

TEACHERS' RETIREMENT BOARD
INVESTMENT COMMITTEE

SUBJECT: Research Report on Commodities – Part III

ITEM NUMBER: 4

CONSENT: ____

ATTACHMENT(S): 2

ACTION: X

DATE OF MEETING: June 3, 2010 / 60 mins

INFORMATION: ____

PRESENTER(S): Steven Tong and Carrie Lo

POLICY

This item complies with the CalSTRS Investment Policy & Management Plan.

BOARD STRATEGIC PLAN GOAL

Goal 5: Ensure a financially sound retirement system through adequate contributions and optimal investment returns.
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Objective A: Explore different alternatives to portfolio management.

HISTORY OF THE ITEM

The Investment Committee (Committee) directed staff to research commodities as part of the Work Plan for the 2009/10 fiscal year. In February 2010, staff, along with two industry experts, discussed what commodities are, what drives their returns and their potential role in CalSTRS' Portfolio (Portfolio). At the April 2010 Committee meeting, staff discussed potential commodity benchmarks, active and passive commodity investing, and the different commodity investment vehicles. Following each of these presentations, the Committee directed staff to further study commodities as a potential investment for the total Fund.

PURPOSE

This is the last of three presentations scheduled to discuss commodities. The attachment includes:

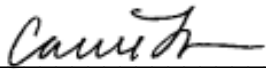
- Measures of the inflation sensitivity of commodities, other real assets, and inflation-linked bonds,
- Analysis of an absolute return portfolio consisting of commodities, infrastructure and Treasury Inflation-Protected Securities (TIPS), and
- Responses to specific questions regarding commodities from the Committee.

RECOMMENDATION

After research and analysis, Pension Consulting Alliance and staff concur that commodities can serve a strategic role in CalSTRS' Absolute Return allocation as one potential hedge against inflation or negative shocks impacting other investment markets.

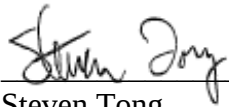
Should the Committee elect to move forward with an allocation to commodities, staff would develop an investment policy and implementation plan that would gradually phase-in the commodity allocation. This information would be presented during the 2010/11 fiscal year.

Prepared by:



Carrie Lo
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Approved by:



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Concur:



Christopher J. Ailman
Chief Investment Officer



Research Report on Commodities, Part 3

Investments – Innovation & Risk

INTRODUCTION

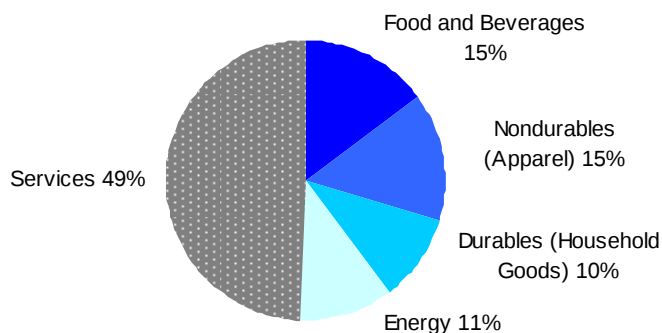
For absolute return-oriented investors, the key risk from inflation is that it will cause a decline in the value of their portfolio, which is typically heavily invested in equities. One potential solution is to invest in commodities, which have demonstrated a reasonable ability to hedge the inflation risk exposure of the typical equity portfolio. In this third presentation, staff evaluated the historical performance and sensitivity to inflation of real assets such as commodities, timber, gold and infrastructure, and inflation-linked bonds (ILBs) such as U.S. Treasury Inflation-Protected Securities (TIPS) and U.K. Linkers. Based on the following three measures, commodities have been responsive to inflation. Commodities exhibited:

- High correlation to the U.S. Consumer Price Index (CPI)
- Favorable historical performance during periods of increasing inflation
- Strong correlation between historical performance and subsequent one-year inflation

The relatively strong relationship between commodities and inflation is due in part to the fact that commodities are inputs to many companies' products. As input costs increase, companies must either pass on these cost increases to their consumers or reduce the overall earnings of the company.

The following pie chart denotes that 51 percent of CPI is directly related to commodities (food, durable and nondurable goods, and energy). Investing in commodities provides direct exposure to approximately half of CPI and, most importantly, to the most volatile segments of CPI, energy and food. In the past, shocks on the upside to CPI have come primarily from energy (i.e. gasoline) and food.

Composition of U.S. CPI (Aggregate Indices)



Source: U.S. Department of Labor as of December 2009.

Following our previous papers, which presented the role of commodities in an institutional portfolio, we now examine the role of commodities in an absolute return asset class that has an allocation of five percent of the total Fund value. Specifically, for analysis purposes only, we compare an absolute return portfolio, consisting of one-third each of commodities, TIPS and infrastructure, to each stand-alone investment. Due to the different types of inflation as well as non-inflationary factors that influence these three assets, a diversified portfolio of inflation-hedging assets may provide greater inflation-sensitivity or less volatility than any single asset on a stand-alone basis.

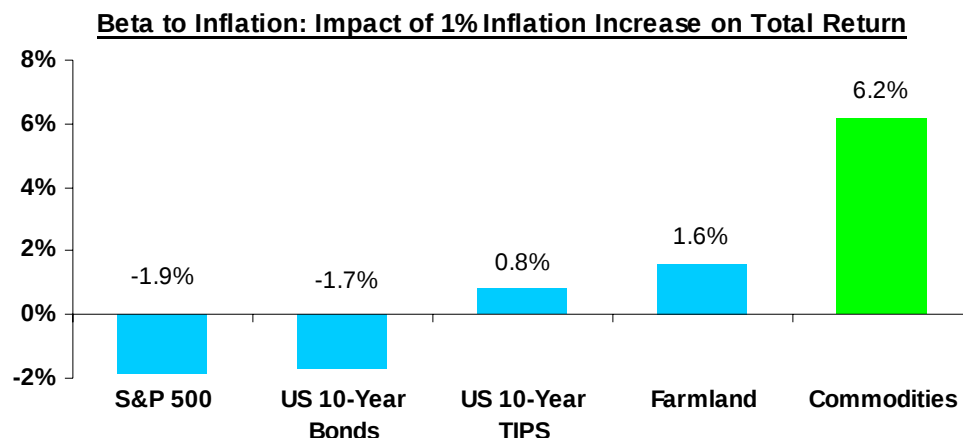
During previous presentations to the Investment Committee (Committee), members raised a number of questions that staff will also address in this report. They are as follows:

- What is the relationship between the ratio of sovereign debt to GDP and inflation?
- What is the impact of Commodity Futures Trading Commission (CFTC) regulation?
- What is the risk of corporate governance and insider trading issues?
- What is the impact of commodity investing on emerging market social issues?
- What are additional concerns related to commodity investing?

COMPARISON OF INFLATION-HEDGING ASSETS

Inflation-linked bonds and real assets, such as commodities, can be viewed as inflation hedges because their cash flows are structured to rise with the general price level. We compare the inflation-hedging ability of commodities to inflation-linked bonds and other real assets, such as infrastructure, timber and gold as a stand-alone investment.¹

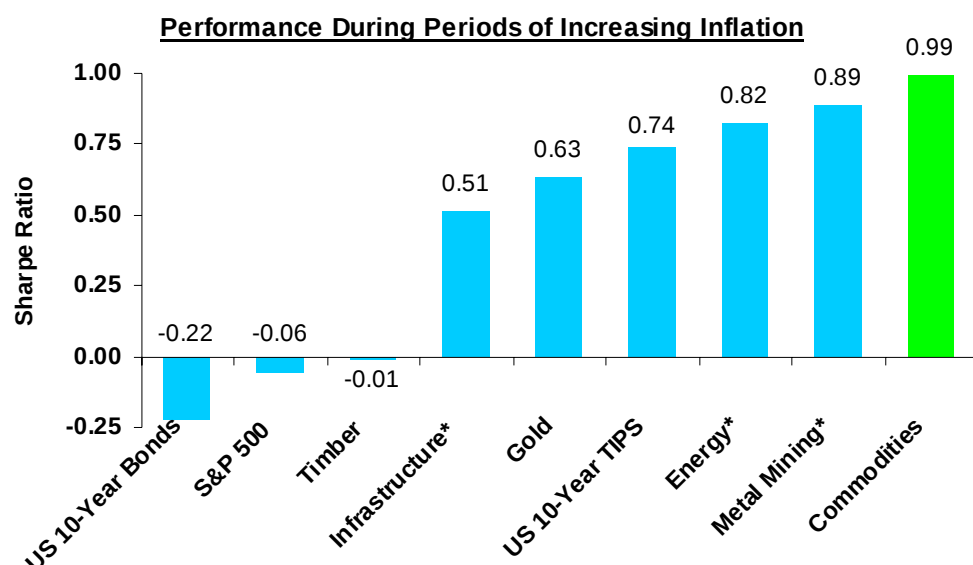
One method to compare the inflation-hedging characteristics of commodities to other real assets is to measure the relationship of each asset's returns to the percentage change in the rate of CPI. The following chart illustrates the sensitivity of commodities to inflation. Because the inflation beta of commodities is greater than one, a five percent allocation to commodities could potentially protect the purchasing power of more than the five percent commodity allocation.



