

USDA

United States  
Department  
of Agriculture

FDS-09G-01  
August 2009

Outlook



A Report from the Economic Research Service

[www.ers.usda.gov](http://www.ers.usda.gov)

# Issues and Prospects in Corn, Soybeans, and Wheat Futures Markets

## New Entrants, Price Volatility, and Market Performance Implications

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### Abstract

The past 5 years have seen large increases in trading of corn, soybean, and wheat futures contracts by nontraditional traders, a trend that coincided with historic price increases for these commodities. These events have raised questions about whether changes in the composition of traders participating have contributed to movements in commodity prices beyond the effects of market fundamentals. Evidence suggests the link between futures and cash prices for some commodity markets may have weakened (poor convergence), making it more difficult for traditional traders to use futures markets to manage risk. This report discusses the role and objective of new futures traders compared with those of traditional futures traders and seeks to determine if the composition of traders in futures markets has contributed to convergence problems. Market activity is analyzed by focusing on positions of both traditional and new market traders, price levels, price volatility, and volume and open interest trends. Convergence of futures and cash prices is examined, along with implications and prospects for risk management by market participants. The report also discusses the implications for market performance and the regulatory response of the Commodity Futures Trading Commission.

Keywords: Corn, soybeans, wheat, futures, liquidity, volatility, speculators, index traders, hedgers, prices, basis, convergence, market performance

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Approved by USDA's  
World Agricultural  
Outlook Board

## **Acknowledgments**

The authors gratefully acknowledge the input and review comments of Paul Westcott, Andrea Woolverton, Greg Pompelli, Janet Perry, and Sarahelen Thompson of USDA's Economic Research Service (ERS); David Stallings and Jerry Norton of USDA's World Agricultural Outlook Board; Scott H. Irwin and Eugene Kunda of the University of Illinois at Urbana-Champaign; and Colin Carter of the University of California at Davis. Excellent editorial guidance was provided by Linda Hatcher of ERS.

## Introduction

Although the traditional role of commodity futures markets is for risk management and price discovery, a new role appears to have emerged: Commodity futures are increasingly used as an asset class in various forms of investment vehicles. Significant amounts of capital have entered the futures market for this purpose.<sup>1</sup> The influx of this new capital was partially responsible for the 216-percent increase in average open interest for corn, soybeans, and wheat between January 2004 and June 17, 2008. Since then, the average open interest for the three commodities declined an average 35 percent between June 17, 2008, and April 30, 2009 (table 1 and fig. 1).<sup>2</sup>

Commodity futures markets and their accompanying derivatives markets have become appealing venues for investors due to widespread electronic trading, the financial integrity of a clearinghouse that alleviates transactions risks, and the ability to leverage investments by requiring only a margin as a performance bond. The costs of purchasing and selling futures contracts as investments in the futures markets are low compared with the costs of investing in other markets.

The large amount of investment capital flowing into agricultural futures markets has prompted increased scrutiny. Industry participants have accused the new traders and new capital of unduly affecting the level of prices and price volatility. Others allege that hundreds of billions of investors' dollars are swamping the market, and it can no longer serve to assist commercial traders who use the physical commodities to hedge and smooth physical production and/or consumption (Cooper, 2008). These concerns initially arose in the energy markets but were later heard in the agricultural commodity markets. The counterargument to these allegations has rested on the dynamic nature of the commodity markets during recent years. For example, biofuel production, poor growing weather, export controls, emerging economy demand, and increased production costs caused demand growth to outstrip supply growth in various commodities. In addition, low real interest rates and a weak U.S. dollar further fueled higher prices. Because of these and a number of other factors affecting prices, many researchers suggest the need for further research to determine the role of speculative activity upon price levels. Abbott et al. (2008), for example, indicate the following:

*While the effects of supply and demand on commodity prices are clear, the effects of changes in the structure of commodity markets, in particular increased speculative activity are not. There is no doubt that the amount of hedge fund and other new monies in the commodity markets has mushroomed. Price volatility has increased, partly due to increased trading volumes. Based on existing research, it is impossible to say whether price levels have been influenced by speculative activity.*

Participants within the commodities industry question whether the goals and objectives of the new traders are compatible with the traditional functioning of the futures market. Some analysts suggest that large fund traders are similar to manipulative individual speculators of the past who artificially inflated futures prices and profited from the resulting higher levels. Yet, based on past research in futures markets, there is little evidence that the new traders reduce the quality of price predictions. Carlton (1984) states "Any deterioration in the accuracy of price predictions would attract informed

<sup>1</sup>This increase in capital was partially fueled by research touting returns from futures portfolios comparable with returns from equities (e.g., Gorton and Rouwenhorst, 2006); the investment community has embraced this idea and created vehicles for easy investment into commodity futures markets for large pension funds or for small investors. Domanski and Heath (2007) have deemed this the "financialization" of commodity markets, and others have referred to this phenomenon as the creation of commodity futures into a bonafide asset class. Earlier research by Fortenbery and Hauser (1990) found that the addition of futures contracts to the portfolio rarely increases the portfolio return. However, they found the investment benefits from agricultural futures are found in the form of a reduction in the portfolio's nonsystematic risk.

<sup>2</sup>Corn, soybeans and wheat are the three largest agricultural contracts from the Chicago Mercantile Exchange (CME) Group/Chicago Board of Trade (CBOT). The CME Group/CBOT wheat contract is commonly used by traders for all wheat classes because of its liquidity and volume. It is used, therefore, to represent all classes of wheat in this analysis. The CME and CBOT merged in July 2007 to form the CME Group. In August 2008, the New York Mercantile Exchange (NYMEX) joined the CME Group.

investors who would have an incentive to use their knowledge to earn higher profits and thereby drive the poorly informed from the market by inflicting losses on them.” In 1925, the “Wheat Scandal” was purported to involve speculators who manipulated prices, but upon further review, Petzel (1981) found no such evidence of manipulation: “Charges of manipulation and excessive speculation usually arise during periods of unusual market activity, but they should be subject to careful analysis before action is taken.” Questions have also been raised about the impact of speculators and nontraditional traders on selected performance issues, such as the decoupling (separating) of the futures and cash markets and increased difficulty in managing risk for traditional market players within the futures market.

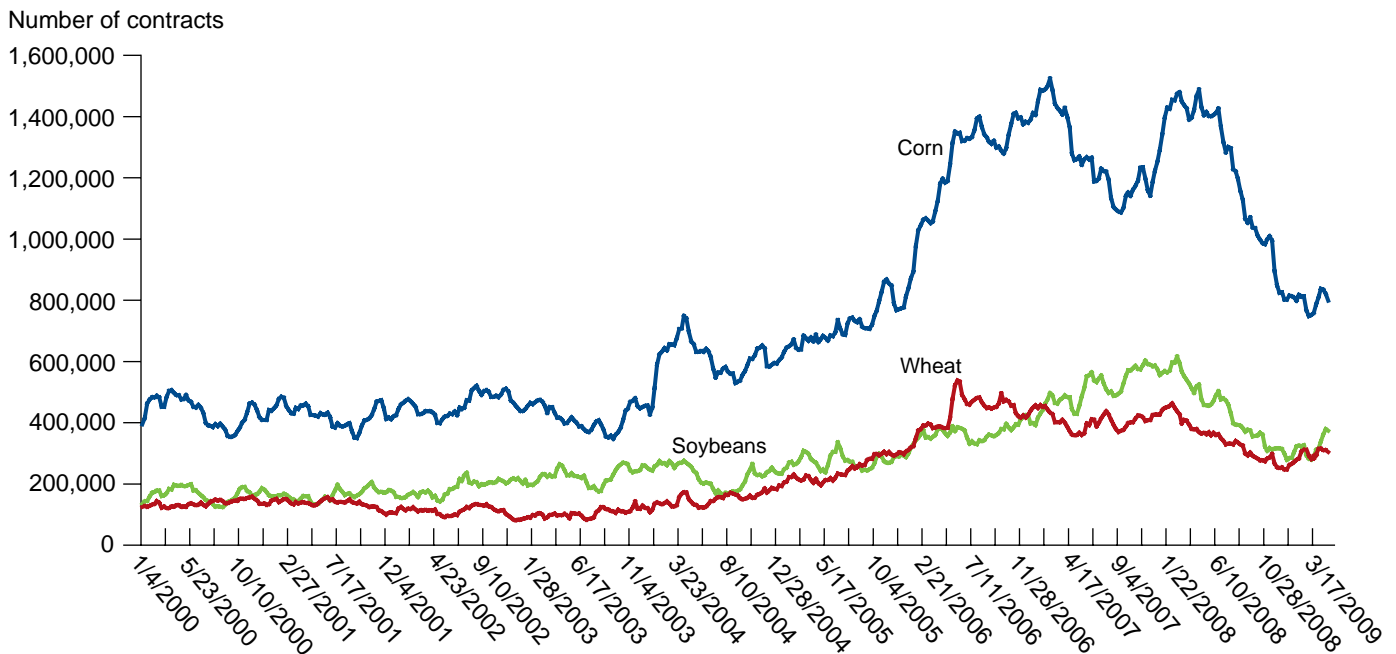
The changing environment raises additional questions (not all of which are addressed here) about the evolving nature of the commodity futures markets.

Table 1  
**Percentage change in open interest for selected CME Group/CBOT futures contracts**

Period	Contracts		
	Corn	Soybeans	Wheat
		<i>Percent</i>	
1/2/2000-1/6/2004	17.8	94.2	-3.6
1/6/2004-6/17/2008	297.7	125.2	226.2
6/17/2008-4/30/2009	-50.2	-31.3	-24.1

CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.  
 Source: Commodity Futures Trading Commission, Commitments of Traders Reports, Futures-and-Options Combined Reports, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html).

Figure 1  
**Open interest in CME Group/CBOT: Corn, soybeans, and wheat, weekly, January 4, 2000-April 30, 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.  
 Source: Commodity Futures Trading Commission, Commitments of Traders Reports, Futures-and-Options Combined Reports, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html).

If the link between futures prices and cash prices weakens, will futures prices continue to be a useful price discovery or hedging mechanism? Will risk managers be able to offset their cash market price exposures as effectively as they have traditionally done? If not, what alternatives exist for market participants? Can the agricultural futures markets continue to function and serve the objectives of each of its market traders? Are changes in trading rules or contract specifications needed?

This report examines the role and objectives of new futures traders compared with those of traditional futures traders and how new traders may affect market metrics. We will assess changes in market activity by focusing on liquidity, volatility, and the relationship between positions of selected traders' categories and price levels. Convergence of futures and cash prices will be further examined, along with the implications and prospects for risk management by market participants. We will also highlight the initial regulatory response by the Commodity Futures Trading Commission (CFTC). A glossary is provided at the end of the document for interested readers.

