approaches to Monetary Economics. Cambridge University Press, 1987.

Part 3. The Ample Statutory Authority and Specific Statutory Requirements

Section VI: Statutory Authority and Regulatory Approach

The changes to the Proposed Rules required fall well within the CFTC's statutory authority under the CEA, as amended by Dodd-Frank. These changes are not only permitted under the statute, they are also necessary to achieve Congress's expressed goal of eliminating excessive speculation in our commodity markets.

The CFTC Has Ample Authority

The CFTC clearly has the statutory authority to establish position limits on speculative traders as a group, or on subsets of those traders, including commodity index funds. In the Dodd-Frank Act, Congress amended the CEA so that the CFTC would have the power to establish position limits not just for any "person," but also for "**any group or class of traders.**"[55] Clearly, therefore, the CFTC may impose position limits on speculative traders as a group, or on subsets of speculative traders, including commodity index funds.

This amendment reflects Congress's understanding that speculation in today's commodity markets is "excessive," that this phenomenon is imposing huge burdens on our economy, and that the CFTC must have new tools at its disposal to address the problem. Congress obviously intended the CFTC to fashion position limits for speculative traders as a group or class, to the extent necessary to diminish, eliminate or prevent excessive speculation.

This specific amendment is just one among many in the Dodd-Frank Act reflecting Congress's sense of urgency surrounding excessive speculation and its decision to grant the CFTC broad discretion in addressing the problem. Under the original provisions of the CEA, the CFTC enjoyed great latitude in setting position limits. For example, the statute empowered the agency to act by rule, regulation, or order to fix whatever limits it deemed necessary to "diminish, eliminate, or prevent" the burdens arising from "excessive speculation," as defined in the CEA.[56] The statute also made expressly clear that the agency had the discretion to establish a wide variety of limits applicable to different commodities, markets, and delivery periods.[57]

The Dodd-Frank Act retained all of this discretion and expanded upon it. The Dodd-Frank amendments repeatedly make clear that the CFTC is to set position limits "as appropriate," and that the CFTC shall have "discretion" as it seeks to achieve the four primary goals

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55 Dodd-Frank Act § 737(a)(3)(A), 7 U.S.C. § 6a(a)(1).
56 7 U.S.C. § 6a(a).
57 *Id.*

enumerated in the statute.[58] The Dodd-Frank Act also expanded upon the CFTC's exemptive authority, giving it broad discretion to exempt, conditionally or unconditionally, "any person or class of persons," or any futures, option, or swap, from any of the requirements that the CFTC may establish with respect to position limits.[59]

Clearly, the CFTC has all the authority it needs under the CEA, as amended by Dodd-Frank, to adopt all of the changes in the Proposed Rules that we advocate, including imposing position limits on speculative traders as a class, including commodity index funds.

The Approach We Advocate Is Necessary To Achieve the Mandatory Goals Set Forth in the Dodd-Frank Act

While Congress gave the CFTC broad discretion in establishing position limits of different types and at different levels, it also left no doubt that the agency must act quickly and aggressively to address the new forms of excessive speculation burdening our commodity markets.

The new statutory provisions are requirements, not simply as a grant of authority: ***The CFTC is required to establish new position limits.***[60] Moreover, the Dodd-Frank amendments set firm deadlines within which the CFTC must act, ranging from six to nine months.[61]

Congress also enumerated four objectives that the CFTC must seek to achieve as it sets position limits.[62] First and foremost on the list, and "to the maximum extent practicable," *the agency must "diminish, eliminate, or prevent excessive speculation."* Other objectives include ensuring "sufficient market liquidity for bona fide hedgers," and ensuring that "the price discovery function of the underlying market is not disrupted." These goals are clearly aimed not only at excessive speculation *per se*, but also at the ancillary harms that excessive speculation can cause: destruction of the hedging environment and distortion of the price discovery function.

To eliminate any potential gaps in the new framework, Congress was careful to expand the universe of financial instruments subject to position limits to include swaps in addition to swaptions, futures contracts, and options.[63] Congress also strengthened the aggregation requirements contained in the original CEA. To guard against evasion of position limits, the CEA required positions to be combined in situations involving one entity controlled by

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58 Dodd-Frank Act § 737(4), 7 U.S.C. §§ 6a(2)(A), 6a(3), and 6a(3)(B).
59 Dodd-Frank Act § 737(a)($), 7 U.S.C. § 6a(a)(7).
60 Dodd-Frank Act § 737(A)(4), 7 U.S.C. §§ 6a(A)(2) and 6a(A)(3).
61 Dodd-Frank Act § 737(A)(4), 7 U.S.C. § 6a(A)(2)(B).
62 Dodd-Frank Act § 737(A)(4), 7 U.S.C. § 6a(A)(3)(B).
63 Dodd-Frank Act § 737(a)(2), 7 U.S.C. § 6a(a)(1); and DODD-FRANK ACT § 737(a)(2), 7 U.S.C. § 6a(a)(5).

another or positions held by multiple parties pursuant to express or implied agreements [64]. ***The Dodd-Frank amendments go further*** and require the CFTC to establish limits on the aggregate number of positions held in the same underlying commodity across different designated contract markets, contracts traded on foreign boards of trade, and swaps that perform a significant price discovery function.[65]

Thus, Congress has mandated action by the CFTC within specified time frames; enumerated specific goals that must be achieved to the "maximum" extent possible; expanded the application of position limits to swaps; and fortified the remedial provisions governing aggregation. ***These amendments leave no doubt that, while the CFTC has broad latitude in deciding how best to eliminate excessive speculation, it must do so expeditiously and effectively.*** As demonstrated in the discussion below in Section VIII, the only way to achieve this goal is to impose limits on the positions that speculators as a class may hold. In keeping with Congress's statutory requirements, the CFTC must follow this approach.

The Listed Futures Markets Play A Unique Role In Price Discovery, And There Should Be No Delay In Implementing Position Limits For Futures

Much has been made of the fact that data on swaps and swaptions will not be fully available for some time, and it has been argued from some corners that this is a reason to delay implementing position limits. However, futures markets serve a unique role in price discovery, as they are the primary benchmarks that are used for pricing in physical markets as well as other derivatives markets.

For this reason, excessive speculation in futures markets has an immediate and wide-ranging effect, damaging price discovery across all venues, and thereby harming businesses and ultimately consumers. Regulation of excessive speculation in the swaps market will mirror the futures market rules. Swaps markets generally reference futures markets for pricing. While activity in swaps affects prices, price discovery is a function of the futures market. Furthermore, swaps markets do not have the structural relationships to prices that are a feature of the futures markets, as described herein. There is therefore neither a reason nor a justification for the CFTC to delay implementing position limits for futures markets, even if they deem it necessary to wait for more comprehensive swaps data before implementing position limits for swaps and for futures-and-swaps combined.

Position limits for futures, aimed at curbing excessive speculation in the futures markets, will reduce costs for *bona fide* hedgers. ***With America's businesses still struggling from the economic after-effects of the financial crisis, it is imperative that the CFTC acts now to remove the additional costs caused by excessive speculation in futures markets.***

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[64] 7 U.S.C. § 6a(a).
[65] Dodd-Frank Act § 737(a)(4), 7 U.S.C. § 6a(a)(6).

Section VII: Background of Position Limits and Evolution since De-Regulation in 2000

De-Regulation and the Evolution of Commodities Markets

Massive changes occurred in the derivatives markets in the first years of the 21st century, especially those for physical commodities. The Commodities Futures Modernization Act of 2000 ("CFMA") dramatically weakened speculative position limits, which opened significant loopholes for financial speculation in completely unregulated shadow markets.