Source: AllianceBernstein. Based on data from 1950-2009. Commodities represented by DJ-UBS Commodity Index.

¹ This analysis uses liquid, publicly investible indices to proxy for illiquid, private placements. Publicly traded equivalents often have similar economic exposures to comparable private placements and so can serve as a reasonable proxy in many cases. However, private assets tend to be less volatile.

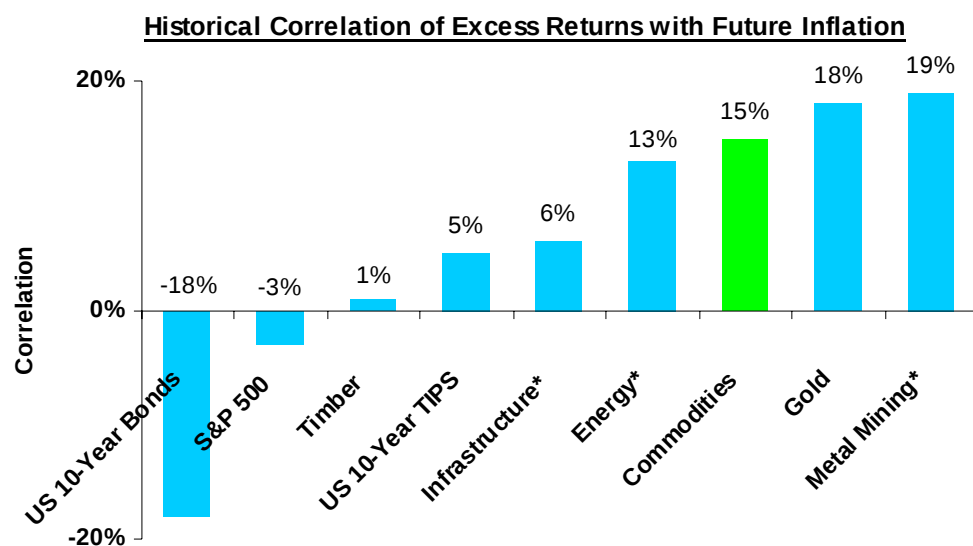
We also examine each asset's historical performance as measured by the Sharpe ratio, or excess return per unit of volatility, during periods of increasing inflation. Of the commodity sectors, industrial metals and energy produced the highest Sharpe ratios.



Source: AQR Capital Management. Data covers the period from 1971 through 2009 with varying availability by asset. Commodities represented by GSCI Commodity Index.

*Based on beta-hedged index of stocks.

Another way to evaluate which assets could be the best predictors of inflation is to measure the correlation of each asset's excess return with future inflation, as measured by subsequent one-year inflation. The assets towards the right of the following bar chart have the strongest statistical relationship with future inflation and may rise in advance of inflation more quickly than would other assets. This feature may allow investors to benefit from the inflation hedging characteristics of gold and other precious metals over a longer period than for other real assets.



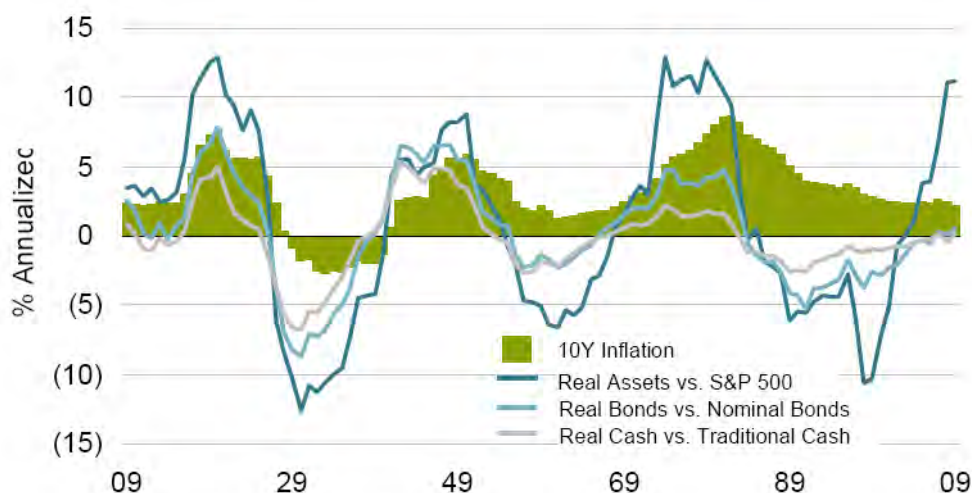
Source: AQR Capital Management. Data covers the period from 1971 through 2009 with varying availability by asset. Commodities represented by GSCI.

*Based on beta-hedged index of stocks.

COMMODITIES IN AN ABSOLUTE RETURN PORTFOLIO

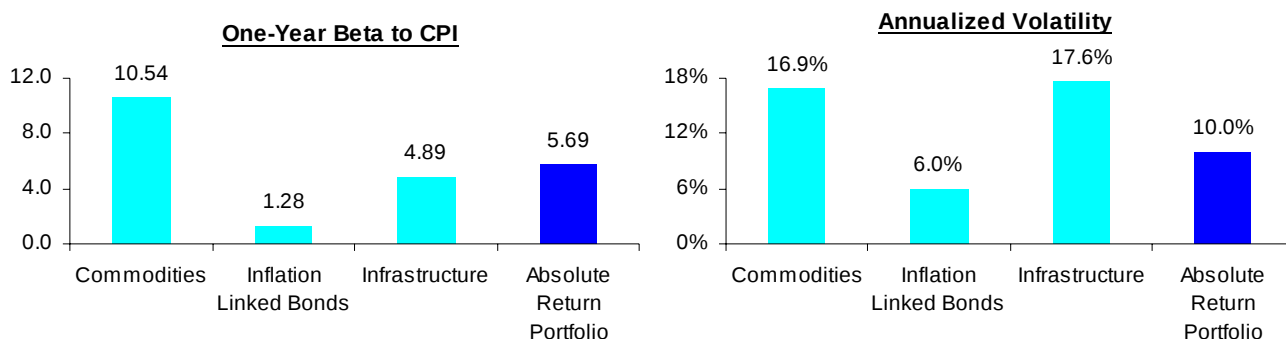
Given its inflation-hedging characteristics, commodities could be included in CalSTRS' absolute return asset class along with TIPS and infrastructure. When compared against similarly volatile stocks, the dark blue line in the chart below illustrates that an absolute return portfolio with equal weight in commodities, TIPS and infrastructure would have outperformed the S&P 500 during past inflationary cycles and underperformed during deflationary or disinflationary periods.

Diversified Real Assets Likely Outperform in Inflation Spikes
Relative Performance of Real Investment vs. Traditional Counterpart, Rolling 10-Years



Source: AllianceBernstein.

The charts below show that a diversified blend of inflation-hedging assets, such as in an absolute return allocation, would also have historically provided greater inflation sensitivity (as measured by the beta to CPI) and/or reduced volatility compared to any stand-alone inflation-hedging asset class.



Source: State Street Associates. Absolute return portfolio assumes equal one-third weighting to commodities, ILBs and infrastructure. Commodities based on DJ-UBS Commodity Index. ILBs based on Barclays Inflation Linked Bonds US Index. Infrastructure based on UBS Developed Infrastructure Index. Based on data from March 1997.

All three investment categories provide a hedge against inflation but the nature of the protection differs, which offers intra-asset class diversification.

One way the inflation protection provided by commodities, inflation-linked bonds and infrastructure differs is by the timing of this protection. Commodities tend to provide early-cycle inflation protection. Inflation-linked bonds tend to provide contemporaneous protection, and infrastructure generally provides longer-term protection. When aggregate demand exceeds aggregate supply, causing inflation in the prices of goods, commodity prices may increase because they are inputs into these goods. Inflation-linked bonds, by design, pass inflation through to investors with a lag of one to three months. Cash flows from many types of infrastructure projects adjust to rising inflation only with a lag that is often later in the inflation cycle.

Inflation-linked bonds and commodities also capture different kinds of inflation. Commodities reflect inflation in the prices of raw materials alone while inflation-linked bonds capture inflation in both raw materials and labor. This is because the holder of the inflation-linked bond is literally paid CPI, and the prices of final goods and services depend on both raw materials and labor costs. For example, if commodities rise and wages fall, inflation-linked returns could be flat while commodity returns are high. However, if labor costs are driving inflation, CPI, and therefore, inflation-linked returns, may rise while commodity returns are flat.

In addition, the return from TIPS is vulnerable to the method by which CPI is calculated by the U.S. Bureau of Labor Statistics. Two possible downward biases exist. First, due to the recent housing crisis, the housing component of CPI may be low for a long period of time, even as the costs of what people need is rising rapidly. Second, CPI assumes a constant level of spending, which is only updated every two years. Thus, if the prices of some goods rise sharply, it is assumed, due to a constant spending budget, that people may buy less of the sharply rising goods due to their spending limit. This results in the weight of the prices of fast rising items to decline in the index calculation.