## Traditional Role and Use of the Futures Market

The traditional role for futures markets is risk management and price discovery (Peck, 1985, pp. 1–73). Since the start of U.S. futures markets in the mid-1800s, they have been used for these purposes by producers, processors, manufacturers, and merchants who handle commodities and commodity products. As the markets developed, speculators, willing to risk their own resources for a chance to gain, entered the markets and provided much needed liquidity. Speculators' willingness to accept risks from others is essential for a well-functioning market.

Grain futures markets are viable risk management tools when futures prices and underlying cash grain prices generally move in the same direction within the same time frames. The most widely traded crop contracts (CME Group/CBOT corn, soybeans, and wheat) are settled physically, meaning that sellers have the option of making delivery of the grain to the buyer.<sup>3</sup> The relationship between physically settled futures contracts and cash prices depends on various factors, including the “cost of carry” (expenses incurred while holding a physical commodity or financial instrument) and ability to conduct arbitrage (practice of taking advantage of a price differential between two or more markets) (see glossary for definition of terms).

The value of a futures contract is related to or derived from the value of the underlying asset. A current futures contract price is typically equivalent to the current cash price of the commodity underlying the futures contract plus the cost of carrying that asset until the expiration of the futures contract, at which time it can be delivered.<sup>4</sup> For example, the cost of carry for a corn futures contract is the storage, insurance, and finance charges incurred by holding the corn from today until the futures contract expires. As long as this relationship holds, supply and demand factors affecting corn prices in the cash market will affect corn prices in the futures contract. Similarly, supply and demand factors affecting corn prices in the futures contract will affect corn prices in the cash market.<sup>5</sup>

The ability of market participants to conduct arbitrage also forces the cash price to converge to the futures price when the futures contract enters the delivery period; this process is called “convergence.” If the cash price is above the futures price, a profit can be made by buying futures, taking delivery of the physical commodity, and selling that commodity at the higher cash price.<sup>6</sup> If the cash price is below the futures price, profitable arbitrage may also be possible. The traditional approach is to buy the underlying physical commodity, sell the futures contract, and make delivery of the commodity at the higher futures price. In reality, the process is much more complicated because the short (seller) must provide a delivery instrument (shipping certificate or warehouse receipt), as opposed to the actual commodity, to the long (buyer). A delivery certificate can be issued only by a firm that has been declared by the exchange as “regular for delivery,” which poses no concern for arbitrage if the short is a regular firm. But, if the short is not regular for delivery, it must acquire a shipping certificate, which is bought

<sup>3</sup>Rather than delivering or taking delivery of the physical commodity, most participants cancel out their sales with equal offsetting purchases or their purchases with equal offsetting sales.

<sup>4</sup>In a low inventory situation, futures prices can be less than cash prices, reflecting the value of having immediate access to the commodity. This situation is known as the convenience yield. Holbrook Working was the first to analyze this phenomenon (Peck, 1985, p. 41).

<sup>5</sup>The storage component of the cost-of-carry is capped by the exchange. The spreads may not reveal the true cost of carry when the forward structure of the futures market approaches “full carry.” The full carry effect is to then weaken the basis since only the cash price component of the basis is not restricted by exchange-determined storage costs.

<sup>6</sup>If a trader buys futures, delivery is not necessarily immediate (since the short futures position controls delivery), and therefore the cash price may move adversely before delivery commences.

in the market at the value of the current futures market.<sup>7</sup> The long receives the certificate from the short and can present it to the issuing elevator. The elevator then delivers the commodity. The arbitrage process is thus subject to various transaction costs, but theoretically, arbitrage ensures that futures prices are close approximates of cash prices and keeps the futures markets in line with market fundamentals.

Futures markets typically have had two types of traders: commercial traders and noncommercial traders. *Commercial traders*, commonly referred to as hedgers, use futures markets to manage price risk resulting from activity in the underlying cash market. A hedger is a trader who purchases or sells futures contracts as a temporary substitute for a cash transaction that will occur at a later date, generally to minimize the risk of financial loss from an adverse price change (CFTC, 2008e, p. 67). For commercial traders, the initial margins, as of April 23, 2009, were \$1,500, \$3,500, and \$2,500 per contract for corn, soybeans, and wheat, respectively.<sup>8</sup> This initial margin must be deposited as a performance bond when a buy or sell position is opened by a trader to help ensure the financial integrity of brokers, clearing members, and the exchange as a whole. For example, on April 23, 2009, the initial margin was 8 percent of the nearby corn contract price, 7 percent of the nearby soybean contract price, and 9 percent of the nearby wheat contract price (all are 5,000-bushel contracts).

*Noncommercial traders*, commonly called speculators, do not hedge, but trade with the objective of achieving profits through the successful anticipation of movements in price levels or through price movements in spread or basis trades (CFTC, 2008e, p. 69). The potential effects of speculation on price has caused much debate in the past. (See box, “Growing Pains of the Agricultural Futures Markets.”) Speculators have limits on the number of contracts they can hold at any given time.<sup>9</sup> The limits have been increased in the past as trading volumes have increased. As of April 23, 2009, the limits were 22,000 contracts for corn, 10,000 for soybeans, and 6,500 for wheat. The intent of position limits on noncommercial traders is to keep them from obtaining a large nonhedging position that will distort prices. Speculators are subject to higher initial margins than commercial traders are. As of April 23, 2009, the margins per contract were \$2,025 for corn, \$4,725 for soybeans, and \$3,375 for wheat.<sup>10</sup> On April 23, 2009, the initial margin for a 5,000-bushel contract was 11 percent of the nearby corn contract price (the price of the contract with the closest settlement date), 9 percent of the nearby soybean contract price, and 12 percent of the nearby wheat contract price.

Over time, the line between hedgers and speculators or commercial and noncommercial traders has been blurred. The behavior of hedgers and speculators is better described as a continuum between pure risk avoidance and pure speculation (Irwin et al., 2009a). The CFTC also acknowledges that the commercial and noncommercial trader classifications have grown less precise over time as both groups may be engaging in hedging and speculative activity (CFTC, 2008e).

The commodity funds that began in the 1980s operated as large speculators, where managers of speculative money pools used technical trading theories and programs in futures markets (Kohlmeyer, 2008). Technical traders are more concerned about using price patterns over time as an indicator of the

<sup>7</sup>The regular firm has an advantage to capture arbitrage opportunities when the cash price is below the futures price, but the regular firm is also a cash grain merchandiser that is in the market to buy cash grain and therefore does not necessarily have the incentive to see cash grain rise to meet futures and bring about convergence.

<sup>8</sup>Margins do change periodically.

<sup>9</sup>Limits are set by the CFTC or by the exchange itself.

<sup>10</sup>Maintenance margins are not different for commercial and noncommercial traders. A maintenance margin is the minimum equity that must be maintained for each contract in a customer's account after deposit of the initial margin.

direction that prices are heading than they are about the fundamental determinants of why prices are heading in that direction. By the late 1990s, these technically trading commodity funds became an important component of futures markets. For the first time, commodity futures markets were used in a large way by traders who were less interested in supply or demand fundamentals of underlying commodities than in technical trading patterns. Generally, their trading followed market momentum patterns, by attempting to buy in a period of rising prices and sell in a period of falling prices.

### **Growing Pains of the Agricultural Futures Markets**

The history of futures markets is marked by growing pains throughout its more than 150-year history in the United States. Much of the controversy surrounding futures trading in the past relates to the effects of speculation on price (Hieronymus, 1971). The recurring argument is made that speculation causes greater price variability than would otherwise exist, and the counterargument states that high-volume futures markets accompanied by a significant amount of speculation have a stabilizing influence on markets and create less variability than would otherwise exist in markets with less speculation. In 1925, after an increase in the price of wheat, the public found a villain in large speculators. In the 1940s and 1950s, the general view of speculation was not positive, but speculators were tolerated because their function was necessary for proper functioning of futures markets by adding liquidity and accepting risk from hedgers. Excess speculation was viewed to cause erratic price fluctuations, and after much debate, the trading of onion futures was abolished in 1958.<sup>1</sup>

In the 1960s, the balance appeared to shift to a more favorable view of futures market speculation and no further bans were enacted, yet futures trading continued to be carefully monitored. Speculative behavior was again blamed for the increase in commodity prices in 1972-75 (Cooper and Lawrence, 1975). But Labys and Thomas (1975) found only a weak relationship between speculative activity and price volatility. Since 2007, the price discovery value of futures markets has again come into question as prices soared and the difference between futures and cash prices for grains failed to converge smoothly after accounting for normal differences, such as transportation and handling, quality, storage, and other market factors (Irwin et al., 2007).<sup>2</sup>

<sup>1</sup>In earlier years, the view was typified in a statement by J.M. Mehl, Administrator, Commodity Exchange Authority, before the Joint Committee of Economic Report on 1947, "It is recognized that in the commodity futures markets there is need for some speculation. It is not believed that speculation is a basic factor determining the general level of prices in the long run. It is believed, however, that an undue amount of speculation tends to make price fluctuations more erratic and at times accentuate price trends." Similar comments were made by the U.S. Futures Association in 1957.

<sup>2</sup>A more detailed history of futures markets development may be found at *Futures Industry Magazine*, <http://www.futuresindustry.org/fi-magazine-home.asp?a=607>.



## Factors That Support Increased Trading of Agricultural Futures Contracts

Overall trading levels for agricultural commodities have increased sharply in recent years partly due to increased open interest (outstanding contracts) of traditional investors, along with new participants, such as index fund and hedge fund investors. Since the beginning of 2004, open interest in CME Group/CBOT corn, soybeans, and wheat has approached or achieved new record levels (see fig. 1). Electronic trading, increased access to the global market, and new product innovation may help explain the rise in open interest and new market participants. In addition, when price uncertainty increases (as seen in recent years), the use of futures markets increases.

### Electronic Trading Brings Ease of Access and the Global Market

Electronic trading has made trading on the latest information or using more sophisticated trading strategies easier and less expensive for fund managers and speculators, particularly spread traders (investors who buy one futures contract and sell another related one to profit from the change in the price difference between the two). Managed funds can trade from almost any location, and the volume and liquidity of the markets have increased to allow a trader to have a larger position size in the futures market (greater number of contracts). The time lag associated with pit trading was a bottleneck for increased trading volume, but with the advent of electronic trading between the pit and screen, the bottleneck was eliminated. Since the introduction in July 2006 of daytime and side-by-side electronic trading, a critical mass of electronic volume was quickly established.