The CFMA also accompanied other deregulatory forces originating from the private sector that changed what and how derivatives were traded. The Enron Corporation created EnronOnline, which allowed the firm's trading operation to become a central trading platform, clearinghouse and market maker, all in one. They also attempted to convert dozens of classes of commercial transactions into commodities derivatives, everything from highly illiquid power and gas to bandwidth. Of course, this chapter was closed by the disastrous collapse of Enron in 2001.

By that time, another new player had emerged in the derivatives market, the InterContinental Exchange ("ICE"). ICE was established by seven swaps dealers and oil companies in order to facilitate over-the-counter energy trades without brokers – a sort of eBay for energy derivatives. ICE displaced both voice brokers and conventional exchanges. It also offered automated systems to traders and increased the ability to transact. Initially, the transactions were bi-lateral and not cleared. Soon, ICE created the ability for traders to elect to clear trades.

As trading activity grew, financial institutions, energy firms, agricultural products businesses and many others rapidly increased their investment in information technology. This investment was intended to make trading more efficient and to enable these entities to analyze markets and create trading strategies. These firms brought in and trained traders, many picking up individuals orphaned by the collapse of Enron. Traders were no longer limited to Chicago and New York, as large desks were established from Baltimore to Green Bay and beyond.

Push to Transform Commodities Markets toward Tradable Asset Classes

De-regulation of the commodities markets induced financial institutions and other major traders to explore these markets for new opportunities. Financial intermediaries believed that if the commodities markets could be transformed to behave more like securities markets, they could increase trading opportunities, and target new speculative customers, like institutional investors. In fact, vehicles and strategies such as commodities index funds were structured and heavily marketed, aided by academic studies like the 2005 AIG-sponsored paper by Gary Gorton and Geert Rouwenhorst[66], which asserted that returns on commodities are inversely related to stock market returns, as well as promoting the benefits of "investing" in a backwardated futures price curve.[67]

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66 Gorton, Gary B. and Rouwenhorst , K. Geert, Facts and Fantasies about Commodity Futures (February 28, 2005). Yale ICF Working Paper No. 04-20. Available at SSRN: http://ssrn.com/abstract=560042

67 Ironically, the vehicle chosen to capture commodity market backwardation has resulted in a persistent state of contango as described above.

The contrast between capital markets and commodity markets is fundamental to understanding the implications of the purposes for commodities futures markets established in the CEA. Equities and debt markets exist to provide accessible sources of capital for businesses. All securities trading by its nature is speculative. If the markets are transparent and fair, this serves a useful purpose because it provides an enormous, liquid source for funding the capital requirements of corporate America.[68]

In contrast, commodities markets are not sources of capital funding. They exist to facilitate hedging by producers and purchasers of commodities. ***Efforts to convert them into venues to trade asset classes as if they were securities are misguided and dangerous.***

Unfortunately, the massive changes in the commodities markets have had this effect. Several academic studies have documented changes that indicate these markets have begun to behave like securities markets (e.g. Tang & Xiong (2010), Philips & Yu (2010), discussed in *Appendix A*). Chief among these new phenomena is the repeated experience of price bubbles, which can be enormously disruptive and damage the economy. In speculative securities markets, bubbles can be ascribed to "irrational exuberance." In commodity futures markets, they reveal that futures prices have detached from fundamentals and the risk hedging purpose of these markets is not being served.

As discussed herein, the direct effects of de-regulation and the exploitation of the commodities markets by transforming them to mimic securities markets are:

- a massive increase in speculation,
- use of trading techniques which increase and exploit commodities futures price volatility
- and the rise of a highly structured vehicle for speculation, the commodity index fund, which distorts price discovery and biases prices toward higher levels.

Sufficient speculation, in well-regulated doses, is an integral part of healthy commodities futures markets. However, excessive speculation, in overwhelming quantities, and in forms that directly undermine the price discovery function, present an undue burden of precisely the type that the CFTC has been clearly tasked to eliminate or prevent by imposing speculative position limits.

Changing Regulatory Approach to Position Limits

Recently, position limits have been employed almost exclusively in commodities futures markets to control market manipulation, a distinct form of profiteering (typically associated with the practice of "cornering" a commodity market or, in the capital markets, practices such as insider trading, illegal short sales, and front running). Further, the financial services industry, given their

[68] Frenk, D. and Masters, M., "Anthropic Finance: How Markets Function" (2010), available at http://www.bettermarkets.com

traditional capital markets focus, has consistently directed regulatory attention to commodity market manipulation, and away from excessive speculation.

But there are **critical differences** between a commodities market position limit regime focused just on manipulation, and one focused on preventing the very different concept of excessive speculation.

During the 1980's and 1990's, as financial futures in the capital markets were developed (notably in major fixed income instruments and popular equity indexes), the regulatory distinctions between financial and commodities futures decayed as the financial services industry promoted a "one size fits all" approach. Excessive speculation, a concept exclusive to commodities futures markets, historically had been regulated through the imposition of position limits. It soon became apparent that position limits regulating excessive speculation threatened the burgeoning, speculative business in financial futures market. Further, financial intermediaries were more familiar with position limits aimed only at preventing manipulation, in line with previous capital market practices. Unfortunately, commodity regulators, pushed by the financial services lobby, subsequently de-emphasized limits targeting excessive speculation in the commodities futures markets, conforming their regulatory approach to the approach employed in the financial futures markets.

However, unlike the capital markets in which all participants are speculators (even those said to be "hedging" are actually disposing of the risk embedded in another security), the commodities futures markets have always had ***two*** distinct participants, *bona fide* hedgers (whose purpose is to reduce price volatility associated with their physically based businesses) ***and*** speculators (whose purpose is to serve the hedgers by "providing liquidity").

Different from the much larger capital markets (and associated derivatives), if speculators come to dominate price discovery of a given commodity market, **then that market is no longer serving the primary constituency of these markets - *bona fide* hedgers.** Moreover, the essential link between the price behavior and actual supply and demand of the underlying commodity is weakened. For this reason, it is clear that excessive speculation as a concept merits continued regulatory scrutiny in the commodities futures markets. In fact, the sharp rise in commodity speculation over the last five years, increasing volatility and hedging costs for producers, has resulted in commodity price increases which have focused renewed public attention on the urgent need for broader and more rigorous position limits, ***ones that could address not only the threat of manipulation, but also the threat posed by excessive speculation.***

Beginning in the 1990s, position limits were gradually widened. Ann Berg, a former director and trader at the Chicago Board of Trade, reports that speculative limits for contracts in Corn, Soybeans and Wheat on CBOT (CBT prior to 1995) had for decades been set at 600 contracts per commodity.[69] By 2005, they had grown 22000, 10000 and 6500 contracts respectively, before being doubled again during the 2006-8 price spike. Berg's figures indicate a ***near 75 times increase in the level of position limits in just two decades*** leaving them arguably too wide

[69] Berg, A. *The Rise of Commodity Speculation: From Villainous To Venerable"* (2011) p15

even to mitigate manipulation, ***and certainly well above the levels required to curb excessive speculation.***[70]

Part 4. The Proposed Rules

Section VIII: Specific Comments on Proposed Rules

The approach to position limits must be expanded beyond the concentration limits set forth in the Proposed Rules. Again, concentration limits are concerned with manipulation, not excessive speculation. Dodd-Frank very clearly spells out the need for regulations pertaining to **both phenomena, not just manipulation.**

Procedures for reducing excessive speculation must be adopted. The process should be focused on the largest speculators and provide them an opportunity to adjust positions. However, there must also be a credible mechanism to required reduced positions if necessary.