The return from TIPS is also influenced by the change in real yields. If rising prices precipitate monetary tightening, TIPS may be hurt by higher real interest rates, which are inversely related to the price of the bond. Meanwhile, commodities may do well if the impact of inflation offsets reduced demand, but might perform poorly otherwise. When inflation is accompanied by falling real yields, both TIPS and commodities could likely benefit.

Some infrastructure projects have attractive attributes of both long-term holding periods and revenues indexed to inflation. However, price increases are often subject to regulatory approval and may lag increases in the cost of operating infrastructure assets. In addition, the political implications of inflation-indexed clauses in long-term infrastructure projects may hamper a project's inflation protection. For example, a toll road should be able to raise tolls in line with inflation. However, if there is an acute rise in energy prices, politicians may intervene to stop simultaneous increases in tolls. Infrastructure is also vulnerable to high inflation when this inflation leads to higher interest rates and increased debt servicing costs.

Due to the varying types of inflation and non-inflationary factors that commodities, TIPS and infrastructure are each sensitive to, a diversified absolute return portfolio that includes these strategies can be beneficial to protect CalSTRS' portfolio from inflation.

The following sections address these issues raised by the Committee:

- The relationship between the ratio of sovereign debt to GDP and inflation;
- The impact of Commodity Futures Trading Commission (CFTC) regulation;
- Corporate governance and insider trading issues;
- The impact of commodity investing on emerging market social issues; and
- Additional concerns related to commodity investing.

RELATIONSHIP BETWEEN LEVEL OF SOVEREIGN DEBT TO GDP AND INFLATION

Deficit spending forces a government to borrow by issuing bonds or raise revenue by increasing taxes on its citizens to finance the excess of its spending over its receipts. Additionally, the government can receive revenue from the central bank when new currency is issued. In 2009, the U.S. federal budget deficit was \$11,875 billion and represented approximately 83.4 percent of U.S. Gross Domestic Product (GDP). Economists have been concerned about the relationship between government deficits and inflation. The cause of concern stems from the possibility that the government will finance the deficits by borrowing or printing money, which can be inflationary.

Giannitsarou and Scott (2006) studied the financing activity of six large industrialized nations between the periods of 1960 through 2005. The study, in part, addressed the question regarding the implication for inflation as fiscal deficits continue to rise in each of those nations. The authors found that increases in deficits are not necessarily predictors of higher future inflation.

Another study by Federal Reserve Bank of Philadelphia economist, Keith Sill, entitled, “Do Budget Deficits Cause Inflation?” asserts that the answer to this question depends on the relationship between monetary and fiscal policy. Monetary policy refers to central bank actions, such as setting bank reserve requirements, establishing lending and borrowing rates and buying or selling government debt, to influence the cost and availability of money. Fiscal policy encompasses government expenditures and revenue collection. Sill concludes that evidence of a link between fiscal deficits and inflation is lacking in developed economies such as the U.S. This is because monetary policy is independent of fiscal policy and can be used to maintain low and stable inflation. In developing countries, however, monetary policy is often driven by fiscal policy and the need to finance deficits. This creates a strong link between fiscal deficits and inflation in developing countries.

This raises the question: what causes inflation? There exists a large body of literature examining this question and a variety of views on what actually causes inflation. While the debate continues, there are two generally accepted theories:

1. Demand-Pull Theory – Inflation occurs when demand is growing faster than supply. Therefore, prices will increase. An increase in the quantity of money in circulation can lead to the increased demand. In addition, an increase in demand could result from declining interest rates, tax rate cuts or increased consumer confidence.
2. Cost-Push Theory – Inflation occurs when companies' costs increase. To maintain their profit margins, companies may pass these cost increases on to consumers. Production costs can rise from higher prices for labor and raw materials. Increased indirect taxes can also lead to higher

production costs. Additionally, if the firm is a monopoly or oligopoly, it can raise prices to increase profitability.

At the moment, the cost-push theory for inflation appears more relevant while the demand-pull theory appears less influential. In part, this is due to higher taxes by governments, such as the U.K. and Greece, attempting to reduce their deficits. However, the continued growth of developing markets, such as China, may lead to more evidence of the demand-pull theory.

Economists generally hold the view that inflation is caused by either excesses developing in the money supply or shortages of the quantity of goods being supplied. While money growth is considered to be a major cause of inflation, non-monetary sources, such as higher commodity prices, have been a major factor in causing inflation to rise.

REGULATORY REFORM

A key responsibility of the CFTC is to ensure that prices in the futures market reflect the laws of supply and demand rather than manipulative practices or excessive speculation. The 1936 Commodity Exchange Act (CEA) directed the CFTC to establish trading limits on the size of futures positions to prevent speculative bubbles. Traders on regulated exchanges are required to keep records of all trades and report large trades to the CFTC. This information assists the CFTC in determining whether concentrated or coordinated positions might be used to manipulate the market.

Most commodity position limits are set by the commodity exchanges themselves. However, the CFTC provides an extra level of regulatory oversight and imposes strict restrictions on a number of major agricultural commodities, such as corn and wheat. Previously, the CFTC was very liberal in issuing exemptions to these limits to over-the-counter (OTC) dealers and other users of agricultural futures. In the past year, however, this trend has reversed. The CFTC rescinded exemptions for two institutions that hedged agricultural futures for their funds. CFTC Chairperson, Gary Gensler, has also advocated the revocation of exemption letters that permit a market participant to exceed permanently the limit in particular commodity contracts. Mr. Gensler is also a strong advocate for greater transparency including clearing OTC swap agreements.

In September 2009, Mr. Gensler and SEC Chairperson Mary Shapiro addressed the House Agriculture committee hearing on the Over-The-Counter Derivatives Markets Act of 2009. Mr. Gensler argued for two sets of derivatives-oriented regulatory regimes: one to regulate the derivative dealers and another to regulate the derivatives markets. He called for:

- The extension of the CEA and for federal securities law to cover OTC swaps in all commodities;
- Derivative dealers to be required to maintain a minimum capital level based on their derivatives exposure;
- Increased “back office” standards to reduce operational risk as dealers, counterparties, and regulators would have access to complete and accurate records;
- Centralized clearing of standardized swap products to reduce the risk of one banks’ failure;

- The creation of central clearing houses to take on the risk of swaps transactions;
- A movement to bring OTC swap transactions onto exchanges;
- The CFTC to be granted authority to set aggregate position limits across all markets and all persons trading OTC derivatives;
- Congress to strengthen the CFTC's rulemaking, oversight, and enforcement authorities; and
- Additional resources for new staff and technology.

Ms. Shapiro reiterated Mr. Gensler's belief that Congress should strengthen the authority of both the SEC and the CFTC by endorsing stronger and more protective rules. Secondly, Congress should make the qualification standards for participating in OTC derivative markets more stringent so less sophisticated investors could no longer invest in OTC products.

A majority of the above recommendations were incorporated into the "Over-the-Counter Derivatives Market Act of 2009." One of Mr. Gensler's early proposals, to force all derivatives trading onto exchanges and make them clearable, has proven to be more complicated and difficult to implement than originally thought. Mr. Gensler continues to push this "exchange mandate" forward, and it is part of the current Dodd bill.

It appears that the CFTC has two policy objectives: (i) to increase market participants and limit the size and influence of large participants, and (ii) reduce the volatility of certain commodity futures. It is unclear whether the second objective will be achieved as a result of current proposals or if it is indeed possible.

This year, the CFTC also issued a proposal for position limits on certain energy futures and hedge exemptions on regulated futures exchanges, derivatives transaction execution facilities and electronic trading facilities. The comment period for the proposal ended on April 26, 2010, and these comments are undergoing review by CFTC staff. Some initial comments are that the proposed new limits on energy positions are less constraining than the current existing limits and may affect only ten institutions. Three of five commissioners expressed concern capping trade would shift volumes to unregulated or overseas markets. The CFTC may be signaling to participants to expect higher overall limits but fewer exemptions from those limits. However, it is too early to determine if the proposals will pass and what the impact may be. No timeline has been established to complete the review of the comments and recommendations, and it will be Mr. Gensler's decision to call a vote of the commissioners on whether to move ahead.

In addition, Congress and the CFTC are working together on legislation to give the agency authority in OTC derivative markets and to require large trader reporting compliance by OTC participants. Congress is also considering policies to improve transparency and establish limits on speculators' positions.

The commodity regulatory system is still in flux with the CFTC proposal on energy position limits still pending and potential legislative debate later this year dealing with the questions of commodity regulatory oversight and limits being extended to OTC positions. The primary risk emanating from these discussions are potential new restrictions on hedging of commodities that could impair institutions' ability to access OTC commodity products and may raise fees for commodity investments.

In light of this risk, commodity trading institutions are preparing to increase trading on international exchanges. The CFTC has been less influential on the imposition of limits on non-U.S. exchanges, and these international commodity exchanges are keen to increase their influence in the market.

The influence of “speculators” was also discussed in staff’s first paper and more information regarding the November 2009 EDHEC-Risk Institute study, “Has There Been Excessive Speculation in the U.S. Oil Futures Markets?” was requested. This study is included as an addendum. The author concluded that speculative participation in outright U.S. exchange-traded oil derivatives contracts during 2007-2008 fluctuated within a normal range relative to historical levels.