The trading share between electronic and pit has changed dramatically between 2005 and 2009. For example, in the beginning of 2005, the average trading share of corn, soybeans, and wheat futures contracts at the CME Group/CBOT was 98 percent pit and 2 percent electronic. In contrast, in April 2009, pit trading accounted for an average of 12 percent of total trading and electronic trading the remaining 88 percent. Figure 2 displays the share of pit and electronic trading from January 2003 through April 2009 for corn, soybeans, and wheat futures contracts. Around the beginning of 2007, electronic trading became the dominate futures trading platform for these commodities.

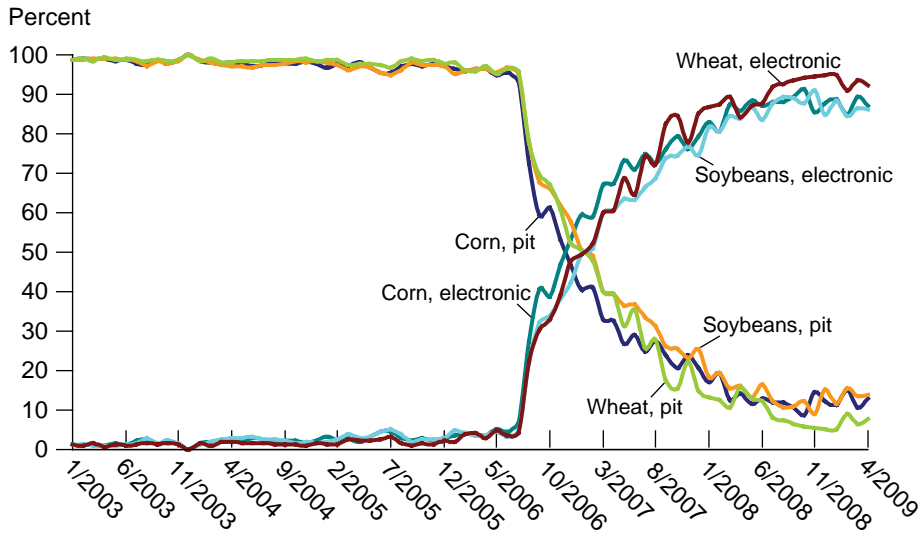
### New Products and Participants

Commodity futures and options exchanges have provided new products and market instruments in response to the growing need for risk management and investment alternatives. These new derivative products (such as swaps based on futures and options and interest rate and foreign exchange market instruments) have attracted a new set of participants that are using the markets in different ways. Furthermore, investors are finding new uses for the traditional agricultural futures products and are directing large sums of money into these markets. For example, the number of futures contract maturities simultaneously traded per commodity has increased between 2000 and 2008, as participants, such as spread traders, have found a need to trade further into the future (table 2).<sup>11</sup> Exchanges add additional maturities based on participant activity and demand.

<sup>11</sup>Contracts for corn, soybeans, and wheat have five, seven, and five contract maturities per year, respectively.

Figure 2

**Share of volume in pit trading versus electronic trading for CME Group/CBOT corn, soybeans, and wheat futures, January 2003-April 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: All volume represents futures contracts only traded on the CME Group/CBOT. Volume percentage represents all maturities trading. Data starts in 2003 due to availability.

Source: CME Group/CBOT, CME Group FTP DATA, <http://www.cmegroup.com/CmeWeb/ftp.wrap/webmthly>.

Table 2

**Average daily number of CME Group/CBOT maturity contracts traded per commodity**

Year	Corn	Soybeans	Wheat
		<i>Number</i>	
2000	9.0	9.3	8.3
2001	9.2	9.9	8.3
2002	10.6	10.4	8.1
2003	9.6	9.3	7.2
2004	9.8	9.6	7.4
2005	10.5	10.7	7.8
2006	11.1	11.1	8.9
2007	11.5	10.3	8.0
2008	11.4	13.7	9.7

CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

## Why Some Consider Commodities an Asset Class

Commodities have been considered a sensible investment alternative during periods of inflation, economic uncertainty, and weak U.S. currency. Investments in commodities are used to balance a portfolio of traditional assets and to reduce volatility because they are not usually highly correlated with other investments in a portfolio. At the CFTC's Agricultural Forum held on April 22, 2008, Doug Hepworth of Gresham Investment Management described the benefit as follows, "Starting with a portfolio consisting of 40 percent debt and 60 percent equities, a 5-percent commodity exposure was added and subsequently decreased volatility by 5 percent of the portfolio based on 196 rolling 5-year periods beginning in 1987 (Hepworth, 2008)."

The nearby futures contract prices and the Standard & Poors (S&P) 500 share prices are shown in figures 3, 4, and 5 for corn, soybeans, and wheat, January 2000 through April 2009. These figures reveal a weak correlation between the futures prices and share prices. Table 3 similarly reflects weak correlation between returns for the 10-year period 1/2000-4/2009 and the recent 3-year period 1/2006-12/2008.<sup>12</sup> The weak correlation between agricultural commodity prices and large capitalization stock values explains how diversification can be achieved by using commodities as an asset class thereby reducing overall risk of a portfolio. While the correlations were higher for corn and wheat in the most recent period 1/2009-4/2009, one may not want to rely on such a short period to make any definitive statements or change investment strategies.

<sup>12</sup>Returns for futures contracts are based on price changes and returns for the S&P 500 are based on price changes plus dividends.

Table 3

### Correlations between S&P 500 and CME Group/CBOT futures returns on weekly data

Commodity	1/2000-4/2009	1/2006-12/2008	1/2009-4/2009
	<i>Correlation coefficient<sup>1</sup></i>		
Corn	-0.020	0.095	-0.439
Soybeans	.062	.112	-.038
Wheat	.106	.189	.683

<sup>1</sup>The correlation coefficient represents the degree of linear relationship between two variables. A perfect positive linear relationship would be represented by a 1, and a perfect negative linear relationship would be represented by a -1. Values in between 1 and -1 represent differing degrees of linear relationship.

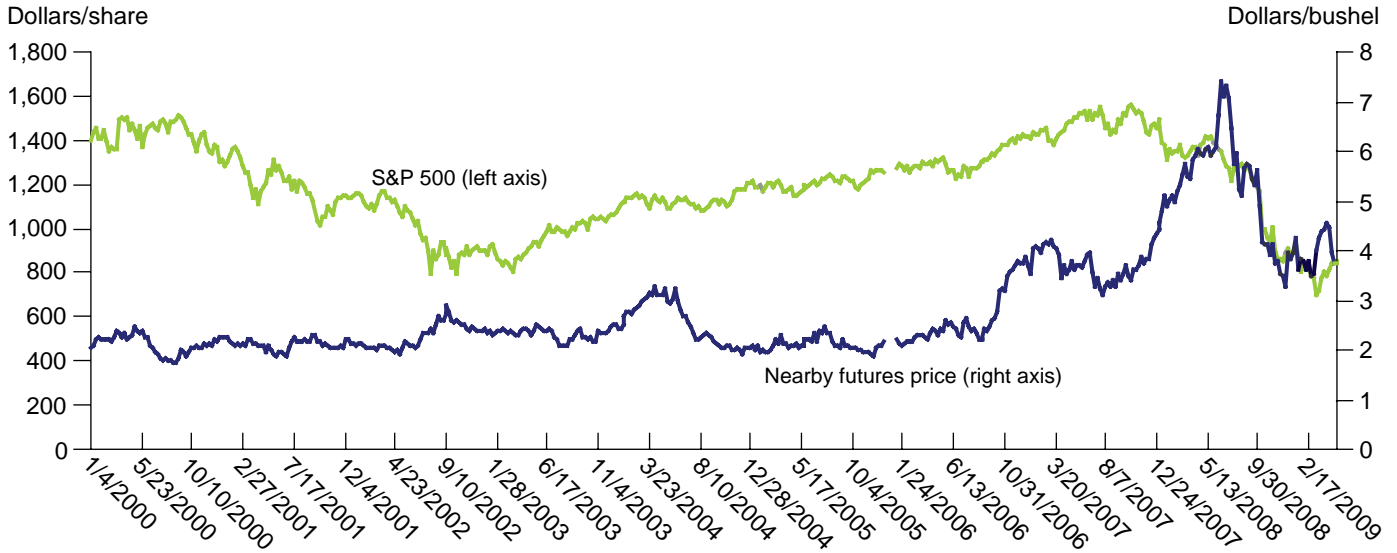
S&P = Standard and Poors; CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Note: Futures prices are nearby contract CME Group/CBOT prices.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>; Yahoo Finance, <http://www.finance.yahoo.com>.

Figure 3

**Weekly prices of nearby CME Group/CBOT corn futures and S&P 500 shares, January 4, 2000-April 28, 2009**



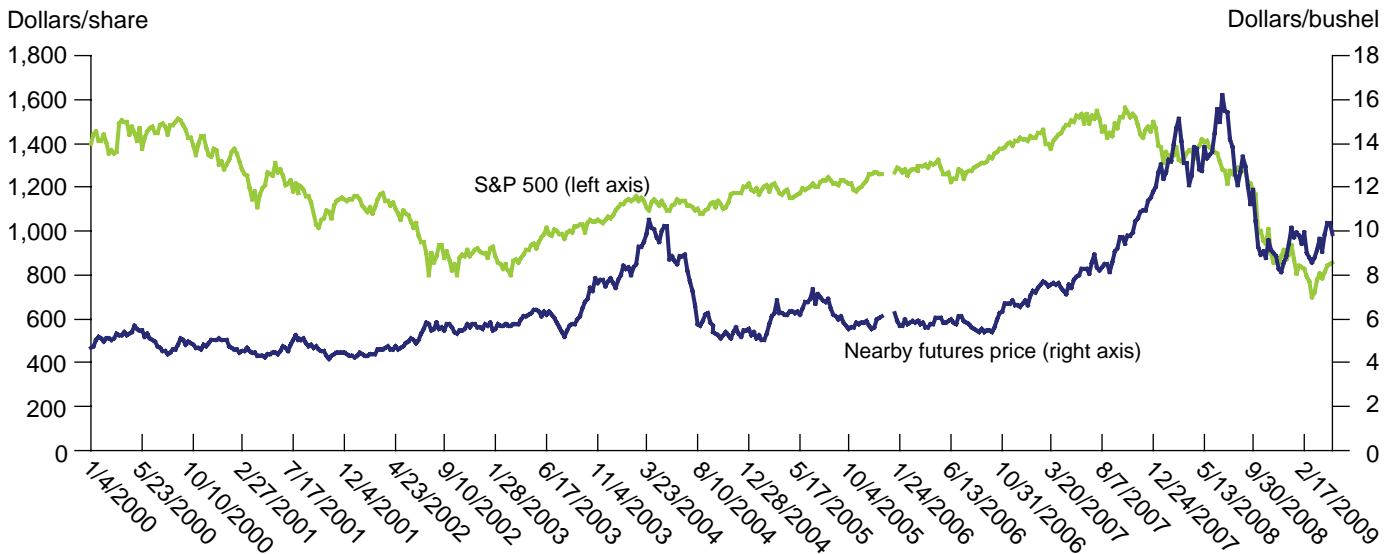
S&P = Standard and Poors; CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Nearby prices are the nearby futures contract on the date specified on the x-axis. The nearby futures price is rolled to the next deferred contract on the last day of the month before the expiration month of the nearby contract.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>; Yahoo Finance, <http://www.finance.yahoo.com>.