In addition, commodity index funds must be significantly limited. Structurally, by affecting other types of speculators, they increase the transaction costs of hedgers causing prices to rise. And by contributing to a persistent contango state, they helped to increase prices through various physical contract index practices and pricing assessments. Commodity index funds, as a specific "class of traders" (in language of the Dodd-Frank Act) constitute a burden on American consumers.

The investors in commodity index funds hold swaps in which the sponsor is counterparty. Each of the swaps is priced in accordance with a specified commodity index. They all are following a common plan for investing in a market basket of commodities futures prices. Therefore the swaps that are indexed to each individual index must be treated as a single position under the aggregation rules.

The aggregate position limit rules must be applied immediately to the futures markets. As illustrated below, the relationships between the futures markets and commodity prices are affected by swaps markets, but indirectly. The largest relationship is the practice of dealers using futures as "futures equivalent hedges" to lay offset swap exposures to end users. While swaps market trading marginally, this "futures equivalent hedging" activity is not sensitive to prices. Furthermore, the interaction between the futures markets and physical commodity prices is largely embedded in structural elements of the futures markets which

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70 While many have claimed that agricultural position limits have not worked historically, the fact that limits have increased 75 fold in 20 years makes it completely clear that no one can say that historic lack of effect is proven. What would have been the result if consistent and meaningful limits had been in place? It seems clear that prices would have been more moderate.

function independently of the swap markets. Aggregate position limits on futures address these structural elements and their consequences.

Concentration position limits applicable to the futures markets must be applied immediately as well. The Proposed Rules call for separate position limit regimes for futures, swaps and the two combined. Information from large swaps dealers may be needed for swaps and swaps/futures combined. The CFTC must implement the futures regime first and immediately. ***The fact is that the futures market position limits are uniquely important. Swaps are almost all priced based on futures prices, so the futures markets influence swaps, rather than the reverse. More importantly, futures prices directly affect commodities prices paid by American consumers.***

Several detailed comments concerning the Proposed Rules are also addressed below. The thresholds for each category of position limits must be lowered. The "look-through" exclusion of positions offsetting swaps entered into with a customer who is entering into a bona fide hedge must be deleted. And the measurement of compliance must be more frequent. Finally, the standards included in the definition of a "referenced paired futures contract, option contract, swap or swaption" must be amended to more accurately reflect market practices and realities.

Look-Through Provision

Under the Proposed Rules, a trader may exceed the position limits to the extent, among other things, that a transaction or position

> Reduces risks attendant to a position resulting from a swap that... [w]as executed opposite a counterparty for which the transaction would qualify as a *bona fide* hedging transaction....[71]

Therefore if a dealer enters into a swap which constitutes a referenced contract with a *bona fide* hedger and then hedges the risk of that swap, in whole or in part, with another referenced contract, the second referenced contract is not subject to position limits. This result is solely a consequence of the purpose of the dealer's initial counterparty qualifying it as a *bona fide* hedging transaction.

The Proposed Rules limit positions in aggregate and by classes, the classes being (a) futures and options and (b) swaps; and it measures positions on a net long or net short basis.[72] Therefore, if the dealer described in the above paragraph hedges the risk of the initial swap with a referenced contract swap, the quoted provision of the proposed rules have no practical consequence since the two swaps would be netted for all purposes. However, if the dealer hedges the initial swap with a referenced contract in the futures market, the

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71 Proposed Rules, Section 151.5(a)(1)(iv).
72 Proposed Rules, Section 151.4(d).

futures contract would not increase the dealer's position in calculating the futures class open interest.

We are in agreement with the Proposed Rules to the extent that positions of dealers in the futures markets includes futures and options which offset swaps and swaptions executed with speculators. However, futures and options offsetting swap and swaption positions with *bona fide hedgers* should also be included. There is no reasonable connection between the purposes of the position limit rules and the "look-through" provision. There is a very real concern about the "look-through" provision is that it will provide an competitively advantage to dealers in providing swap hedges to *bona fide* hedgers It is disingenuous to assert that dealers would withdraw liquidity from the swaps markets because offsetting positions in the futures markets count against the class position limit. If the dealer sees fit to manage class limits by avoiding futures, it can offset with a swap. As we have pointed out above, the futures markets have structural relationships to commodities prices that are specific and unique. This class position limit is extraordinarily important and the level of speculation must be brought under controls regardless of the motives of a counterparty indirectly related to the futures position.

Finally, the look-through provision focuses on intent and causal relationships that are difficult to ascertain. The existence of a futures position might be motivated by an intent to lay off swap risk. On the other hand, it might be the consequence of an algorithmic strategy to squeeze a commodity index fund engaged in a roll. If the purpose is the latter, the look-through rule should not prevent the futures position from counting in the position calculation. Policing the intent would be virtually impossible. *The "look-through" should be identified for what it really is: a potential regulatory loophole promoted by the swap dealer community for competitive purposes.*

Calculation Periods

In the Proposed Rules, the CFTC will fix concentration position limits on January 31 of each year, and publish them. The position limits then will become effective on March 1 and remain in effect for one year.[73]

This process is inadequate, given the fluidity of trading activity and the availability to the CFTC of data under the reporting regime required by the Dodd-Frank Act. The CFTC will have the tools and capacity to responding to changing market conditions much more frequently than annually. The data will be provided by derivatives clearing organizations and swap data repositories. Large dealer reporting based on futures equivalent pricing will provide needed data promptly, The CFTC will have the ability to monitor and analyze this data at least annually under the Proposed Rules to set position limits. Running these procedures more frequently will be a matter of initiating automated processes.

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[73] Proposed Rules, Section 151.4(h).

Updating the concentration position limits more frequently will have significant benefits to the marketplace. Position limit changes will more accurately reflect current market conditions and more precisely serve the purposes behind the position limits rules.

Moreover, a quarterly regime will allow regulators to adjust position limits up or down, as necessary to promote or deter speculative liquidity as necessary so that liquidity is sufficient. This could be an especially critical tool for regulators given the rapidly changing macro environment of the present.

Furthermore, infrequent calculations will undoubtedly create opportunities for abuse. As market conditions change, and position limits set earlier become outdated, they can easily become a "safe harbor" for trading activity which is precisely the type the Dodd-Frank Act seeks to eliminate.

Finally, a desirable regulatory result is to encourage large traders to monitor their own open interest in order to maintain compliance. More frequent updates of position limits will motivate these market participants to implement stringent monitoring and procedures to adjust their activities to maintain compliance. Perhaps the largest and most important practical consequence of position limits will not be enforcement, but new *self-regulation* by a majority of market participants.

This will only happen if the CFTC establishes concentration position limits on a quarterly basis, at a minimum.