Many regulatory issues are still in discussion and information is limited. Thus, it is too early for staff to establish a position on current regulatory trends, but staff will continue to monitor the outcome of these discussions.

POTENTIAL INSIDER DEALING RISK

A potential risk exists if CalSTRS partners with, for example, an investment bank to take a commodity position, for example in orange juice, and the bank uses this inside information in their dealings or investment in a commodity producer, such as Minute Maid.

CalSTRS’ participation in commodity futures will likely be minuscule compared to the total size of the commodity futures market. This will limit the impact of CalSTRS commodity trading on the market and reduce the benefit of possessing information regarding CalSTRS commodity trading activities. The following table shows that a \$100 million investment in DJ-UBS Commodity Index futures contracts would be less than 0.1 percent of the total monthly value traded of any single contract.

Percent of Monthly Value Traded for a \$100 Million Investment

	1 Month USD Value traded	DJ UBS weight	\$100,000,000	Allocation as % of Total
Corn	\$22,778,382,533	5.72%	\$5,721,409	0.03%
WTI Crude Oil	\$137,335,874,403	13.75%	\$13,752,633	0.01%
Cotton	\$3,257,576,028	2.27%	\$2,265,150	0.07%
Gold	\$106,032,788,146	7.86%	\$7,862,747	0.01%
Heating Oil	\$20,876,076,599	3.65%	\$3,648,174	0.02%
Coffee	\$4,521,608,382	2.97%	\$2,972,640	0.07%
Live Cattle	\$8,838,336,998	4.29%	\$4,285,345	0.05%
Lean Hogs	\$4,306,816,996	2.40%	\$2,398,878	0.06%
Aluminum	\$14,621,746,907	7.00%	\$6,999,166	0.05%
Copper	\$19,735,256,869	7.31%	\$7,306,541	0.04%
Nickel	\$5,090,747,609	2.88%	\$2,882,723	0.06%
Zinc	\$5,608,504,420	3.14%	\$3,142,431	0.06%
Natural Gas	\$23,129,977,702	11.89%	\$11,890,064	0.05%
RBOB Gasoline	\$28,129,606,208	3.71%	\$3,709,128	0.01%
Soybeans	\$40,414,868,109	7.60%	\$7,599,433	0.02%
Soybeans Oil	\$6,399,338,178	2.88%	\$2,882,869	0.05%
Sugar	\$15,465,975,134	2.99%	\$2,993,155	0.02%
Silver	\$7,548,850,764	2.89%	\$2,891,302	0.04%
Wheat	\$9,915,403,397	4.80%	\$4,796,212	0.05%

Source: Hermes Investment Management, which manages approximately \$34 billion and is wholly owned by British Telecommunications Pension Scheme.

In select cases, trading activity is more limited and institutions could account for a large proportion of the trading activity in a particular commodity future. The most widely used commodity indices, S&P Goldman Sachs Commodity Index (GSCI) and DJ-UBS Commodity Index (DJ-UBS), employ filters to ensure that each index constituent has sufficient liquidity to prevent index investors from having an undue influence on the price of that commodity future. One instructive example is orange juice, which was added to the GSCI in 1998 and then eliminated from the index at the end of 2004 due to a lack of liquidity (pardon the pun).

Despite accounting for an insignificant portion of some commodities' trading volumes, CalSTRS should ensure that external managers or broker-dealers protect knowledge of CalSTRS' trading activity. As part of the due diligence process, CalSTRS must obtain assurances from managers that procedures exist to prevent information leakage. CalSTRS should also obtain transparency into how trades are sized and executed on CalSTRS' behalf and the market impact of these trades. Investment banks are regulated by the Financial Industry Regulatory Authority (FINRA) and traders are further regulated by the National Futures Association (NFA). Repercussions for insider-dealing include fines on the investment bank and sanctions on the individual trader. FINRA publishes disciplinary actions monthly. Given the potentially significant financial and reputational damage of breaching a client's trust, investment banks generally also implement internal policies and procedures to eliminate illegal and unethical activity by employees. For example, the commodity index trading desk may be separate from other trading desks so that no client activity is communicated between desks. Moreover, investment banks typically advise their clients on trades to minimize the market impact of these trades.

SOCIAL RESPONSIBILITY AND EMERGING MARKET DEVELOPMENT

Historically, commodity scarcity is due, in part, to the economic rise of emerging markets (i.e., China), and has led to rising commodity prices. Emerging markets' increased demand for commodities has benefited leading commodity exporters such as Brazil, Canada, Australia, and Russia. In 2000, more than 50 developing countries earned more than half of their export earnings from commodity sales. In roughly 20 of these countries, the earnings exceeded 90 percent. Commodity production and trade has a significant effect on the economic livelihood of millions of people who live in developing countries.

The increase in GDP growth and rising per capita income in developing economies has resulted in higher consumption of agricultural products. Supply growth has not been able to keep pace with rising demand for food products as the population grows.

One concern is the potentially negative impact of commodity price volatility on developing countries. In general, commodity prices are driven by current supply and demand for specific commodities. In 1999, the World Bank formed an International Task Force (ITF) to explore options that would aide developing countries to better manage their vulnerability to commodity price fluctuations. After consultations and deliberations, the ITF reached a consensus that developing countries need access to risk management instruments that focus on providing access to commodity price insurance.

Commodity investors can provide liquidity to commodity producers and reduce market distortions. Producers who own the physical commodity can off-load their price risk to index investors who, due to their long term investment horizon, are well suited to bear the commodity

price risk. By hedging their price risk, producers can focus on their core competency of operating their business, rather than managing commodity price risk.

Spot prices are driven by supply and demand fundamentals which are not impacted by financial players. The April 2010 IMF World Economic Outlook states, “there remains little evidence that financial investment has a significant sustained impact on commodity prices above and beyond current and expected supply-demand fundamentals. If anything, inflows tend to follow changes in fundamentals and prices, rather than the other way around. Recent disaggregated data from the U.S. Commodities Futures Trading Commission, which allow for a more comprehensive analysis of the impact of financial investors, support this view.”

Index investors do not hold, hoard, or take any physical commodities out of the market place. As index investors cannot change the supply or demand characteristics of a commodity, they cannot influence the spot price at which end users purchase the raw products. Therefore, staff does not believe that investors influence geopolitical risk or instability in some countries through food price volatility. An example of this was the riots seen in Asia in 2008 following a large increase in the price of rice. Rice is not included in the main investment indices and investor impact on this contract is minimal; the occurrences in 2008 were from reduced availability of supply.

The only way an investor can impact commodity prices is by trading in the physical underlying commodities. If an investor was to purchase physical corn and put it in their own silo, then the investor would be taking supply out of the market which could increase the spot price.

Regarding human rights issues, commodity extraction is analogous to any other production process. In some cases, such as the “blood diamonds,” the extraction was so cruel that the international community enacted standards to restrict trade in this particular commodity thereby improving working conditions or eliminating production all together.

In other cases, such as palm oil production, various groups have lobbied to reduce the impact it has on deforestation.

Commodity contracts in the major indexes are traded on the regulated U.S. and London exchanges. The purpose of these contracts is to permit producers and consumers to either hedge or guarantee prices or delivery of certain commodities. Each commodity contract is standardized, including the particular quality and delivery point. The relationship between the commodity producer and a commodity investor is determined via these standard contracts.

At the moment, commodity investors have little influence on how a commodity contract is defined and, therefore, how a commodity is produced. Furthermore, the ability to differentiate between a good and bad extraction method is difficult. For example, gold production in China and gold production in South Africa may differ. However, as long as the quality of gold meets the contract standard, investors have not to date differentiated between the extraction methods of either country.

Investment vehicles to access commodities are not limited to futures contracts. There are a number of commodity related opportunities that focus on agricultural growth markets where investments may have positive social influences. These investments focus on the acquisition of property and making infrastructure improvements. The increased yield of the commodity products may also help offset the resource depletion. By investing in projects focused on the development of natural resources (e.g., agricultural commodities), an institutional investor may be able to integrate social performance into the investment process. The investor will not only be

able to invest in an opportunity that meets its financial goal but also has a positive impact on developing nations' economic development. As part of the manager due diligence process, investors can also determine whether proper human rights laws and corporate governance standards are upheld in developing these projects. Financial and social performance thresholds may be factored into the investment process to preserve the character of the "double-bottom line."

ADDITIONAL CONCERNS

In staff's previous presentations, several risks with respect to investing commodities were noted. This includes:

- Disappointing returns;
- Long cycles and high volatility;
- Commodities could be the next bubble;
- Contango in the futures market results in negative roll returns;
- Potentially adverse view of investor social responsibility; and
- Rising commodity prices, commodity futures speculation and regulation.

Additional considerations not mentioned above include:²

Further technological innovations

Recently, change in the supply of natural gas corresponded to a reduction in natural gas prices. The market anticipated an increasing supply bottleneck. However, a technological innovation has led to a new source of supply at a reasonable price: extraction from shale rock formations.