Figure 4

**Weekly prices of nearby CME Group/CBOT soybean futures and S&P 500 shares, January 4, 2000-April 28, 2009**



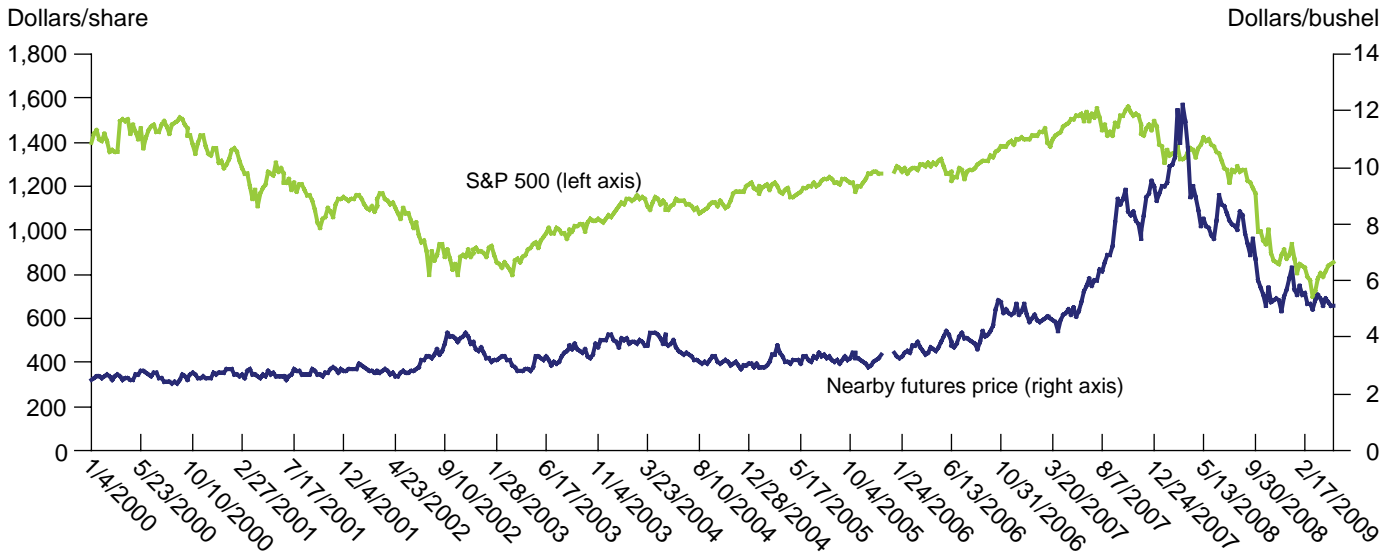
S&P = Standard and Poors; CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Nearby prices are the nearby futures contract on the date specified on the x-axis. The nearby futures price is rolled to the next deferred contract on the last day of the month before the expiration month of the nearby contract.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>; Yahoo Finance, <http://www.finance.yahoo.com>.

Figure 5

**Weekly prices of nearby CME Group/CBOTwheat futures and S&P 500 shares, January 4, 2000-April 28, 2009**



S&P = Standard and Poors; CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Nearby prices are the nearby futures contract on the date specified on the x-axis. The nearby futures price is rolled to the next deferred contract on the last day of the month before the expiration month of the nearby contract.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>; Yahoo Finance, <http://www.finance.yahoo.com>.

## Role and Objectives of New Market Traders

The new participants who are the focus of controversy in the commodities world are index funds and selected speculative funds traders, such as swap dealers and managed funds traders. Commodity index funds made a significant appearance around 2004. Although index fund traders look like speculators, unlike speculators, their investment style is not based on a view about current or expected individual commodity prices, but rather on gaining long-side exposure to a broad index of commodity prices in an unleveraged and passively managed manner. Their goal is to gain diversification in their investment portfolio.<sup>13</sup> They usually do not reduce their position unless forced to by client withdrawals from their money pool. Fund managers use this strategy for assets in an entire fund, or as part of a larger fund, and are commonly called “long-only” or “perma-long” investors because they consistently hold a long position.<sup>14</sup>

In many cases, the index funds are sold in shares to investors, with the fund manager charging fees for the service of providing the investment vehicle. To hedge the risks of selling a basket of commodity market prices to consumers, index funds buy futures contracts of the commodities in proportion to the fund’s weighted index. Index funds are used by investors to reduce their portfolio risk via diversification or as a hedge against inflation.

The index funds commonly invest and rebalance by following a broad index of commodities; the two most popular indices are the Standard and Poors-Goldman Sachs Commodity Index (S&P GSCI) and the Dow Jones-AIG Commodity Index (DJAIGCI). The S&P GSCI is more heavily invested in energy, and the DJAIGCI is less invested in energy because of its stipulation that one group of commodities cannot account for over 33 percent of the index and no single commodity can be less than 2 percent or greater than 15 percent of the index (table 4).

Index funds generally are not involved in the physical commodity markets and so have no physical market transactions to hedge in futures contracts. Index funds are entitled to a hedge exemption that classifies them as commercial traders and subjects them to lower initial margin deposits than it does speculators.<sup>15</sup> The large index funds sell a commodity index to customers and then take long futures positions in each of the specified market basket commodities. The selling and buying transactions are construed as a hedge by the CFTC, just as the offsetting position that commercial producers, merchants, and users of commodities take to manage their own risks in the futures market is considered a hedge. But unlike traditional hedgers, index funds are selling a market basket of futures prices to investors, not a market basket of physical commodities.

The swap dealer is an old player with a new purpose. The swap dealer sells an over-the-counter (OTC) swap contract to customers (such as a corn grower who wants to fix a price to sell corn at a future date) and in turn hedges his or her price exposure with futures positions in corn or other commodities. In essence, the two parties are “swapping” payment streams. The benefit to the commercial grower of using a swap dealer is commodity price protection through a fixed price, customized transaction amount, and pricing dates; cash

<sup>13</sup>Prior to the CFTC’s new commodity index trading report, these traders were mostly classified in the commercial category. Many of the trades that compose an index are conducted through swap dealers who are classified as commercial traders because they use the futures market for risk management. For more information, see (CFTC, 2006).

<sup>14</sup>See glossary for definitions of trading terms.

<sup>15</sup>See CFTC, 2008e, pp. 13 and 14, for additional details.

settlement (typically); and no complex exchange-traded brokerage or margin calls. In exchange for these benefits, the swap dealer collects a fee for the service. Customers assume the risk of a swap dealer not upholding its end of the contract. Swap dealers are considered commercial traders because they hedge financial risk and therefore are granted a hedge exemption that allows them to hold larger positions than noncommercial traders can. The traditional swap dealer provides “short” exposure to the futures markets for growers or other commodity handlers. The nontraditional swap dealer provides “long” exposure to the futures markets for institutional traders, such as large pension funds, commonly to facilitate the investment in a commodity index fund. The traditional commercial swap trader predominantly hedges long swap positions with short futures contracts; nontraditional swap dealers frequently hedge short swap positions with long futures contracts.

Figure 6 illustrates how index funds interact with swap dealers. An index fund has 10 investors with \$1,000 dollars invested each, giving the index fund a total of \$10,000 dollars. The swap dealer is hired by the index fund for a fee to invest the \$10,000 in a specific basket of commodity futures contracts in the proportions desired. Typically, the fund will pay the appropriate initial margin—for instance, 6 percent—leaving \$9,400 for the index fund to invest in a low-risk money market account to be used for any maintenance margins or fees and to accumulate a small return on interest payments. The investors taking the opposite side of the swap dealers are commonly commercial hedgers or speculators using the futures market for their own purposes.

Another trader in the futures market receiving increased scrutiny is the managed fund. Although managed funds trading in futures markets and their

Table 4

**Commodity index components for the Standard and Poors-Goldman Sachs Commodity Index (S&P GSCI) and Dow Jones-AIG Commodity Index (DJAIGCI)**

Commodity	S&P GSCI	DJAIGCI	Commodity	S&P GSCI	DJAIGCI	Commodity	S&P GSCI	DJAIGCI
	----Percent----			----Percent----			----Percent----	
Energy	77.28	33.00	Industrial metals	5.97	19.97	Precious metals	1.72	10.12
Crude oil	39.96	13.16	Aluminum	2.17	7.11	Gold	1.50	7.40
Brent crude oil	14.50	—	Copper	2.63	7.04	Silver	.22	2.72
Unleaded gas	4.52	3.78	Lead	.25	—			
Heating oil	5.27	3.82	Nickel	.54	2.79			
Gas oil	5.40	—	Zinc	.38	3.03			
Natural gas	7.63	12.24						
Agriculture and softs	12.10	29.47	Livestock	2.94	7.44			
Wheat	3.22	4.70	Live cattle	1.70	4.89			
Red wheat	.77	—	Feeder cattle	.31	—			
Corn	3.78	5.66	Lean hogs	.93	2.55			
Soybeans	2.08	7.63						
Cotton	.73	2.48						
Sugar	.83	3.19						
Coffee	.47	3.00						
Cocoa	.22	—						
Soybean oil	—	2.81						

— = Not applicable.

Note: S&P GSCI components as of 6/19/2008. DJAIGCI as of 6/19/2008.