Definition of "Referenced Paired Futures Contract, Option Contract, Swap or Swaption"
The Proposed Rules define "Referenced Paired Futures Contract, Option Contract, Swap or Swaption" as

> (1) Directly or indirectly linked, including being partially or fully settled on, or priced at a differential to, the price of any core referenced futures contract; or
>
> (2) Directly or indirectly linked, including being partially or fully settled on, or priced as a differential to, the price of the same commodity for delivery at the same location, or at locations with substantially the same supply and demand fundamentals, as that of any referenced futures contract.[74]

The required use of futures equivalence, in conjunction with the CFTC's proposed rule on "Position Reports for Physical Commodities Swaps," is clearly a necessity as well as an excellent approach to making market data useful to regulators and the broader public. In addition to promoting sensible and market-based calculation of positions,

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[74] Proposed Rules, Section 151.1.

this new requirement will dramatically add to overall market transparency in the OTC commodities derivatives markets.

The quoted definition should accomplish one primary purpose: it should cover contracts for physical commodities having different delivery points or differing in other ways, but having prices that are sufficiently related that they should be grouped for purposes of position limits.

Often, this sort of price relationship occurs because the different delivery points are subject to substantially the same supply and demand fundamentals. However, this is not always the case. The essential feature of the relationship is not the supply and demand fundamentals of the different delivery points, but rather the enduring price relationship between the two contracts. This link may rest on other factors than different delivery points with shared fundamentals. For example, it may arise between different grades of a commodity, or different secondary products of a single commodity, rather than between different delivery points for precisely the same commodity.

Therefore, by focusing the definition on the supply and demand relationships of the delivery points rather than the price relationships themselves, the Proposed Rules offer an unnecessarily narrow definition of a paired swap or swaption. This may be the cause of price relationships, but not in all cases. The focus must be shifted to the actual issue – market price relationships. Location issues should be considered along with other factors, but in a second level of analysis which involves examining the cause behind the relationship to validate the price relationships which are apparent from the market.

The markets for crude oil and derivatives such as jet fuel are good examples. Physical characteristics like storability, storage capacity and relative absence of distribution constraints can make the physical delivery points much less meaningful. Crude oil delivered in many different and remote locations is closely related in terms of price. The same is true of jet fuel. In contrast, products like electricity that are not easily stored and have severe limits on distribution capacity are less broadly correlated.

As a result, in the U.S. oil market, crude oil has a widely applicable reference price – WTI. In contrast, power contracts have few and very narrowly applicable reference prices, such as PJM West Hub.

Another consideration is the concept of the "same commodity." Just as supply and demand similarities can cause two contracts to have related prices, so can the processing of one product that is the subject of a contract into another which is the subject of a second contract. For instance, crude oil grades have a strong price relationship with the crude oil reference price, regardless of delivery points. These grades are often hedged with WTI contracts, the widely used reference price. Even though they do not constitute precisely the same product, they are sufficiently closely related that these grades should be considered as valid pairs with WTI contracts. A swaps position in West Texas Sour (WTS) or Mars should therefore, for position limit purposes, be paired with a position in WTI as a position in crude oil outright It should not be possible to artificially widen position limits

by claiming that a position in WTS is materially distinct from a position in WTI, so that the two should not be aggregated. Different grades of crude are all, in an important and relevant sense, the "same commodity."

Returning to the jet fuel example, under common trading practices, it is widely accepted that there is a close relationship between heating oil, jet fuel and other middle distillates. Delivery locations are not significant to the correlations between jet fuel contracts because of the specific market structure, storage capacities and distribution capabilities. Rather than arising from fixed differentials between delivery points, the significant price relationships here are based on commonly understood relationships between various refined products. Traders recognize strong hedging relationships among jet fuel, heating oil and other middle distillates like diesel, based on the similarity of the products and enduring price correlations between them. They often use these contracts interchangeably, with minimal reference to location of delivery. This suggests strongly that the concept of the "same commodity" must be given a broad interpretation.

The concept of the "same commodity" must therefore be made broader to cover relationships beyond that of different delivery points with shared supply and demand fundamentals. The definition should reflect the market's understanding of what constitutes the "same commodity," which extends to different grades, and other variations that trade at a stable and well-defined differential, are commonly regarded as hedge equivalents, and display enduring and widely recognized price relationships.

The CFTC must adopt a layered approach to this definition, as follows:

1. Because participants have a financial stake in the existence of the relationship, a persuasive indication of strong price relationships is the behavior of the market,. The analysis should consider the hedging relationships that are broadly used by market participants in hedging activities. If a listed contract is used as a hedge for a non-listed contract, for instance, this is a strong indication that the price relationships of the two contracts are sufficient to support pairing.

2. The practices of clearing organizations are also indicative. They provide netting of initial margin through credits for price correlated contracts. This is an indication of potential pairs. It should be noted, however, that the basic purpose of clearing organizations is credit management. As a result, the contracts qualifying for netting of initial margin constitute a narrower list than paired contracts that are appropriate for position calculations.

3. The existence of an enduring price relationship should qualify two positions to be considered paired, provided it is justified by the other considerations. Thus, although gold and silver may display an enduring price relationship, they clearly should not be considered as the same commodity for reporting purposes, because they are not treated as such by the market. However, jet fuel and heating oil, which would not be paired under the Proposed Rules as they stand, should be paired because of (a) their enduring price relationship, and (b) the fact that they are

generally used as equivalent hedges by market participants, and also pass the other tests listed below. Historic price correlations between the potentially paired contract and the listed contract can, in the proper circumstances, be predictive of future relationships. It is most useful in cases where hedging activity is difficult to determine. Market participant behavior as described in paragraph 1, is a more reliable factor. The strength of the correlation should indicate merely that the relationship is significant.

Finally, the physical characteristics of the subject of the futures, options, swaps or swaptions which might be paired based on the foregoing criteria should serve as a check on potential pairings. Where the cause for a relationship can be determined, it reinforces the conclusion drawn from the other factors. These physical characteristics may indicate that market practices, treatment by clearing organizations and historic correlations do, or do not, support pairing. Examples of the physical characteristics should include:

a. Distribution systems and delivery locations in relation to supply and demand relationships. Where the supply and demand relationships are similar, the pairing of price-related contracts is supported.

b. Relationships between grades of the same basic products, such as grades of crude oil. Where the specific products are grades of the same basic product, the pairing is supported.

c. Relationships between the products based on common source for processing, such as heating oil, diesel and jet fuel. Where the specific products are produced by different processing of the same underlying product, pairing is supported.

Aggregation of Commodities Index Fund Swap Positions

The investors in commodity index funds hold swaps in which the sponsor is counterparty. Each of the swaps is priced in accordance with a specified commodity index. The price is adjusted by the profit or loss the fund manager receives in connection with the roll of futures used to off-set the swap. All of the investors are following a common plan for investing in a market basket of commodities futures prices - the swap payments follow the index as adjusted and calculated by the index provider and the rolls are managed in accordance with a common agreement and set of standards by the manager. Obviously, fund promoters will point out slight differences in the way different vehicles work. They are immaterial. The important facts are that: (a) they all track a single index; and (b) to avoid tracking error, all index fund participants must replicate the weightings in the index; (c) and they all must continuously extend maturities by rolling their positions forward.

The aggregation provisions of the Proposed Rules provide as follows:

> The position limits set forth in § 151.4 shall apply to all positions in accounts for which any trader by power of attorney or otherwise directly or indirectly holds positions or controls trading and to positions held by two or more traders acting pursuant to an expressed or implied agreement or understanding the same as if the positions were held by, or the trading of the position were done by, a single individual.[75]

The swaps which are indexed to each individual index must be treated as a single position under the aggregation rules. The investment plan as described above is the same, an expressed agreement.