Other possible areas of innovations all impacting the supply side could be: hydrogen-fueled motor vehicles, biofuels, solar energy and other alternative sources of energy. The history of scientific innovation has shown that these types of innovations and applications are not predictable yet may have a demonstrative impact on the way people live.

Disappointment in global demand

As developed economies have reduced their demand for important commodities such as crude oil and industrial metals, developing nations, in particular China, have had a net increase in demand. This has compensated for the lack of demand elsewhere, but the sustainability of China's and other developing countries' demand is uncertain.

China's economy has heavily weighted their investment program towards infrastructure which often has a positive multiplier effect. For example, China now consumes approximately 50 percent of the world's copper. Of this copper demand, 45.8 percent is to expand power production and 10.4 percent transportation. These activities are not consumer related and are expected to continue irrespective of global demand. In fact, China may accelerate these activities if demand were to stagnate elsewhere.

² Source: Hermes Investment Management.

Increasing nationalization of natural resources

Emerging market governments may choose to nationalize their resources, thereby reducing available supply and or reducing overall investment and productivity. The most recent example of wholesale repossession is in Venezuela. This nationalization may act to have a positive impact on commodity prices given their negative impact on supply. Other countries may also privatize natural resources to increase supply, such as Iraq and Libya in the case of crude oil.

Exposure to weather related events

Various commodities, particularly perishables, such as agricultural, soft and livestock commodities are affected by weather patterns. These effects can be unpredictable and normally negative as they represent a negative shock to supply. Some examples include: droughts, monsoons, hurricanes, water and even volcanic eruptions.

Volcanic activity can impact the agricultural markets in two ways: (1) in the near term, geographic dislocations of supply owing to transport disruptions, and (2) in the medium to longer term, potentially negative impacts on crop production in the event that volcanic ash impacts atmospheric temperatures and/or accumulates on cultivated land.

As these events are difficult to predict, it is also difficult to predict their impact on commodities. However, the importance of weather to commodities is without question. Generally, adverse weather conditions restrict supply, which may cause prices to spike. Favorable weather patterns may increase supply and cause prices to stagnate or drop.

SUMMARY AND RECOMMENDATION

Historically, commodities have exhibited significant inflation-hedging ability. This is primarily due to commodities accounting for approximately half of CPI. The high beta of commodities to inflation means that commodities can have the ability to hedge inflation for a larger percentage of assets than is allocated to commodities.

Despite the strength of commodities' ability to hedge inflation, commodities are not a perfect hedge for inflation. Its reliability as an inflation hedge is weakened by its relatively high volatility and vulnerability to non-inflationary factors, such as roll yields.

A diversified blend of inflation-hedging assets in CalSTRS' Absolute Return portfolio may provide superior inflation-hedging characteristics or reduced volatility in periods of rising inflation. As of this report, the CalSTRS portfolio does not own assets that will provide a hedge against increased inflation. Staff is building a TIPS portfolio, but it will only comprise two percent of total assets.

After review and analysis, staff and Pension Consulting Alliance (PCA) recommend a long-term strategic allocation to commodities as a compliment to other inflation-hedging assets held in the CalSTRS' Absolute Return portfolio. If the recommendation is approved by the Committee, staff will present an implementation plan to the Committee in the 2010/11 fiscal year.

GLOSSARY

ASYMMETRIC RETURNS – Investment opportunities whereby the potential profit or probability of profit is higher than the potential loss or probability of loss. The risk/reward relationship is asymmetric with respect to the magnitude and frequency of positive versus negative returns.

BACKWARDATION – Futures contracts with a later maturity date trade at a discount to futures contracts with an earlier maturity date, generating a positive roll return when a futures contract is rolled.

BETA – The relative volatility of an investment compared to the market as a whole, often proxied by a broad index. The market itself has a beta of 1.0. A beta above 1.0 is more volatile than the overall market, while a beta below 1.0 is less volatile.

CARRY COSTS – Costs associated with holding a physical commodity, such as storage, insurance and transportation costs.

CASH YIELD – A component of the futures return equivalent to the interest earned on the cash not required as collateral for the futures contract.

CBOE – Chicago Board Options Exchange.

CME – Chicago Mercantile Exchange.

CONTANGO – Futures contracts with a later maturity date trade at a premium to futures contracts with an earlier maturity date, generating a negative return when the futures contract is rolled.

CONTRACT or DELIVERY MONTH – The specified month within which a futures contract matures and can be settled by delivery of the underlying commodity.

CORRELATION – Measure of the strength or direction of a relationship between two assets.

COUNTERPARTY – The opposite party in a bilateral contract or transaction such as a swap. There are two counterparties to each trade.

DIVERSIFICATION – A risk management technique to reduce risk by investing among a variety of assets within a portfolio.

DOWNWARD SLOPING – A situation in which nearby futures contract prices are higher than futures contract prices with later maturities.

ENHANCED INDEXING – A strategy that follows rules similar to an index but slightly diverts from the index to maintain a high beta to the benchmark while reducing volatility and enhancing return.

EQUAL-WEIGHTED – Each sector in an index is given the same weight in that index.

EQUAL RISK-WEIGHTED – Each sector in an index is given a weight such that the volatility that each sector contributes to the index is equal.

EXCESS RETURN – Return in excess of a market rate or target rate of return.

FINANCIAL ASSET – An asset, such as stocks and bonds that derives its value from a contractual claim.

FRONT-MONTH CONTRACT – Futures contract with the earliest maturity date. Also called the “nearby contract.”

FULLY FUNDED – The investor must invest cash equivalent to the full value of the investment. Also called an “unlevered” investment.

FUTURES CONTRACT or FUTURE – A publicly traded, standardized agreement to buy or sell a specified quantity of a given commodity at a future date at an agreed-upon price.

ICE – Intercontinental Exchange, which operates OTC electronic exchanges.

INFLATION-LINKED BONDS – Bonds that pay yields that are tied to the inflation rate. Examples include U.S. TIPS (Treasury Inflation-Protected Securities) and U.K. Linkers.

KURTOSIS – A statistic used to measure the "peakedness" of a probability distribution and occurrence of fat tail events. The standard normal distribution has excess kurtosis of zero. Positive kurtosis indicates a "peaked" distribution with fatter tails and negative kurtosis indicates a "flat" distribution with thinner tails.

LONG – One who has bought a futures contract to establish a market position or one who owns an inventory of commodities.

MASTER LIMITED PARTNERSHIP (MLP) – Limited partnerships that are publically traded on a U.S. securities exchange. MLPs pay no income tax, and instead pay out their income to their shareholders.

MATURITY DATE – The date on which a futures contract expires and the holder of the future must accept the underlying commodity for delivery in exchange for a pre-specified price.

MEAN-VARIANCE OPTIMIZATION – A quantitative asset allocation tool used to identify the maximum return portfolio for a selected level of risk.

MERC – The Chicago Merc is the Chicago Mercantile Exchange (CME). The New York Merc is the New York Mercantile Exchange (NYMEX).

NEARBY FUTURES CONTRACT – Futures contract with the earliest maturity date. Also called the “front-month” contract.

NOMINAL RETURN – The real return plus the inflation rate.

NYMEX – New York Mercantile Exchange.

OPEN INTEREST – The total number of futures contracts that are not closed or delivered on a particular day, or the total number of contracts held by market participants at the end of the day.

OVER-THE-COUNTER (OTC) MARKET – The trading of commodities, contracts or other instruments directly between two parties off of a regulated exchange.

PRICE DISCOVERY – The process of determining the price level for a commodity based on supply and demand conditions.

REAL ASSET – Physical, identifiable assets, such as gold, oil and land.

REAL RETURN – The nominal return less the inflation rate.

ROLLING A FUTURES CONTRACT – Selling (buying) a nearby contract and buying (selling) a contract with a later maturity date to avoid taking delivery of (delivering) the underlying commodity.

ROLL RETURN – Return generated from the difference in price between a nearby contract and a contract further out on the curve.

SHARPE RATIO – Measure of the excess return (alpha or return over a cash yield) per unit of risk in an investment.

SHORT – The selling side of a futures contract.

SKEW – A statistic used to measure the symmetry of a distribution around its mean value. Normal distributions are perfectly symmetrical and have zero skew. Negative skew indicates a distribution with a downside bias. Positive skew indicates a distribution with an upward bias.

SPOT MARKET – Market of an immediate delivery of and payment for the commodity.

SPOT PRICE – The current market price of the commodity.

SWAP – An agreement between two counterparties to exchange a stream of payments over time according to specified terms. For example, in a commodity swap, Counterparty A may pay Counterparty B a payout based on the price of a commodity, while Counterparty B pays Counterparty A a payout based on the level of a commodity index.

UPWARD SLOPING – A situation in which nearby futures contract prices are lower than futures contract prices with later maturities.

VOLATILITY – Measure of the dispersion of returns for a security or market index.

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Has There Been Excessive Speculation in the US Oil Futures Markets?

What Can We (Carefully) Conclude from New CFTC Data?