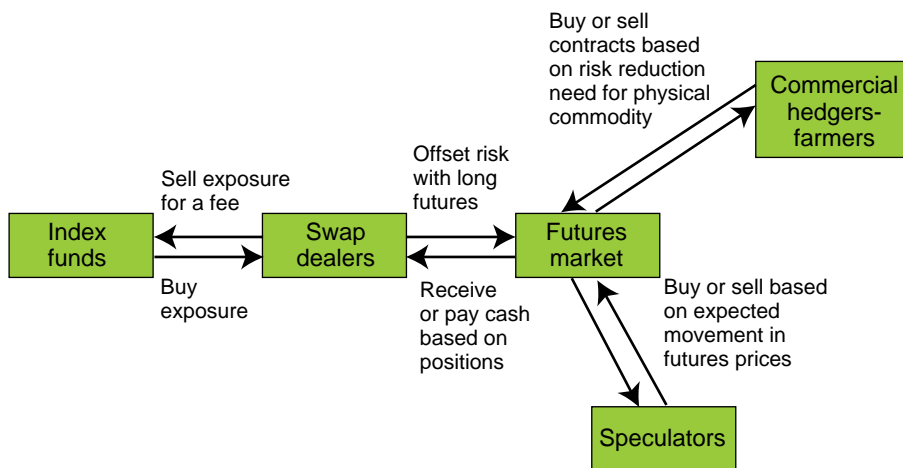
Sources: S&P GSCI, <http://www2.goldmansachs.com/services/securities/products/sp-gsci-commodity-index/tables.html>; DJAIGCI, <http://www.djindexes.com/aig/index.cfm?go=home>.

effect on price discovery has been an issue for several decades, one change in the managed money investment category is the increasing ease with which retail investors can gain access to basic agricultural commodities. Thus, while index funds have been receiving most of the scrutiny in recent years, managed money funds' greater ability to access basic agricultural commodities has also brought them under renewed scrutiny. Managed money includes commodity funds, investment funds, hedge funds, and sovereign wealth funds. To roughly define each group, the *commodity fund* is a managed portfolio made up strictly of commodities; the *investment fund* is a portfolio with commodities in addition to traditional assets, such as equities and bonds; and the *hedge fund* has a position in a variety of assets and can invest in more complex and riskier investments than other investment funds can. Hedge funds are private investment funds that typically require larger overall net wealth for investors to participate than do other investment funds. Finally, a *sovereign wealth fund* (SWF) is owned by the sovereign State or government as the key shareholder. The fund is managed separately from traditional reserves and is composed of financial assets, such as stocks, bonds, property, or other financial instruments. SWFs grew 24 percent per year since 2002 to around \$3.5 trillion by the end of 2007. The wide-ranging group of managed funds functions as speculators and is different from index funds because managed funds are actively managed in that futures contracts are bought and sold in anticipation of favorable price moves in contrast with the passively managed index funds.

These new participants, including nontraditional swap dealers, commodity funds, index funds, managed funds, and other speculators, have altered the mix of investors in the futures markets. Traditional commercial traders are hedgers interested in the underlying cash market and are normally commodity producers, commodity merchants, manufacturers, and processors who use futures markets to reduce risk and maximize profits.<sup>16</sup> The dual purpose of risk reduction and profit maximization explains the role of hedgers in moving prices toward fundamental value. A concern is that index funds are less interested in fundamentals and more interested in investor demand for diversification. The question then becomes: What is dominating the market movement of agricultural futures prices, asset fundamentals, or other objectives to futures trading? This important question is currently

<sup>16</sup>If an existing or expected cash position is compensated for via an opposite future, the market participant is classified as a hedger.

Figure 6  
**Schematic showing how an index fund works**





unresolved. Widespread skepticism about the impact of nontraditional investors on futures market performance is exemplified by a *Wall Street Journal* article:

*Enterprises like Exxon and Newmont Mining are profit-making because they create value. The purchase of shares in such enterprises reflects the investment manager's analysis of that value creating process and the resultant profit-making potential. In contrast, commodities such as crude oil and gold do not, in and of themselves, create value. The purchase of crude oil by Exxon from an independent driller represents a business expense. Purchase of crude oil futures by Calpers represents speculation. Over time, stock prices go up in real terms because of the value-creation process, commodity prices do not* (Riley, 2008).

The bottom line here is not speculation versus value creation, but whether or not speculators and other nontraditional traders are harming (or adding value to) futures markets. A U.S. Senate study argues that the activities of long-only index funds increase wheat futures prices above what would be explained by supply and demand fundamentals, leading to convergence problems between cash and futures prices (U.S. Senate, 2009). Alternative arguments abound that futures markets function well. For example, “The presence of the well-established forward and cash market protects the futures market. If the futures market were temporarily or systematically manipulated, arbitrageurs would rush in to eliminate the abnormality” (Carlton, 1984). In addition, Irwin et al. (2009a) provide evidence that defends the role and effect of speculators, including index traders, by presenting logical flaws, inconsistent facts, and historical research. Sanders et al. (2008) show that speculation compared with hedging is not misaligned in agricultural futures markets, which contradicts the hypothesis of excess speculation. An Informa study (2008) found very little evidence that trader groups, index funds, and managed money were routinely detrimental to any of their studied commodity markets.

## Futures Markets Structure: Volume-to-Open Interest Ratios, Price Volatility, and Net Trader Positions

What changes have occurred within the futures market as a result of the influx of new entrants into futures markets? The variables that we examine to answer this question include the volume-to-open interest ratio (a measure of liquidity), price volatility, price levels, and aggregate net trader positions. Although we did not isolate whether a particular type of trader, such as an index trader, is responsible for changes in liquidity, price volatility, or price levels, we did document what happened to the general level of these variables. Where possible, we examine how these data for corn, wheat, and soybean futures contracts change between three periods: 1/2000-12/2005, a time with less trading in index and managed funds and more stable prices; 1/2006-12/2008, a time with increasing prices and large amounts of trading in index and managed funds; and 1/2009-4/2009, a more recent time with decreasing prices and somewhat less trading in index and managed funds.

### Volume-to-Open Interest Ratio

The ratio of volume to open interest is referred to as the “turnover ratio,” a measure of liquidity.<sup>17</sup> Higher ratios indicate a greater turnover in futures contract ownership, or an increase in liquidity. One would expect the turnover ratio to decline as the number of index traders increases relative to other market participants. We found that the average ratio for soybean and wheat contracts declined in 1/2006-12/2008 relative to 1/2000-12/2005, whereas the average ratio for corn contracts increased.<sup>18</sup> However, the difference between the average ratios of the two periods for corn, soybeans, and wheat was statistically insignificant (table 5).

The monthly ratio for corn, soybeans, and wheat futures contracts for January 2000 to April 2009 is shown in figure 7. The volume and open interest ratios in figure 7 contain all trader categories for all contract maturities; thus, index traders who buy and hold futures are adding to open interest but creating very minimal trading volume. Volume is the number of purchases and sales of futures contracts for a given commodity during a month. Open interest is

<sup>17</sup>Volume must be twice open interest to turn over all ownership because each contract has a buyer and a seller. When a contract is both sold and bought by different people, it creates a volume of two but only an open interest of one. Thus, to completely turnover a contract’s ownership, the ratio of volume to open interest must be 2 to 1.

<sup>18</sup>An Informa study (2008) found increased liquidity for CME Group/CBOT corn and wheat contracts but over a much shorter period between 2005 and 2008.

Table 5  
**Comparison of average monthly ratio of volume to open interest for CME Group/CBOT corn, soybeans, and wheat, futures contracts**

Commodity	Average ratios, calendar years			Statistical test for means comparison			
	1/2000-12/2005	1/2006-12/2008	1/2009-4/2009	1/2000-12/2005 vs. 1/2006-12/2008		1/2006-12/2008 vs. 1/2009-4/2009	
				T-test	P-value <sup>1</sup>	T-test	P-value <sup>2</sup>
	-----Percent-----						
Corn	3.40	3.68	5.05	-0.31	0.756	1.36	0.181
Soybeans	6.47	6.09	9.14	.22	.826	2.02	.050
Wheat	4.51	4.03	4.67	.38	.708	.51	.614

CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

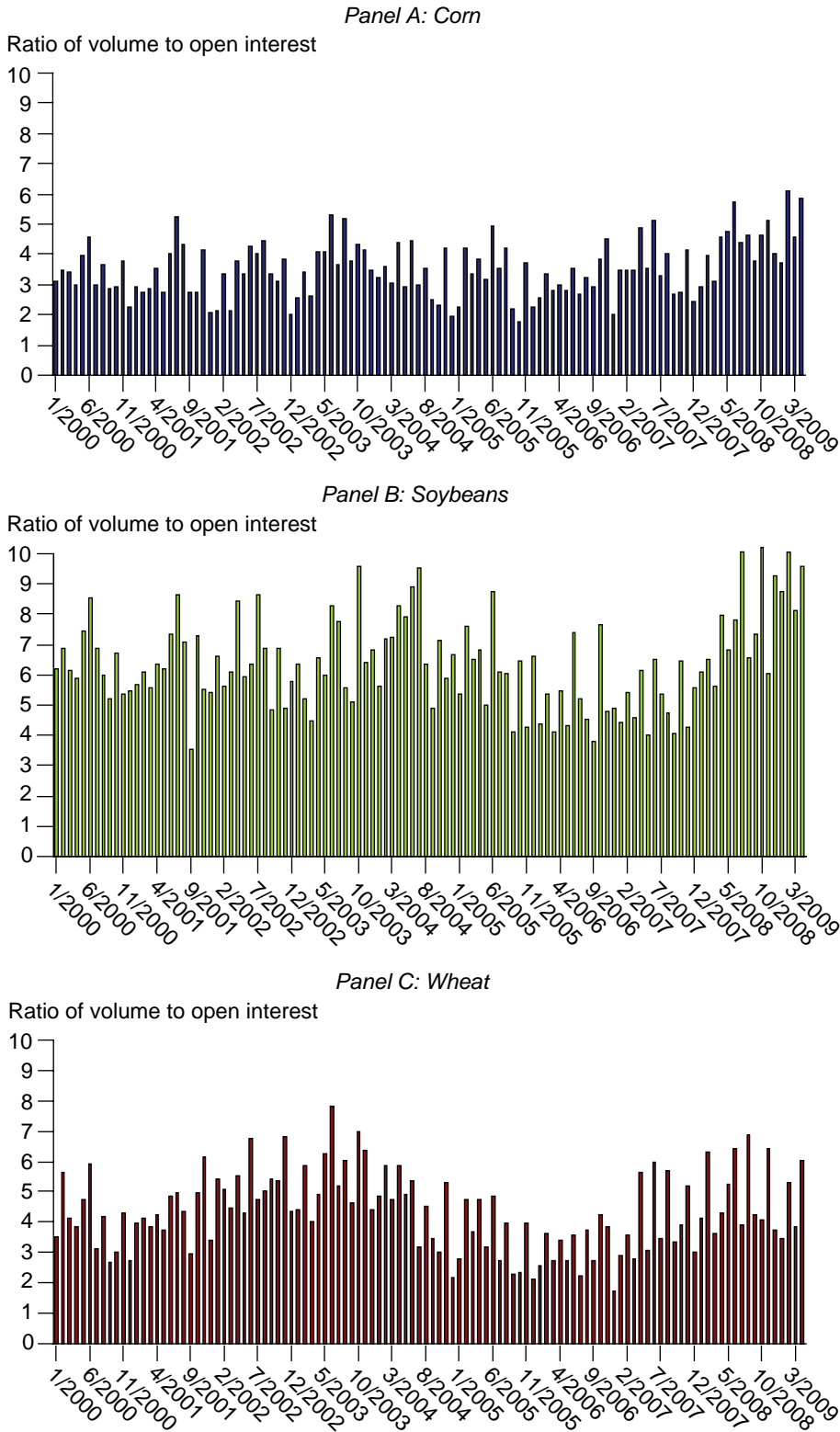
<sup>1</sup>Mean ratios do not differ at a significant statistical level.