This also is a sensible result given the reality of the marketplace. At the time of the roll or upon any re-weighting, the managers act in accordance with a common set of requirements, often collectively disrupting the commodities futures markets as described above. It is precisely this wave-like market activity that helps to cause the damage described herein.

Excessive Speculation

Rules relating to excessive speculation which overlay the manipulation-oriented concentration provisions of the Proposed Rules must be added. These rules must address two issues: what standards are used and what are the consequences of speculation exceeding those standards.

1. As discussed in the analysis above, historic data and analysis indicate that ***speculation by liquidity providers is much more than sufficient to provide necessary liquidity to hedgers if such speculation constitutes more than 30% of total open interest.*** Speculation levels above sufficiency must be deemed "excessive."

2. ***For individual markets, this maximum aggregate level of 30% may still be too high***. Therefore, as part of the biennial review of the effectiveness of position limits required by Dodd-Frank Act §719(a)(4), the Commission should also take into account the views of hedgers, the *primary constituents* of commodity futures markets, to determine whether a tighter limit might be appropriate in individual markets with unique liquidity conditions.

3. Commodity index funds must be dealt with separately because of the unique characteristics discussed above: they are liquidity takers who structurally increase volatility, they damage price discovery, and they have pushed commodity prices

[75] Proposed Rules, Section 151.7.

towards higher price levels. *This fits precisely with the Dodd-Frank Act authorization to establish position limits not just for any "person," but also for* ***"any group or class of traders."***

Commodity Index Funds Class Position Limits

Currently, commodity index funds represent about the same percentage of markets as other speculators and hedgers, respectively. The interests of the public and the effective operation of the market to facilitate hedging and price discovery would best be served if their positions were limited to zero. ***However, any limit below current levels would be constructive.*** For example just limiting commodity index funds to 10% of the total market open interest would likely have significant beneficial effects.

Reducing Excessive Speculation

If a condition of excessive speculation exists for a material amount of time, the CFTC must require a reduction in non-commodity index fund speculation, commodity index fund speculation or both, depending on the circumstances. The method of reducing levels of excessive speculation would work as follows:

If the condition is a result of excessive non-index fund speculation,

- the largest market participants in this category representing one third of speculative activity must file a plan with the CFTC for the reduction of their speculative positions commensurate with the excess speculation over a reasonable period of time; and

- if the plans are deemed inadequate or do not have the effect of eliminating excess commodity index fund speculation, the positions of these market participants will be limited to a percentage of the market sufficient to eliminate excess speculation.

It has been pointed out many times that data from swaps markets are not yet available. This concern focuses on concentration, the approach used to target manipulation in the Proposed Rules. In contrast, excessive speculation, addressed in our proposed addition, is specific to each of the two markets – futures and options and swaps. There is no doubt that additional data provide greater knowledge. However, as described above, the futures markets are independently and structurally critical to the prices of commodities. In substantial part, the linkages described herein are not dependent upon any levels of activity in the swaps markets. Furthermore, swap prices are overwhelmingly indexed to futures prices. Swaps are routinely hedged with futures equivalent contracts. The foregoing rules regarding excessive speculation can and must be applied immediately to the futures and options markets. As data become available, similar approaches, analyzing hedging and speculation in relation to swaps using a parallel methodology, such as the hedge equivalent approach to the definition of Referenced Paired Futures Contract, Option Contract, Swap or Swaption.

Concentration Position Limits

In addition, for the same reasons, concentration position limits applicable to the futures markets must be applied immediately as well. The Proposed Rules call for separate position limit regimes for futures, swaps and the two combined. Information from large swaps dealers may be needed for swaps and swaps/futures combined. The CFTC must implement the futures regime first and immediately.

CONCLUSION

The position limits rules are unique in the effort to implement the Dodd-Frank Act. The Dodd-Frank Act Requires the imposition of new position limits that will, above all, eliminate excessive speculation. While the Proposed Rules address one of those purposes, concentration and the potential for manipulation, the other major purpose, the problem of excessive speculation is not addressed. We have articulated the serious need to expand the scope of the rule on position limits by demonstrating the effects of excessive speculation, and in particular speculation by commodity index funds, on commodity prices. We have pointed out the specific adverse impact that excessive speculation has on price discovery. We have documented the relationship of commodity index fund speculation on market liquidity. And we have laid out a regime for setting and enforcing limits on excessive speculation.

In summary we have proposed the following:

- Elimination of the "look-through" provision in the Proposed Rules.
- Quarterly calculation of concentration limit amounts.
- Adoption of a market-based approach to determining referenced paired contracts.
- Limiting commodity index funds to 10% of the open interest in individual markets.
- Setting speculative position limits at 30% of the open interest in individual markets.
- Establishing a flexible regime for reducing speculation when excess speculative conditions exist in the markets.
- Immediate implementation of concentration and excessive speculation position limits to the futures markets and subsequent extension to swaps markets when data become available,

We hope that this comment letter aids the CFTC in its effort to address this important, complex and controversial rule making.

Sincerely,

Dennis M. Kelleher
President & CEO

David Frenk
Director of Research

Wallace C. Turbeville
Derivatives Specialist

Steven Hall
Securities Specialist

Better Markets, Inc.
1825 K Street, NW
Suite 1080
Washington, DC 20006
(202) 618-6464

dkelleher@bettermarkets.com
dfrenk@bettermarkets.com
wturbeville@bettermarkets.com
shall@bettermarkets.com

www.bettermarkets.com

Appendix A

Review of Academic Literature

Appendix A: Review of Academic Literature

As discussed on page 36 *Supra*, there is an ongoing and lively academic debate surrounding the impact of speculation on commodity prices. Various interested parties, including Terrence Duffy of CME, cited above, have repeatedly claimed that the debate is overwhelmingly one-sided, with an absolute dearth of evidence that speculation impacts prices. Surprisingly, this assertion has been echoed by several academics.

A review of the thirty studies cited below clearly demonstrates the absurdity of these claims. Moreover, a closer reading of the available literature uncovers an interesting fact. Many of the studies arguing that speculation is not a causal factor with respect to commodity prices are effectively the same study in different clothes. That is, they merely present the same findings as other papers, occasionally with some minor tweaks, and often with none at all.

On the other hand, the studies that argue speculation *is* a causal factor display a wider range of approaches, ranging from theoretical and empirical treatments of actual market structure, to direct and indirect statistical tests.

In fact, those who negate the impact of speculation on commodity prices enjoy much less support, both quantitatively and qualitatively than those with a vested interest would have the regulators and the public believe. Indeed, once it is realized that the studies arguing speculation is not a causal factor are generally variations on a few highly flawed approaches, it appears that the most reasonable conclusion to reach is that speculation *is* a causal factor, consistent with all the evidence presented in the accompanying comment letter.

Speculation is not a causal factor

A number of economists, e.g. Irwin and Sanders (2010), Krugman (2008), Pirrong (2009)[76] are skeptical that non-commercial speculation in general, or index fund participation in particular, is capable of affecting prices over the long-run. These economists present clear, simple, yet erroneous arguments to support the view that the elevated price levels and volatility of the last several years have been fully attributable to supply and demand explanations.