November 2009



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Abstract

Because many facets of the global oil markets have not been sufficiently transparent, it is unclear how much of the oil-price rally that peaked in July 2008 can be put down to speculation. This uncertainty has led to concerns that there was actually excessive speculation in the oil derivatives markets. In an effort to make the oil markets more transparent, the U.S. Commodity Futures Trading Commission has recently launched the "Disaggregated Commitments of Traders" report. This report includes three years of enhanced

market-participant data for twenty-two commodity futures contracts. This report makes it possible to examine whether, over the last three years, speculative position-taking in the exchange-traded oil derivatives markets has been excessive relative to commercial hedging needs. We use a traditional metric for evaluating speculative position-taking and find that this position-taking does not appear to be excessive over the past three years when compared to the scale of commercial hedging at the time.

About the Author

Hilary Till is a Research Associate at the EDHEC-Risk Institute (Nice, France) and co-editor of the bestselling book, *Intelligent Commodity Investing*, Risk Books, <http://www.riskbooks.com/intelligentcommodity>. She is based in Chicago and is the co-founder of the proprietary trading firm, Premia Capital Management, LLC.

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Her published work on behalf of EDHEC-Risk has been cited in the *Journal of Finance* and *Journal of Structured Finance* as well as by the Bank of Japan, the Banque de France, the European Central Bank, the Bank for International Settlements, the International Monetary Fund, the International Organization of Securities Commissions (IOSCO), the US Senate's Permanent Subcommittee on Investigations, and by the United Nations Conference on Trade and Development. In addition, she presented her research on the oil futures markets to the International Energy Agency at the agency's Paris headquarters in March 2009.

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Introduction

In October 2008, the EDHEC-Risk Institute appealed for the evaluation of the oil futures markets to be based on a careful examination of empirical data. In the EDHEC-Risk paper, "The Oil Markets: Let the Data Speak for Itself," we noted that there were numerous plausible explanations for the oil-price rally that had culminated in July 2008, but that many areas of data uncertainty remained, making definitive conclusions on this matter conditional on increased transparency in these markets.

Our 2008 position paper asserted that many facets of the world oil market, including future productive capacity estimates from major suppliers, inventory statistics from important non-OECD consumers, and summary position data from derivatives participants, have been too opaque.

The US Commodity Futures Trading Commission (CFTC) has recently made significant progress in addressing the latter challenge: the need for improved market-participant data.

On October 20, 2009, the CFTC released three years of enhanced market-participant data for twenty-two commodity futures markets in its new "Disaggregated Commitments of Traders" (DCOT) report.¹

For statisticians and economists, this is a welcome announcement of additional transparency in the workings of the US futures markets. The public release of detailed market-participant data also shows that the CFTC is continuing in its decades-long tradition of providing policymakers and academics with empirical data that (one hopes) can be used to make sound decisions on the regulation of the US futures markets.

Our new paper on the oil markets examines whether this increased transparency can provide any answers on whether there has been excessive speculation in the US oil markets. Using a traditional metric for evaluating speculative participation, we find that outright position-taking in US exchange-traded oil derivatives contracts has fluctuated in a largely normal range based on historically relevant benchmarks.

1. Background on Publicly Available Data

Before the release of the new Disaggregated Commitments of Traders report, the CFTC had already provided market-participant data in its weekly Commitments of Traders (COT) report. This report classifies futures-and-options open interest according to three categories: commercial, non-commercial, and "non-reportable". The latter category includes small traders whose position sizes are smaller than the CFTC's reporting threshold, and are thus "non-reporting".

In using the COT report, analysts have traditionally viewed the "commercial" category as commercial hedgers, and the "non-commercial" category as futures speculators. Furthermore, "commercial hedgers" were traditionally regarded as those who were involved in the handling of the physical commodity.

The meaning of the traditional COT categories became ambiguous when swap dealers, who were providing commodity-index exposure to investors, became classified as "commercials". In a broad sense, swap dealers who hedge the exposure of their swaps with positions in futures markets are indeed hedging. But they are not hedging in the traditional sense of the word.

Therefore, it became difficult, strictly speaking, to understand the balance between (physical) commercial hedging in the futures markets and participation by those not involved in the handling of the physical commodity.

As a result, the CFTC has gradually been rolling out new reports to address this ambiguity.

Starting in 2007, the CFTC began releasing a "Commodity Index Traders" (CIT) report, which provided information on index participation in twelve agricultural futures

markets. The CIT report includes data back to 2006. The CIT report, though, does not include the oil markets.

But with the October 20 launch of the DCOT report, we can now directly examine the break down of open interest between pure handlers of commodities and other market participants. Specifically, the DCOT report creates four new categories of large traders:

- (1) Producer/Merchant/Processor/User
- (2) Swap Dealers
- (3) Managed Money
- (4) Other Reportables.

This granular categorization of market participation can help us determine whether there has been excessive speculation in the US oil futures markets. In examining this question, we will use the framework of Sanders *et al.* (2008), which was originally created to analyze the US agricultural futures markets.

2. Traditional Metric for Evaluating Speculative Activity

Sanders *et al.* (2008) wrote that one way of examining the adequacy or excessiveness of speculative participation in the commodity futures markets is to apply Working's speculative T index, which the eminent economist Holbrook Working originally devised in 1960.

The idea behind the T index is that the economic function of commodity futures markets is for hedging and fulfilling risk-management needs. Even when commodity futures markets are viewed as "hedging" markets, there is still a vital role for speculators because there will not always be an even balance of short hedgers and long hedgers at any one time. Therefore, speculators are needed to balance the market. Historically, in the agricultural futures markets, there was not enough speculation to provide for commercial hedging needs.

The question now, especially in the oil markets, is whether the scales have not been tipped the other way. Quite simply, if there is more speculation than is required for commercial hedging needs, a futures market becomes one of speculators trading with other speculators, and the century-long question concerning the economic usefulness of futures markets would need to be addressed yet again.

Let us review the Sanders *et al.* (2008) framework, which uses the T index, for analyzing the balance of speculation and hedging in the agricultural markets. Later in this article, we will adapt this framework to analyze the petroleum complex, again using the T index.

Using the data provided by the CFTC's CommodityIndexTraders(CIT) report, Sanders *et al.* (2008) effectively re-characterized agricultural index positions as speculative (rather than as hedges) and examined whether the balance of hedging and

speculation through the first quarter of 2008 had been outside historical norms. If speculative positioning relative to hedging activity was greater than in the past, then one might characterize the speculative activity as potentially excessive.

The authors found the following in their agricultural study: "after adjusting speculative indices for index fund positions, values are within the historical ranges reported in prior research" dating to 1960.

3. Oil Futures Market Study

Arguably, we are now in a position to carry out a similar study for the petroleum complex, given that we have the brand-new Disaggregated Commitments of Traders (DCOT) report. Again, the DCOT divides the large-trader open interest into the following categories: (1) Producer/Merchant/Processor/User, (2) Swap Dealers, (3) Managed Money, and (4) Other Reportables.

The first category is clearly the purest definition of a physical handler of a commodity. Regarding the second and fourth categories, it may be that some "swap dealers" and "other reportables" are commercial hedgers. But if a study of the balance of hedgers and speculators classified the activity of the swap dealers, managed money, and other reportables as entirely speculative, then the study would provide an upper bound on speculation relative to hedging.

Another category of open interest is that of the "non-reportables". The historical literature contains a number of suggestions on how to classify this category, including treating the non-reportables as small speculators or reapportioning their open interest to both commercials and non-commercials, according to the balance of large traders in these two categories. We will include the non-reportables as speculators so as to be consistent with our previous decision, and to provide an upper bound on speculation relative to hedging. In other words, our study may exaggerate the amount of speculation in the US oil futures markets.

Finally, one category of open interest that we will address in future research, but not here, concerns intra-market futures spreading. Before 2006, this author would not have thought to include spreading as a potential source of excessive speculation. This activity had evidently been the private

domain of either highly specialized market-makers, primarily locals on the floors of the open-outcry exchanges, or highly-capitalized storage traders. But one's view on this matter had to change with the 2006 Amaranth debacle. This global hedge fund took on surprisingly large speculative positions in natural gas futures spreads, positions that later led to its demise. The hedge fund's sizing in one particular contract month exceeded the nationwide US residential natural gas consumption for that month, even though the hedge fund had no ability to make or take physical delivery in this commodity.

This paper will use Working's T index to examine only whether *outright* positioning by speculators and index investors in the US oil futures market may have been excessive relative to hedging. As previously noted, we will address the question of speculative spreading as a potential source of excessive speculation in future work.

Sanders *et al.* (2008) define Working's T index as follows:

$T = 1 + SS / (HL + HS)$ if $(HS \geq HL)$

or

$T = 1 + SL / (HL + HS)$ if $(HL > HS)$

where open interest held by speculators (non-commercials) and hedgers (commercials) is denoted as follows:

SS = Speculation, Short

HL = Hedging, Long

SL = Speculation, Long

HS = Hedging, Short".

Some explanation is in order to make this statistic (we hope) intuitive. The denominator is the total amount of futures open interest resulting from hedging activity. If the amount of short hedging is greater than the amount of long hedging, speculative longs are needed to balance the market; and, technically, speculative shorts

3. Oil Futures Market Study

are not required by hedgers. Any surplus of speculative short positions would need to be balanced by additional speculative long positions. Technically, the speculative short positions would then be superfluous or perhaps even "excessive". The speculative T index measures the excess of speculative positions beyond what is technically needed to balance commercial needs, and this excess is measured relative to commercial open interest.