<sup>2</sup>Mean ratios do not differ at a significant statistical level, except for soybeans.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 7

**Monthly volume-to-open interest ratios for CME Group/CBOT corn, soybeans, and wheat futures, January 2000-April 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Open interest is the open interest on the last day of the month. Volume is the total volume traded in all contracts for that commodity for the specified month.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

the number of either long or short outstanding futures contracts of a given commodity that have neither been offset by opposite futures or options transactions nor fulfilled by delivery of the commodity. For example, the wheat volume-to-open interest ratio in February 2000 was 5.67, volume was 691,068 contracts, and open interest was 121,916 contracts (fig. 7, panel C). In May 2008, this ratio was 5.23, volume was 1,857,866 contracts, and open interest was 355,198 contracts. Each contract has a buyer and a seller, but for calculation of open interest, only one side of the contract is counted.

When examining the period 1/2009-4/2009, we find that each commodity's ratio has increased compared with the 1/2006-12/2008 period. However, this more recent period contains only four observations, and the average ratio for each commodity may be viewed as having too few observations to form any meaningful conclusions, including the statistical tests for the mean differences.

## Price Volatility

A major concern regarding the participation of noncommercial traders in futures markets is whether their participation has led to increased price volatility. Three common explanations of how volatility may be influenced include (1) information flows that commonly occur on a seasonal basis due to crop conditions or to the changing information available as time to maturity decreases in futures contracts, (2) economic variables based on supply and demand conditions, and (3) market structure, which refers to the relative positions of speculators and hedgers and the role of traders in futures markets (Streeter and Tomek, 1992). Recently, much attention has been given to the influence of market structure on volatility, with speculators blamed for creating excessive volatility through their trading. Although the average level of volatility was found to have increased, the differences between periods was found to be statistically insignificant.

Futures price volatility is measured by comparing the absolute value of the daily percentage change in the natural logarithm of closing prices between three periods: 1/2000-12/2005, 1/2006-12/2008, and 1/2009-4/2009.<sup>19, 20</sup> Corn, wheat, and soybean price volatility appears to increase over time (table 6). However, the difference in means between the periods 1/2000-12/2005 versus 1/2006-12/2008 and 1/2006-12/2008 versus 1/2009-4/2009 was not statistically different from the comparison period 1/2006-12/2008. Figures 8, 9, and 10 show the absolute percentage price changes for corn, soybeans, and wheat futures prices. The figures are consistent with the results in table 6 and show a general increase in corn, soybeans, and wheat price volatility. The volatility spike in soybeans around the end of June 2004 was due to wet weather, tight stocks, and fewer than expected acres planted (Ash and Dohlman). An Informa study (2008) found increased volatility for grains and soybeans during their study period 2005-08. They found no persuasive evidence that index traders or money managers caused increased volatility.

<sup>19</sup>Price change is calculated as the natural logarithm from one future's closing price minus the natural logarithm of the next closing price. This measure of price change has become the standard since its use in the Black-Scholes option pricing model (Black-Scholes, 1973).

<sup>20</sup>The three periods were selected to capture a historical period as previously defined.

Table 6

**Comparison of average absolute daily percentage changes of the natural logarithm of closing CME Group/CBOT futures prices for corn, soybeans, and wheat**

Commodity	Average absolute price change, calendar years			Statistical test for means comparison			
	1/2000-12/2005	1/2006-12/2008	1/2009-4/2009	1/2000-12/2005 vs. 1/2006-12/2008		1/2006-12/2008 vs. 1/2009-4/2009	
				T-test	P-value <sup>1</sup>	T-test	P-value <sup>1</sup>
	-----Percent-----						
Corn	1.10	1.74	1.91	-0.50	0.614	0.09	0.929
Soybeans	1.14	1.35	1.67	-.18	.858	.24	.807
Wheat	1.29	1.89	2.12	-.44	.657	.14	.890

CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

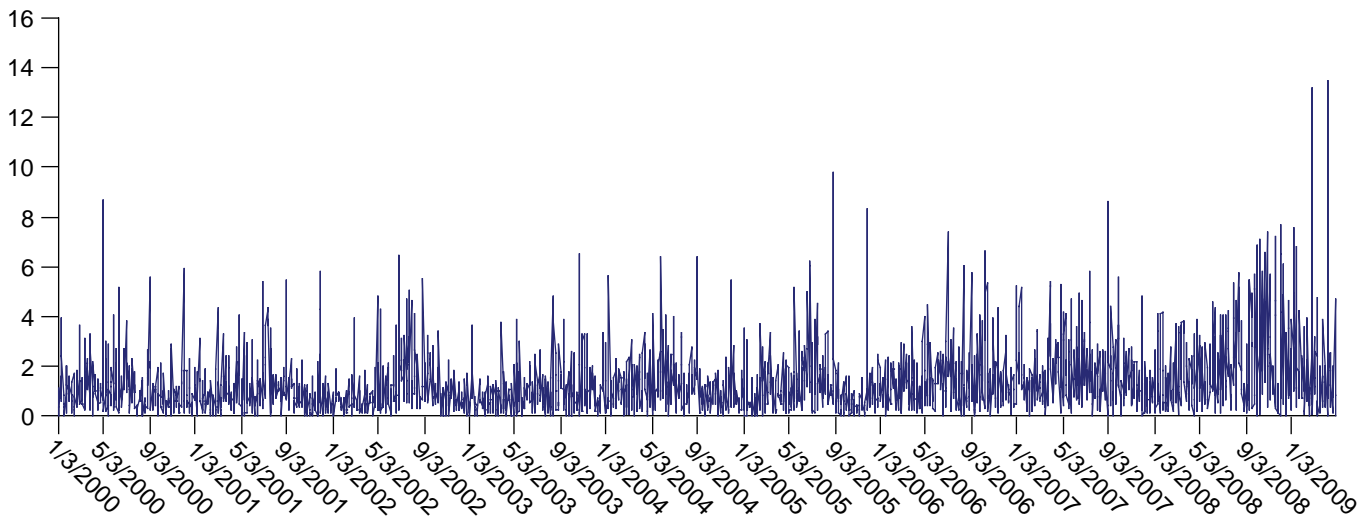
<sup>1</sup>The mean percentage change increased from one period to the next, but statistically, the means are not different when compared with the 1/2006-12/2008 period.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 8

**Absolute daily natural logarithm percentage change in nearby CME Group/CBOT corn futures closing prices, January 2000-April 2009**

Percentage change

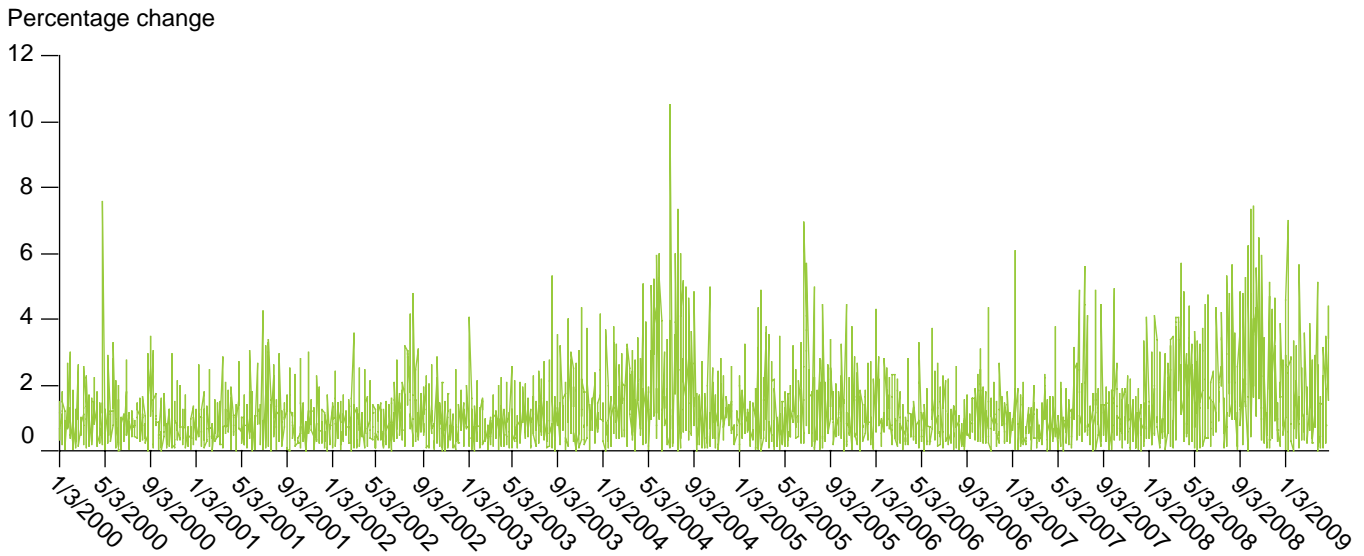


CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 9

**Absolute daily natural logarithm percentage change in nearby  
CME Group/CBOT soybean futures closing prices, January 2000-April 2009**

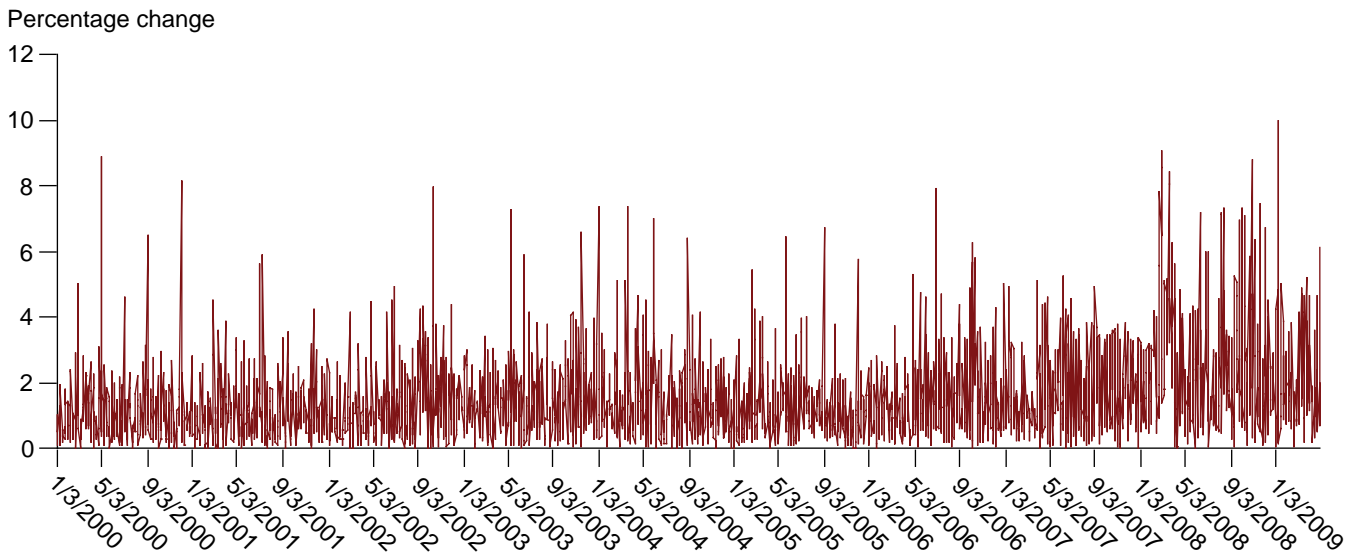


CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 10

**Absolute daily natural logarithm percentage change in nearby  
CME Group/CBOT wheat futures closing prices, January 2000-April 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Source: CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