Some, including Irwin and Sanders (2010), argue that there is a "logical inconsistency"[77] in the thesis that a large inflow of commodity index fund money can distort prices. They note that, unlike in the stock market, there is an indefinite supply of futures contracts. The

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[76] Irwin and Sanders (2010) available at: www.oecd.org/dataoecd/16/59/45534528.pdf Krugman (2008) available at http://krugman.blogs.nytimes.com/2008/06/25/confusions-about-speculation/

[77] *Op. Cit.* p3

implication is that the usual laws of supply and demand do not apply to futures markets: increased demand for long futures contracts needn't push up prices. This argument holds no merit, however, because demand for long futures contracts from a "buyer" must be met with demand for short futures contracts from a "seller" willing to take the opposite short position; otherwise, a transaction cannot occur. If new buyers enter the market, they must therefore bid prices higher in order to attract new sellers. The laws of supply and demand are therefore no different in futures markets than they are in any other market, contrary to what Irwin and Sanders argue.

Others, like Krugman (2008) argue that speculation in futures markets can only affect physical prices by changing physical inventories through altering the incentive structure of physical owners. They then point out that inventories have not risen sufficiently to indicate a speculative impact. This argument ignores the fact that physical prices are not just affected by futures prices via inventory effects. They are also directly influenced by futures prices via futures-linked physical contracts in grain and energy markets, and also by their role in setting benchmarks for physical auctions in all commodity markets. It also ignores the fact that both supply of and demand for essential commodities are hugely inelastic; meaning a speculation-driven run-up in prices needn't lead to a significant rise in inventories. Any generic rise in inventory levels due to speculation-driven price inflation is therefore likely to be completely outweighed by seasonal fluctuations and other short-term factors.

Some academics, e.g. Pirrong (2009)[78], have tried to prove that commodity prices are fully explained by supply and demand fundamentals, so no speculative impact is present. The most popular candidates for supply-and demand explanations are emerging market demand and biofuels. To date, no rigorous model of this relationship has emerged. However, this is perhaps inevitable, given the vague nature of such claims. While nobody denies that demand increases or supply constraints should, ceteris paribus, lead to price increases, there is no generally accepted model for estimating the real-world elasticities of demand and supply that would allow for calculation of the appropriate *size* of such increases. Insofar as models of real-world elasticities have been developed, they have given widely divergent results, and not even a basic degree of consensus has been reached.

Moreover, while the fundamentals might explain at least part of the general *rise* in prices, there is no obvious reason why a long-term structural demand surplus should explain the rising *volatility* of prices. It also fails to explain the rapidly rising correlations between the prices of very different commodities, from perishables to storable food commodities, to energies and metals – correlations that have outlasted the financial crisis that some observers originally proposed as an explanation. Nor does it explain the breakdown in traditional inventory relationships, which held steady for decades before breaking down during the index fund era.

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[78] Pirrong (2009) available at http://www.bauer.uh.edu/downloads/Pirrong_WTI_Report_091116_Final.pdf

A final reason for the lack of a definitive study on the link between fundamentals and prices is the lack of definitive data on the fundamentals. While we know that emerging market demand is growing, it is hard to know just how quickly it is doing so. Even our best estimates, therefore, contain too many degrees of freedom to facilitate a fully rigorous analysis of the strength of the link between fundamentals and prices. Consequently, it is often simply taken as an article of faith. For an issue of such immediate and practical importance, however, faith is surely not the appropriate arbiter.

Beyond these theoretical claims, the economists who claim speculation is not a relevant factor in the current price turmoil tend to make the following evidence-based claims:

(i) Granger Causality tests and other similar approaches display no statistically significant relationship between speculative behavior and price moves.

(ii) The amount of speculation present in today's commodity markets is within historical norms, so the clear changes in commodity price behavior cannot be attributed to an increase in speculation.

Both of these lines of argument are deeply flawed, to the point of outright falsehood. The first type of argument suffers from two main deficiencies. First, the statistical techniques applied are unsuitable for commodity price data, which is non-stationary (highly volatile). Linear regression models and similar approaches rely upon data smoothing techniques that cannot be expected to give reliable conclusions. See Frenk (2010)[79] for further discussion of these points.

Second, leaving aside the issue of whether the tools themselves are appropriate, the actual execution of such studies e.g., Irwin and Sanders (2010), Harris and Bhukusyin (2009) is *clearly inappropriate*. Those who believe speculation impacts prices believe it does so in a way that generates observable relationships over periods of months. Over a few days or a week there are too many other independent variables to expect any single factor to show a consistent degree of impact on prices exclusively. The thesis is not, therefore, that an increase in speculation or an increase in index fund positions one week will always lead to higher prices or higher volatility the following week. The Granger Causality tests applied by Irwin and Sanders (2010), by Harris and Bhukusayin (2009), and by their many emulators therefore address a straw man. Testing a more appropriate time frame, Professor Kenneth Singleton at Stanford University has found that "[W] investor flows are measured over periods of weeks, rather than days as in much of the literature, they have sizable correlations with excess returns."[80]

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[79] Frenk (2010) available at http://stopgamblingonhunger.com/wp-content/uploads/2010/07/Response-to-OECD-study.pdf

[80] Singleton, K. "Investor Flows And The 2008 Boom/Bust In Oil Prices" (2011)

The claim that "levels of speculation...are within historical norms," also offered by Irwin and Sanders (2010) and by Harris and Bhukusayin (2009), and additionally made by Stoll and Whaley (2009) is even more flawed. In wheat, for example, the T-Index hovers at around 100% excess speculation for most of 2007, 2008 and 2009.[81] This is unprecedented, and constitutes a level of excess speculation three times greater than the historical norm, which tends to be in the region of 30%-40%.[82] The diagrams starting on page 26 of the accompanying comment letter show this graphically for a range of commodities, and one set of charts is reproduced below:

Finally, the introduction of commodity index funds as a major component open interest since around 2004 throws off Working's Speculative T-Index, since these participants cannot be classified as traditional speculators (because they are liquidity takers rather than liquidity providers), yet nor are they bona-fide hedgers, as their underlying business has nothing to do with commodities [for more on this, see p59 *supra*].

Speculation is a causal factor

In contrast to the view that speculation does not impact prices, other economists have produced significant amounts of theoretical and empirical evidence that speculation is a causal factor. Indeed, this is a logical consequence of the fundamental principle that markets are made of participants, and it is therefore the buying and selling behavior of those participants that moves prices.[83] Therefore, if the participants' behavior is driven by fundamentals, then prices will reflect fundamentals. To the degree that factors come to dominate participants' behavior, prices will become divorced from other fundamental supply and demand factors.

These economists recognize that the structure of commodity markets today is one in which a significant proportion of market participants do not trade on fundamentals, and that the size and power of this group is sufficiently large that rational arbitrageurs cannot eliminate divergences from fundamental value, as to attempt to do so would be too risky.[84] Additionally, a lack of transparency as to how various types of participant are classified may prevent arbitrageurs from identifying divergences from fundamental value in the first place.

Thus, this group of economists recognizes the theoretical possibility that non-commercial speculators as a group, index funds as a group, or both groups in combination, can cause

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81 i.e. a T-Index value of around 2.0. Source: author calculations.