Sanders *et al.* (2008) write that: "Working is careful to point out that what may be 'technically an excess of speculation is economically necessary' for a well-functioning market".

For the speculative T index, what value(s) greater than 1 are considered excessive?

The following are average T indices from historical agricultural studies, excerpted from Sanders *et al.* (2008):

1.21 (calculated from 1954-1958 data)
1.22 (calculated from 1950-1965 data)
1.26 to 1.68 (calculated from 1947-1971 data)
1.155 to 1.411 (calculated from 1972-1977 data).

Evidently, the concern in these historical studies was the *inadequacy* of speculation in the agricultural futures markets, so these historical T indices would therefore *not* be considered indicative of excessive speculation.

Let us calculate the T indices for the petroleum complex using the CFTC's new DCOT report.

The DCOT includes data starting on June 13, 2006, for NYMEX contracts. For the ICE Futures Europe WTI crude oil contract, the data does not start until July 28, 2009. As of the writing of this article, the latest update was on October 20, 2009. The following

analysis uses Bloomberg to access the new CFTC data.

We will calculate T indices using the methodology noted above. That is, only the "Producer/Merchant/Processor/User" category will be regarded as hedgers. All other categories in the DCOT will be treated as speculators. Our T indices will therefore be upper bounds on a pure calculation of the T index.

Another consideration is that the DCOT provides both futures-only data and data for futures and options combined. The options data is provided as delta-equivalent futures data. We will calculate and display T indices for both sets of data. That said, we would regard the futures and options data to be more comprehensive than the futures-only data in providing an indication of the balance of speculative and hedging positions.

The first step in calculating the T indices is to determine whether the "Producer/Merchant/Processor/User" category consists predominantly of short positions (rather than long positions). We would expect this since the economic function of commodity futures markets has traditionally been for the hedging of prohibitively expensive inventories.

Indeed, for the NYMEX crude oil, ICE crude oil, NYMEX heating oil, and NYMEX gasoline futures markets, the "producer" category has been net short over the time period of each data set. This result is shown in the graphs below. Please see exhibits 1, 3, 5, and 7.

Therefore, our T indices will be universally calculated as:

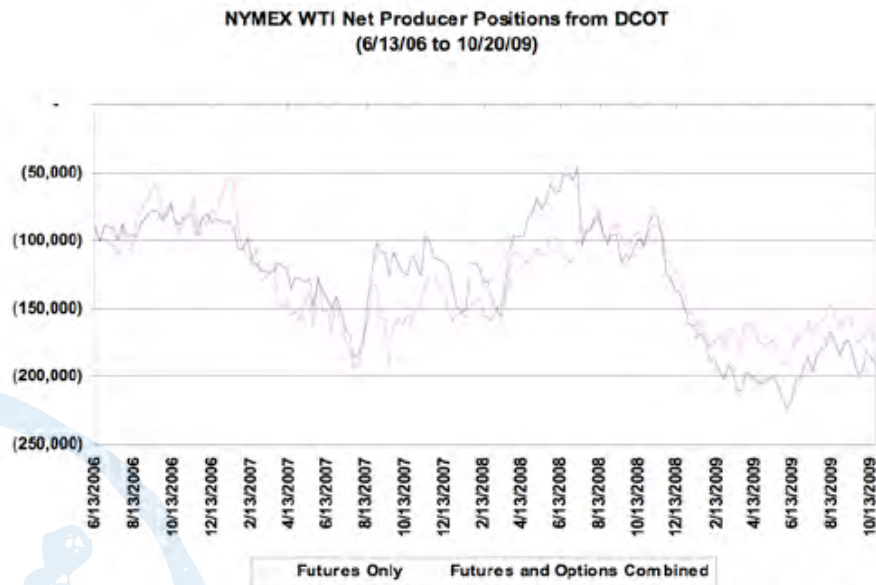
$$T = 1 + SS / (HL + HS).$$

The graphs for the T indices across the US energy futures markets are shown in exhibits 2, 4, 6, and 8.

Exhibits

Exhibit 1

Net Producer/Merchant/Processor/User Positions in the NYMEX WTI Crude Oil Contract from the CFTC's Disaggregated Commitments of Traders Report (in futures contract equivalents)



Legend:

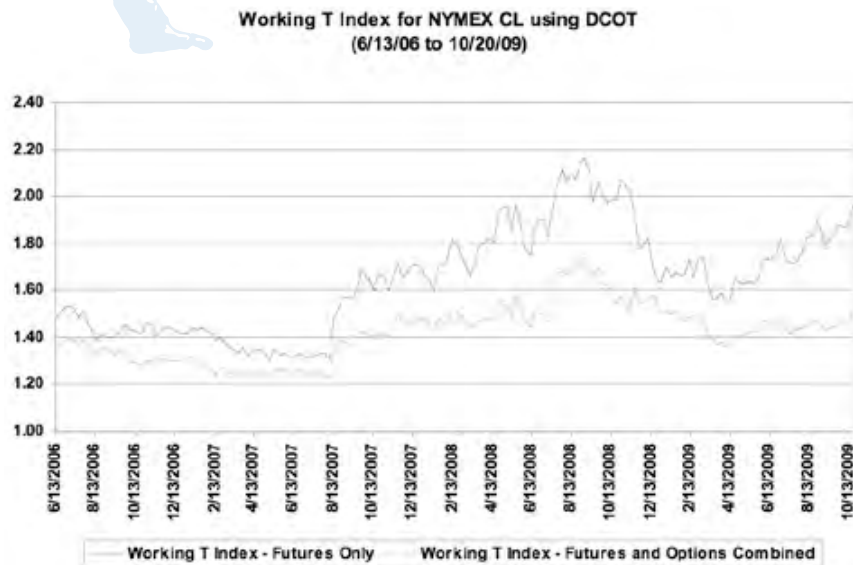
NYMEX: New York Mercantile Exchange

WTI: West Texas Intermediate

DCOT: Disaggregated Commitments of Traders

Exhibit 2

Working T Index for the NYMEX WTI Crude Oil Contract Based on the Classifications in the CFTC's Disaggregated Commitments of Traders Report



Legend:

CL: Crude oil.

Exhibits

Exhibit 3

Net Producer/Merchant/Processor/User Positions in the ICE WTI Crude Oil Contract from the CFTC's Disaggregated Commitments of Traders Report (in futures contract equivalents)

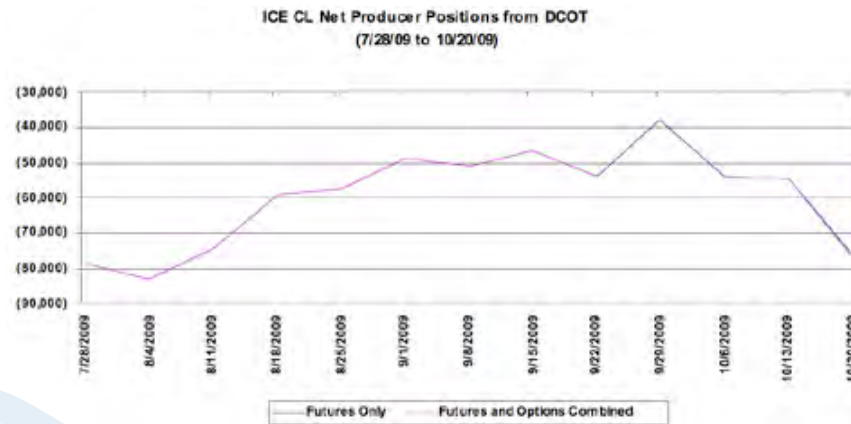
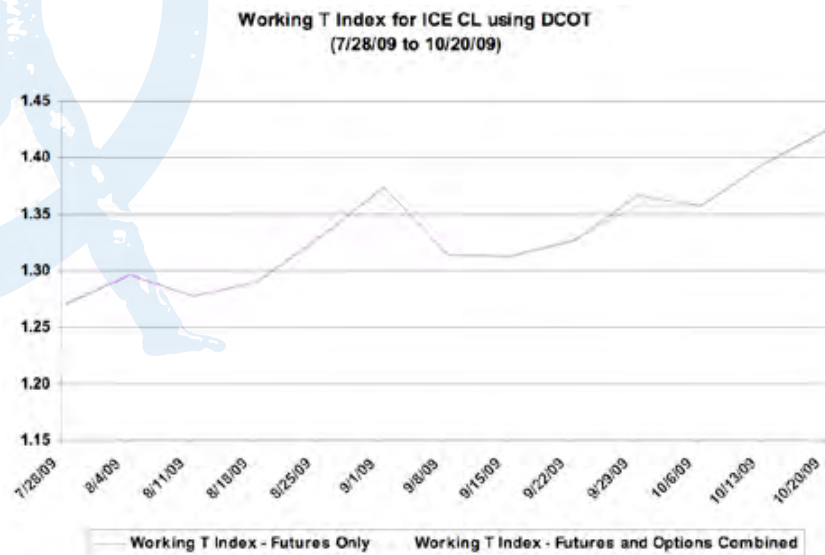