## Net Positions of Traders and Price Levels

Another concern regarding the participation of new traders and new capital in futures markets is that they are affecting the level of prices. The weekly net positions of trader groups and the nearby futures price from 1/3/2006 to 4/30/2009 are shown in figures 11, 12, and 13. Here, commercial traders are defined as hedgers, noncommercial are speculators, index traders are passive investors, and nonreporting traders are those whose positions are too small to require reports to be filed. Correlations between the changes in net positions of these traders and the changes in nearby price were examined for the periods 1/2006-12/2008 and 1/2009-4/2009. As expected, index traders were found to be less correlated than noncommercial traders or commercial traders.

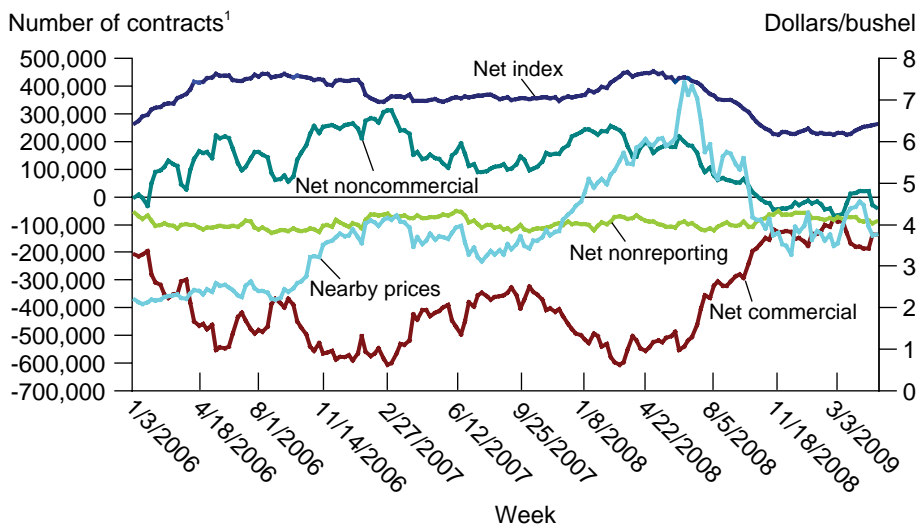
The *Commitments of Traders Report* (COT) is published weekly by the CFTC and reports, among other items, open interest for commodities, as well as the long and short positions of this open interest. In January 2007, the *Commitments of Traders Supplement Report* (CIT) was created. This report separates index traders from commercial and noncommercial traders, with the separation computed retroactively starting in January 2006 (CFTC, 2006).<sup>21</sup>

The net index positions for corn, soybeans, and wheat have generally risen and then declined somewhat for the period 1/2006-12/2008, and have remained more stable during 1/2009-4/30/2009, as have their nearby futures prices (figs. 11, 12, and 13). Index funds control a somewhat fixed amount of the open interest that is essentially “tied up” because index funds generally

<sup>21</sup>The CIT numbers used here include both futures and delta-adjusted options. “Delta” is measured as the change in price of an option for every 1-point move in the price of the underlying security. Delta-adjusted indicates that a mathematical alteration is made to the options positions to make them equivalent to futures positions.

Figure 11

### Net trader positions and nearby prices for CME Group/CBOT corn futures, January 3, 2006-April 28, 2009



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

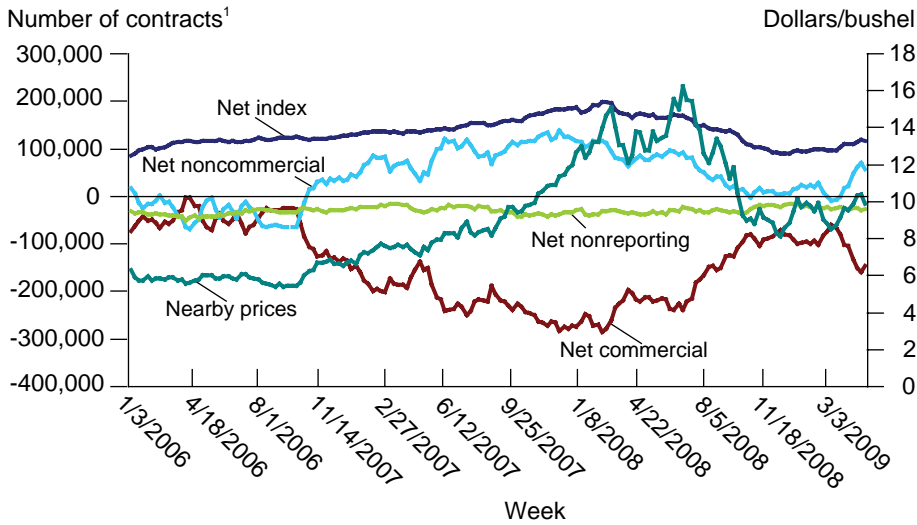
Notes: Net commercial = Commercial longs minus commercial shorts. Net noncommercial = Noncommercial longs minus noncommercial shorts. Net index = Index longs minus index shorts. Net nonreporting = Nonreporting longs minus nonreporting shorts.

<sup>1</sup>Net shorts are shown in the negative quadrant; net longs are shown in the positive quadrant.

Sources: Commodity Futures Trading Commission, Commitments of Traders Reports, Commodity Index Trader Supplement, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html); CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 12

**Net trader positions and nearby prices for CME Group/CBOT soybean futures, January 3, 2006-April 28, 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

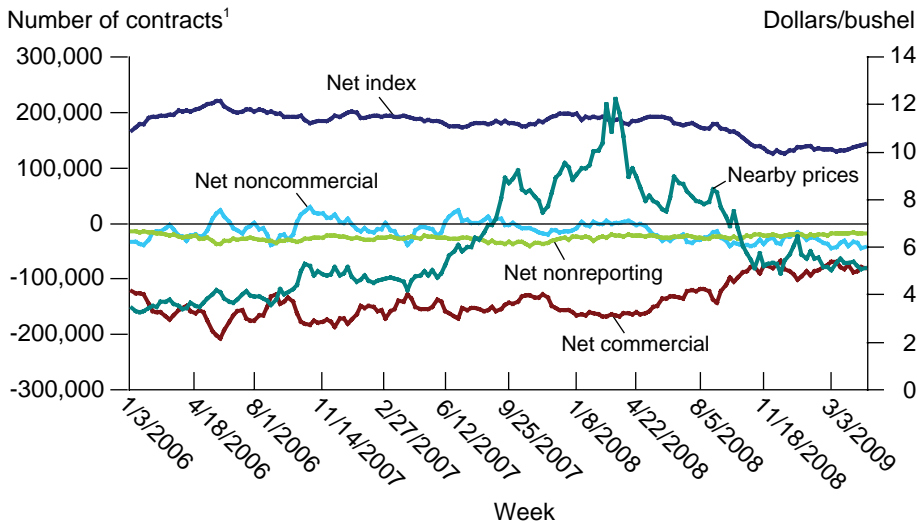
Notes: Net commercial = Commercial longs minus commercial shorts. Net noncommercial = Noncommercial longs minus noncommercial shorts. Net index = Index longs minus index shorts. Net nonreporting = Nonreporting longs minus nonreporting shorts.

<sup>1</sup>Net shorts are shown in the negative quadrant; net longs are shown in the positive quadrant.

Sources: Commodity Futures Trading Commission, Commitments of Traders Reports, Commodity Index Trader Supplement, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html); CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 13

**Net trader positions and nearby prices for CME Group/CBOT wheat futures, January 3, 2006-April 28, 2009**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Net commercial = Commercial longs minus commercial shorts. Net noncommercial = Noncommercial longs minus noncommercial shorts. Net index = Index longs minus index shorts. Net nonreporting = Nonreporting longs minus nonreporting shorts.

<sup>1</sup>Net shorts are shown in the negative quadrant; net longs are shown in the positive quadrant.

Sources: Commodity Futures Trading Commission, Commitments of Traders Reports, Commodity Index Trader Supplement, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html); CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.



buy and hold, although these funds also have to reduce their position if investors withdraw their funds. While net index positions changed somewhat, this change was more gradual compared with the change in net positions for the noncommercial or commercial traders. Index funds were in a net long position during the period 1/2006-12/2008 and have remained so for the 1/2009-4/30/2009 period. Index funds' share of long open interest averaged 23, 25, and 41 percent for corn, soybeans, and wheat, respectively, during the 1/2006-12/2008 period. The share of long open interest for corn index funds during 1/2006-4/30/2009 remained the same, whereas soybeans and wheat each gained 1 percentage point. For the CME Group/CBOT wheat contract, index traders net long positions were about 200,000 contracts in early crop year 2007, or 1 billion bushels, which is about half of the size of the 2007 crop of 2 billion bushels of all wheat types in the United States, or about 2.8 times the size of the annual 2007 crop of soft winter wheat.<sup>22</sup>

Noncommercial traders consist of many trader types. For example, momentum traders seek out assets that are rallying and follow the price trend or investment funds. Investment funds are created in "boom" times for various markets—that is, when prices are on an upward swing, investors of all sizes want a vehicle by which to include these assets in their broader portfolio. Table 7 displays yearly changes from January 2006 to April 30, 2009 for corn, soybeans, and wheat nearby futures prices and net trader positions. Generally, the noncommercial traders have the largest variation in net open interest, especially for corn, for which the net noncommercial category went from net short to net long and back to net short. Net positions for corn, soybean, and wheat index traders increased during 2006 and 2009, but only

<sup>22</sup>The CME Group/CBOT wheat contract is technically designed to allow for delivery of No. 2 Soft Red Winter, No. 2 Hard Red Winter, No. 2 Dark Northern Spring, and No. 2 Northern Spring at par and No. 1 Soft Red Winter, No. 1 Hard Red Winter, No. 1 Dark Northern Spring, and No. 1 Northern Spring at 3 cents per bushel over the contract price. The CBOT wheat contract is commonly used by traders for all wheat classes because of its liquidity and volume. However, the higher cash market prices for the other classes of wheat relative to Soft Red Winter make delivery against the CME Group/CBOT contract impractical for other classes.