82 See e.g. Working (1960), Peck (1982), both available at http://www.farmdoc.illinois.edu/irwin/links_archive_papers1.asp

83 *See* e.g. Vayanos and Woolley (2010) and Vayanos and Woolley (2011) both available here: http://www.lse.ac.uk/collections/paulWoolleyCentre/WorkingPapers/Default.htm

84 *See* e.g. Schleifer (1995) and Schleifer and Vishny (1997) both available here: www.nber.org/papers/w5167

significant and "unwarranted" changes in commodity futures prices. They further recognize that this impacts physical prices via (1) anchoring expectations through the "price discovery" role of futures markets, which then influences physical auctions; (2) physical term contracts that are directly indexed to near month futures prices; (3) physical term contracts that are indirectly indexed to futures prices via benchmarks such as the "Platts price," which is itself determined by an algorithmic function involving a combination of physical auction prices and futures prices.[85]

This latter group of economists has gathered substantial empirical data to show that, in addition to being logically possible, this phenomenon is, in fact, occurring.[86] These data tend to take one of the following forms:

(i) Increased correlations between financial asset prices and commodity prices, interpreted as evidence that the increased financial participation in commodities is now a primary driver of prices, e.g., Masters and White (2008), Singleton (2011). Also, increased correlations between prices of different commodities, interpreted as evidence that index fund buying has distorted prices e.g. Tang and Xiong (2010);

(ii) Changes in the term structure of commodity prices. Structurally, if index fund activity is influencing prices, one would expect a greater prevalence of contango, because index funds put a continual bid on further out months. Contango has indeed become considerably more prominent in the index fund era.

(iii) Changes in the pattern of commodity prices. Some economists have attempted to model the defining characteristics of a price bubble, measured purely formally e.g. Phillips and Yu (2009). They have then applied these metrics to commodity prices, and found that the 2007-8 price run-up displayed bubble-like behavior. This is interpreted as implying that excessive speculation was a driving factor, as bubbles are, according to these studies, associated with capital markets rather than traditional commodity markets.

In addition to these studies, Mou (2010)[87] has demonstrated convincingly that the effect of the commodity index fund roll is real and large. He characterizes it as "a significant and persistent market anomaly in the commodity futures markets".[88] By comparing excess returns around the dates of the rolls of futures in the GSCI (the most popular benchmark for commodity index funds) with those of futures not included in the GSCI, he shows that huge arbitrage opportunities (inefficiencies) have been generated by the "Goldman Roll".

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85 *See* p. 54 *supra*

86 A representative sample of such studies is included below.

87 Mou, Y. *Limits to Arbitrage and Commodity Index Investment: Front-Running the Goldman Roll* (Columbia University 2010) http://www.nhh.no/Files/Filer/institutter/for/seminars/finance/2011_spring/180211.pdf

88 *Ibid.*

They did not exist before the GSCI launched, but they have since existed consistently. Over the same time period, these opportunities simply *did not arise* in commodities not included in the GSCI. Moreover, Mou finds that the more index fund money flows into commodities markets, the greater these inefficiencies become. Finally, he finds that when other speculators' positions increase, the inefficiencies tend to be arbitraged away to a greater degree.

This important study therefore provides overwhelming evidence that the actions of speculators have a significant impact on commodities prices.

The balance of academic discussion therefore provides yet more evidence, in addition to that presented in the accompanying letter, that speculation impacts prices, and that U.S. commodity markets today are in a state of excessive speculation that the CFTC is statutorily required to address through a meaningful and targeted position limits regime.

Partial List of Studies Arguing Speculation Is A Causal Factor[89]

Agriculture and Food Policy Centre (University of Texas) (2008): The effects of ethanol on Texas food and feed: "Speculative fund activities in futures markets have led to more money in the markets and more volatility. Increased price volatility has encouraged wider trading limits. The end result has been the loss of the ability to use futures markets for price risk management due to the inability to finance margin requirements."

Baffes, J. (World Bank) and Haniotis, T. (European Commission) (2010): Putting the 2006/2008 Commodities Boom into Perspective. World Bank Research Working Paper 5371: "We conjecture that index fund activity (one type of "speculative" activity among the many that the literature refers to) played a key role during the 2008 price spike. Biofuels played some role too, but much less than initially thought. And we find no evidence that alleged stronger demand by emerging economies had any effect on world prices. "

Chevalier, J., Baule, F., Lasserre, F., Odonnat, I., Viellefond, E., Laffitte, M. and Chevalier J. (Ministère de l'Economie, de l'Industrie et de l'Emploi) (2010): Rapport du groupe de travail sur la volatilité des prix du pétrole: "on peut raisonnablement avancer en conclusion que le jeu de certains acteurs financiers a pu amplifier les mouvements à la hasse ou à la baisse des cours, augmentant la volatilité naturelle des prix du pétrole..."

Eckaus, R.S. (MIT) (2008): The Oil Price Really Is A Speculative Bubble: "Since there is no reason based on current and expected supply and demand that justifies the current price of oil, what is left? The oil price is a speculative bubble."

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[89] For a list of studies arguing that speculation is not a causal factor, see Irwin and Sanders (2010) at footnote 67 *Supra.*

Gilbert, C. (Trento University) (2010): How to understand high food prices. Journal of Agricultural Economics: "By investing across the entire range of commodity futures, index-based investors appear to have inflated food commodity prices."

Gosh, J. (Jawaharlal Nehru University) (2010): Commodity speculation and the food crisis: "Thus international commodity markets increasingly began to develop many of the features of financial markets, in that they became prone to information asymmetries and associated tendencies to be led by a small number of large players.

Hernandez, A. and Torero, M. (2010): Examining the Dynamic Relation between Spot and Future Prices of Agricultural Commodities. In: FAO Commodity Market Review 2009-2010: "The causality tests performed indicate that the futures markets analyzed generally dominate the spot markets. Price changes in futures markets lead price changes in spot markets more often than the reverse, especially when examining returns."

International Monetary Fund (2008): Regional Economic Outlook: Middle East and Central Asia: "In summary, it appears that speculation has played a significant role in the run-up in oil prices as the U.S. dollar has weakened and investors have looked for a hedge in oil futures (and gold)."

Jouyet, J.P. (President de l'Autorite des marches financiers), de Boissieu, C. (President du Conseil d'analyse economique), Guillon, S. (Controleur general economique et financier) (2010) : Rapport d'étape – Prévenir et gérer l'instabilité des marchés agricoles: "Les marches agricoles sont confrontes a une mondialisation et a une financiarisation qui influencent leur fonctionnement. La volatilite naturelles des prix qui caracterise ces marches est amplifiee par de nouveaux facteurs et notamment par une speculation excessive."

Khan, M.S. (Petersen Institute) (2009): The 2008 Oil Price "Bubble": "While market fundamentals obviously played a role in the general run-up in the oil prices from 2003 on, it is fair to conclude by looking at a variety of indicators that speculation drove an oil price bubble in the first half of 2008. Absent speculative activities, the oil price would probably have been in the $80 to $90 a barrel range."

Krugman, P. (Columbia University) (2009): Oil speculation: "Last year I was skeptical about claims that speculation was central to the price rise, because what I considered the essential signature of a speculative price rise ... just wasn't showing. This time, however, oil inventories are bulging, with huge amounts held in offshore tankers as well as in conventional storage. So this time there's no question: speculation has been driving prices up."

Medlock, K. and Myers Jaffe, A. (Rice University) (2009): Who is in the Oil Futures Market and How Has It Changed?: "...trading strategies of some financial players in oil appears to be influencing the correlation between the value of the U.S. dollar and the price of oil. (...) We also find that the correlation between movements in oil prices and the value of the dollar against the trade-weighted index of the currencies of foreign countries has

increased to 0.82 (a significant measure) for the period between 2001 and the present day, compared to a previously insignificant correlation of only 0.0ß between 1986 and 2000."