Exhibit 4

Working T Index for the ICE WTI Crude Oil Contract Based on the Classifications in the CFTC's Disaggregated Commitments of Traders Report



Exhibits

Exhibit 5

Net Producer/Merchant/Processor/User Positions in the NYMEX Heating Oil Contract from the CFTC's Disaggregated Commitments of Traders Report (in futures contract equivalents)

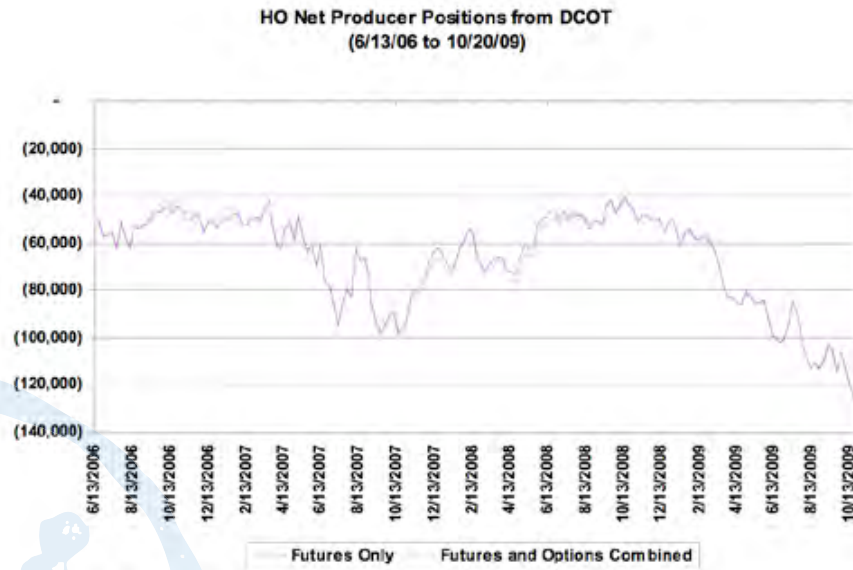
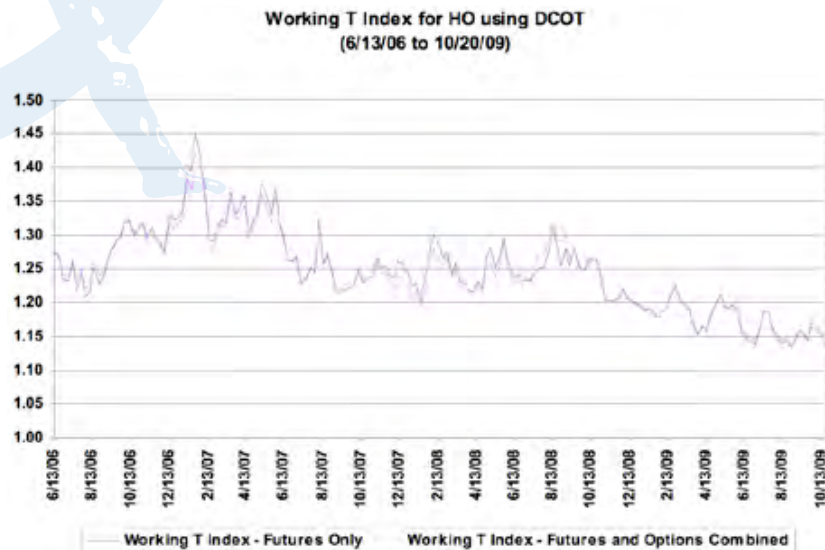


Exhibit 6

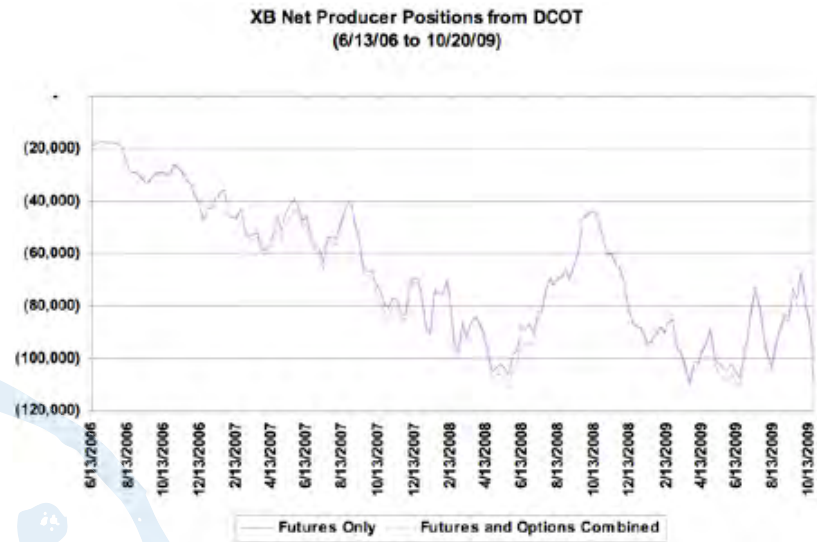
Working T Index for the NYMEX Heating Oil Contract Based on the Classifications in the CFTC's Disaggregated Commitments of Traders Report



Exhibits

Exhibit 7

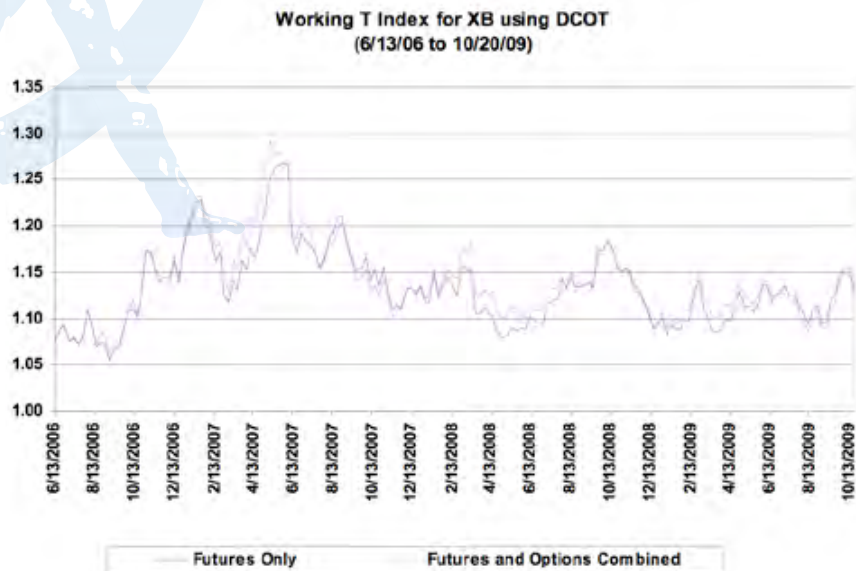
Net Producer/Merchant/Processor/User Positions in the NYMEX Gasoline Contract from the CFTC's Disaggregated Commitments of Traders Report (in futures contract equivalents)



Legend:
XB: Gasoline.

Exhibit 8

Working T Index for the NYMEX Gasoline Contract Based on the Classifications in the CFTC's Disaggregated Commitments of Traders Report



Conclusion

What can we say about the T indices for the petroleum complex?

For the NYMEX heating oil and gasoline futures markets, the T indices are within range of what had not been considered excessive for the agricultural futures markets.

For the very brief time period that we have ICE Futures Europe data, the conclusion for the ICE WTI contract is the same as that for the NYMEX heating oil and gasoline contracts.

As long as one includes options positions, the T indices for the NYMEX oil futures markets are not excessive, again, provided that it is acceptable to use the historical agricultural futures markets as a guide to the adequacy (or excess) of speculation. It is also noteworthy that from the summer of 2007 to the summer of 2008 the NYMEX WTI oil futures market did become more speculative (relative to hedging), even if the data for futures and options combined showed that the peak T index would not be regarded as excessive using our historical benchmarks.

Now, to be circumspect in our conclusions, we must note that if we exclude the option positions in the NYMEX oil data, the futures-only data would potentially indicate excessive speculation in the US oil futures markets.

We must clearly be careful about how strongly we word our conclusions. Within the closed system of the US oil futures and options markets, we find no evidence of excessive speculation, at least not when we use traditional metrics and when we include options positions with outright futures positions.

Also, if excessive speculation can be defined differently than as in our paper, then obviously we cannot say for certain that there has not been excessive speculation in the oil derivatives markets. Nor are our conclusions necessarily incontrovertible, if it is inappropriate to use the historical balance of agricultural speculation-versus-hedging activity to categorize this balance in the oil markets. In addition, we have not examined whether futures-spreading activity over the past three years could have constituted excessive speculation. Finally, we cannot say there has not been excessive speculation in the oil markets through other venues.

But we can say that, based on traditional speculative metrics, the balance of outright speculators in the US oil futures and options markets was not excessive relative to hedging activity in those same markets from June 13, 2006, to October 20, 2009.²

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