Van der Molen, M. (University of Utrecht) (2009): Speculators invading the commodity markets: a case study of coffee: "Various analyses were performed to investigate these effects [i.e. effects that index speculators have on the futures market]. The results indicate that index speculators frustrated the futures market in the period between 2005 and 2008. This conclusion is based on the following indications: fundamentals have a lower impact on the price, the volume of index speculators has increased and their ability to influence the futures market has increased."

Mou, Y., "Limits to Arbitrage and Commodity Index Investment: Frontrunning the Goldman Roll," Columbia University (2010): "This paper focuses on the unique rolling activity of commodity index investors in the commodity futures markets and shows that the price impact due to this rolling activity is both statistically and economically significant."

Newell, J. (Probability Analytics Research) (2008): Commodity Speculation's "Smoking Gun": "Real market forces in these diverse markets are largely independent of one another, and therefore price changes should be essentially uncorrelated. This was clearly true historically; from 1984 through 1999 average correlation between all commodities was only 7%. In the last 12 months this average rose to 64%. Correlation with the GSCI was 23% historically, and rose to 76% in the last year. Index speculation has swamped real market forces."

Philips, P. (Yale University) and Yu, J. (Singapore University) (2010): Dating the Timeline of Financial Bubbles During the Subprime Crisis: "a bubble first emerged in the equity market during mid-1995 lasting to the end of 2000, followed by a bubble in the real estate market between September 2000 and June 2007 and in the mortgage market between August 2005 and July 2007. After the subprime crisis erupted, the phenomenon migrated selectively into the commodity market and the foreign exchange market, creating bubbles which subsequently burst at the end of 2008, just as the effects on the real economy and economic growth became manifest."

Randall Wray, L. (University of Missouri-Kansas City) (2008) The Commodities Market Bubble – Money Manager Capitalism and the Financialization of Commodities. Public Policy Brief No 96, The Levy Economics Institute of Bard College: "There is adequate evidence that financialization is a big part of the problem, and there is sufficient cause for policymakers to intervene with sensible constraints and oversight to reduce the influence of managed money in these markets."

Ray, D.E. and Schaffer, H.D. (University of Tennessee) (2010): Index funds and the 2006-2008 run-up in agricultural commodity prices: "the fundamentals and/or expectations in the energy and mineral markets reign supreme—grains are along for the ride with little-to-no regard to what is happening in the grain sector. Worries during the

period about the availability of oil drove up the price of crude, which caused index funds to rebalance their portfolios by making additional purchases of the other commodities to maintain the specified balance. Since the resulting price increases in agricultural commodities had virtually nothing to do with their market conditions, the record level of activity in the futures market by index funds would seem to make index funds a logical source of possible price overshooting."

Schulmeister, S. (Vienna University) (2009): Trading Practices and Price Dynamics in Commodity Markets. Study commissioned by the Austrian Federal Ministry of Finance and the Austrian Federal Ministry of Economics and Labour: "Based on the "bullishness" in commodity derivatives markets, short-term oriented speculators reacted much stronger to news in line with the expectation of rising prices than to news which contradicted the "market mood". Hence, they put more money into long positions than into short positions and held long positions longer than short positions. Due to this trading behavior, upward commodity price runs lasted longer in recent years than downward runs causing prices to rise in a stepwise process. Commodity price runs were lengthened by the use of trend-following trading systems of technical analysis. These systems try to exploit price runs by producing buy (sell) signals in the early stage of an upward (downward) run. The aggregate trading signals then feed back upon commodity prices."

de Schutter, O. (UN Special Rapporteur on the Right to Food) (2010): Food commodities speculation and food price crises: Regulation to reduce the risks of financial volatility: "The global food price crisis that occurred between 2007 and 2008, and which affects many developing countries to this day, had a number of causes. The initial causes related to market fundamentals, including the supply and demand for food commodities, transportation and storage costs, and an increase in the price of agricultural inputs. However, a significant portion of the increases in price and volatility of essential food commodities can only be explained by the emergence of a speculative bubble."

Silvennoinen A. (Queensland University) and Thorp S. (Sydney University) (2010): Financialization, crisis and commodity correlation dynamics: "We observe higher and more variable correlations between commodity futures and stock returns from mid-sample, with many series showing a structural break in the conditional correlation processes from the late 1990s."

Singleton, K.J. (Stanford University) (2010): The 2008 Boom/Bust in Oil Prices: "In my view, while spot-market supply and demand pressures were influential factors in the behavior of oil prices, so were participation in oil futures markets by hedge funds, long-term passive investors, and other traders in energy derivatives."

Singleton, K.J. (Stanford University) (2011): Investor Flows And The 2008 Boom/Bust in Oil Prices: "I present new evidence that there was an economically and statistically significant effect of investor flows on futures prices...The intermediate-term growth rates of index positions and managed-money spread positions had the largest impacts on futures prices."

Tanaka, N. (head of International Energy Agency) (2009): IEA says speculation amplifying oil prices moves (Reuters article): "Our analysis shows that the fundamentals are deciding the direction of the price while these funds or speculations ... are amplifying the movement."

Tang, K. (Princeton University) and Xiong, W. (Renmin University) (2010): Index Investment and The Financialization of Commodities: "This paper finds that concurrent with the rapid growing index investment in commodities markets since early 2000s, futures prices of different commodities in the US became increasingly correlated with each other and this trend was significantly more pronounced for commodities in the two popular GSCI and DJUBS commodity indices. This finding reflects a financialization process of commodities markets and helps explain the synchronized price boom and bust of a broad set of seemingly unrelated commodities in the U.S. in 2006-2008. In contrast, such commodity price co-movements were absent in China, which refutes growing commodity demands from emerging economies as the driver."

Trostle, R. (2008): Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices. USDA Economic Research Service: "It is unclear to what extent the effect these new investor interests had on prices and the underlying supply and demand relationships for agricultural products. However, computerized trend-following trading practices employed by many of these funds may have increased the short-term volatility of agricultural prices."

United Nations Conference on Trade and Development (UNCTAD) (2009): Trade and Development Report, Chapter II – The Financialization of Commodity Markets: "The financialization of commodity futures trading has made commodity markets even more prone to behavioural 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."

United Nations Conference on Trade and Development (UNCTAD) (2009): The global economic crisis: Systemic failures and multilateral remedies: "The evidence to support the view that the recent wide fluctuations of commodity prices have been driven by the financialization of commodity markets far beyond the equilibrium prices is credible. Various studies find that financial investors have accelerated and amplified price movements at least for some commodities and some periods of time. (...) The strongest evidence is found in the high correlation between commodity prices and the prices on other markets that are clearly dominated by speculative activity."

United Nations Commission of Experts on Reforms of the International and Monetary System (2009): Report: "In the period before the outbreak of the crisis, inflation spread from financial asset prices to petroleum, food, and other commodities, partly as a result of their becoming financial asset classes subject to financial investment and speculation."

United Nations Food and Agricultural Organisation (FAO) (2010): Final report of the committee on commodity problems: Extraordinary joint intersessional meeting of the intergovernmental group (IGG) on grains and the intergovernmental group on rice: "Unexpected crop failure in some major exporting countries followed by national responses and speculative behaviour rather than global market fundamentals, have been amongst the main factors behind the recent escalation of world prices and the prevailing high price volatility."

United States Senate, Permanent Subcommittee on Investigations (2009): Excessive Speculation in the Wheat Market: "This Report concludes there is significant and persuasive evidence that one of the major reasons for the recent market problems is the unusually high level of speculation in the Chicago wheat futures market due to purchases of futures contracts by index traders offsetting sales of commodity index instruments."