Table 7

**Category comparison for CME Group/CBOT corn, soybeans, and wheat contracts, January 2006-April 2009**

Item	Levels					Percent change in positions and prices			
	1/3/06	1/3/07	1/8/08	1/6/09	4/28/09	1/06-1/07	1/07-1/08	1/08-1/09	1/09-4/09
	-----Number of contracts-----					-----Percent-----			
<b>Corn:</b>									
Net commercial (OI)	-206,650	-566,561	-514,003	-177,664	-135,988	174	-9	-65	-23
Net noncommercial (OI)	-746	247,646	244,620	-12,302	-38,083	333	-1	-105	210
Net index (OI)	264,624	421,579	367,720	246,609	261,785	59	-13	-33	6
Net nonreporting (OI)	-57,229	-102,664	-98,338	-56,643	-87,714	79	-4	-42	55
Nearby price (\$/bushel)	2.18	3.71	4.79	4.12	3.75	70	29	-14	-9
<b>Soybeans:</b>									
Net commercial (OI)	-72,404	-152,630	-274,157	-98,723	-146,999	111	80	-64	49
Net noncommercial (OI)	17,050	47,071	116,086	17,357	57,094	176	147	-85	229
Net index (OI)	86,617	129,727	187,368	96,219	115,921	50	44	-49	20
Net nonreporting (OI)	-31,263	-24,168	-29,297	-14,853	-26,016	-23	21	-49	75
Nearby price (\$/bushel)	6.29	6.82	12.67	9.77	9.90	9	86	-23	1
<b>Wheat:</b>									
Net commercial (OI)	-121,682	-172,589	-165,193	-101,454	-81,098	42	-4	-39	-20
Net noncommercial (OI)	-32,721	-1,094	-8,731	-15,891	-43,351	-97	698	82	173
Net index (OI)	167,666	201,104	197,178	136,417	142,289	20	-2	-31	4
Net nonreporting (OI)	-13,263	-27,423	-23,255	-19,072	-17,839	107	-15	-18	-6
Nearby price (\$/bushel)	3.46	4.77	9.08	6.11	5.11	38	90	-33	-16

OI = Open interest. CME = Chicago Mercantile Exchange. CBOT = Chicago Board of Trade.

Sources: Commodity Futures Trading Commission, Commitments of Traders Reports, Commodity Index Trader Supplement, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html); CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

soybeans showed an increase in net index positions in 2007. The number of net index positions generally declined in all three markets in 2008.

Index traders are considered more passive investors than noncommercials or commercials are. As expected, we found less correlation between the changes in net trader positions and changes in nearby futures prices for index traders than for noncommercials or commercials (table 8). This finding applied to both periods—1/2006-12/2008, when index and managed funds increased, and 1/2009-4/2009, when index and managed funds decreased. However, because of aggregate trader data and a lack of causality, we cannot make any conclusive statement about these new traders affecting price levels.

Furthermore, analytical evidence to date does not indicate that the positions of index funds or speculators cause prices to change (Sanders et al., 2007; CFTC, 2008c, and Informa, 2008) or that speculation is excessive (Irwin et al., 2008). Although a recent U.S. Senate report claims that the activities of long-only index funds increase wheat futures prices above what would be explained by supply and demand fundamentals (U.S. Senate), further research is required to establish causal relationships between these trader positions and changes in futures price levels.

Table 8

**Correlations between changes in traders' net positions and changes in nearby CME Group/CBOT futures price by commodity, January 2006-April 2009**

	Corn		Soybeans		Wheat	
	1/2006-12/2008	1/2009-4/30/09	1/2006-12/2008	1/2009-4/30/09	1/2006-12/2008	1/2009-4/30/09
	<i>Unit</i>					
Commercials	-0.74	-0.72	-0.70	-0.84	-0.56	-0.67
Noncommercials	.61	.58	.57	.74	.52	.55
Index	.26	.39	.41	.52	.20	.20
Nonreporting	.55	.56	.45	.43	-.03	.44

<sup>1</sup>The correlation coefficient represents the degree of linear relationship between two variables. A perfect positive linear relationship would be represented by a 1, and a perfect negative linear relationship would be represented by a -1. Values in between 1 and -1 represent differing degrees of linear relationship.

Sources: Commodity Futures Trading Commission, Commitments of Traders Reports, Commodity Index Trader Supplement, [http://www.cftc.gov/marketreports/commitmentsoftraders/cot\\_historical.html](http://www.cftc.gov/marketreports/commitmentsoftraders/cot_historical.html); CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

If speculative and index traders are not the cause of the increasing prices, then who or what is? Alternative explanations for price increases point to a culmination of many demand and supply fundamentals as outlined in Trostle (2008). An increase in ethanol mandates, foreign demand and purchasing power, number of potential customers in the market, and prices of substitutes has boosted demand for agricultural commodities. Supply has varied because of changes in the weather and increases in prices for crop production inputs, especially those for crude oil, which substantially increased costs of tractor fuel, fertilizer, and transportation.<sup>23</sup>

<sup>23</sup>Following Trostle's (2008) argument, prices have since declined substantially after deterioration in demand both domestically and abroad.

## Problems Arising in Market Performance

In addition to concerns about the level and volatility of prices, questions have been raised about other futures market performance issues, such as the relationship between futures and cash markets and the ability of traditional market players to manage risk. Some evidence shows that the link between futures and the underlying cash price has weakened, resulting in unpredictable and erratic basis levels and lack of normal convergence of cash and futures prices.

Some have alleged that the trading activities of institutional investors are responsible for at least some part of the weakening in the relationship between cash and futures prices (Stallman, 2008). As mentioned earlier and outlined in Irwin et al. (2007), failure of convergence between futures and cash markets affects the risk transfer and price discovery functions of the futures markets (see box, “Effects of a Lack of Convergence Upon a Grain Elevator’s Gross Hedging Returns”). Convergence is defined as the cash and futures prices coming together at contract expiration and hence the basis (cash minus futures price) approaching zero.<sup>24</sup> Transaction costs, such as trading, barge load out, storage, and interest opportunity costs, have an impact on each arbitrage transaction designed to take advantage of a basis relationship. Therefore, convergence is not defined as a basis of zero, but rather, typically, a basis less than 10 cents per bushel.

Arbitrage has recently not insured normal convergence in cash and futures prices for grains. The basis for selected expirations of the December corn contract, November soybeans contract, and July wheat contract are shown in figures 14, 15, and 16. Each figure shows, to varying degrees, the severity of the lack of convergence. Reasons for this lack of convergence include insufficient load-out capacity at delivery locations, lack of incentives to engage in arbitrage, and an outdated delivery system. A higher cost of meeting margin requirements on futures positions has also contributed to increased costs of hedging.<sup>25</sup> Some have asserted that the large long positions held by index funds have had an impact on the cash-futures price link (Coyle, 2008).

Proposed solutions to assure convergence, as outlined by Irwin et al. (2008), include the following:

1. Altering delivery rules to force longs who stand for delivery to take load out within a certain amount of time, which could theoretically force all other longs out before the delivery month and drive down the nearby contract.
2. Changing the futures contract to cash settlement tied to some cash price index instead of physical delivery.
3. Forcing groups with no interest in the underlying commodity to adhere to stricter speculative limits and pay larger margins when trading.
4. Expanding the delivery system to make arbitrage activities easier and less costly.

<sup>24</sup>In a costless transaction and delivery market, the cash price would exactly equal the futures price at contract expiration. If the cash price is less than the futures, the commodity could be bought in the cash market and, simultaneously, a futures contract could be sold short and delivery made. Conversely, if the cash price is greater than the futures price, then a futures contract could be bought and delivery accepted at expiration. These arbitrage opportunities should theoretically keep the cash and futures prices closely related.

<sup>25</sup>Grain merchandisers offer contracts to growers who want to sell grains before harvest to lock in prices. When a merchandiser makes an agreement with a grower to buy his/her grain in the future, the merchandiser then takes a short position in the futures market to offset the risk of the agreement (called a forward contract). If prices increase substantially in the futures markets, the merchandiser must finance margin calls on those positions until the forward contract is fulfilled by the grower and futures positions are closed. A producer desiring to hedge directly on futures markets would likewise face increased trading costs.

## Effects of a Lack of Convergence Upon a Grain Elevator's Gross Hedging Returns

Examples of a grain elevator's storage hedge are used to illustrate the effects from a lack of convergence on a grain elevator's gross hedging returns (see table). Three convergence alternatives are shown in the table, column 1, ranging from full convergence to divergence. The elevator in our example is expecting to earn a storage return when the hedge is terminated (March 1) that is equal to the basis when the hedge is initiated (November 1) for each alternative. That is, the elevator is expecting full convergence.

**Full convergence** is illustrated in the table, alternative 1, line 1. When the elevator initiates a hedge, two transactions are conducted (column 4, line 1). On November 1, the elevator buys 5,000 bushels of cash corn from a farmer for \$3.50 per bushel and simultaneously sells a March corn futures contract (short position in the futures market, 5,000 bushels) for \$3.65 per bushel. Note that the difference between the cash and futures prices (the basis) is  $-\$0.15$  per bushel (cash price less futures price shown in column 2).

When the elevator terminates the hedge on March 1, it sells 5,000 bushels of cash corn for \$3.75 per bushel and purchases (long) a March corn futures contract for \$3.75 per bushel (column 4). Note on March 1, the difference between the cash and futures prices (the basis) is \$0.00 per bushel (column 3). Thus, the elevator earns a storage return equal to \$0.15 per bushel. The hedging gross return per bushel is \$0.015 per bushel, the sum of the cash and futures transactions (alternative 1, column 4). For simplicity, we assume that the basis is expected to be zero when the hedge is terminated and the prices are expected to converge and their difference is zero. (The elevator is assumed to be located at the contract delivery point.)

**Partial convergence** is shown in alternative 2. The cash and futures prices have not quite converged when the hedge is terminated; thus, the gross returns, while still positive, are \$0.10 per bushel, or \$0.05 per bushel less than the full convergence alternative. In this case, the basis at the time of terminating the hedge, while not zero, is still less than the basis at the time of initiating the hedge. Thus, there is still a storage return, although it is less than anticipated.

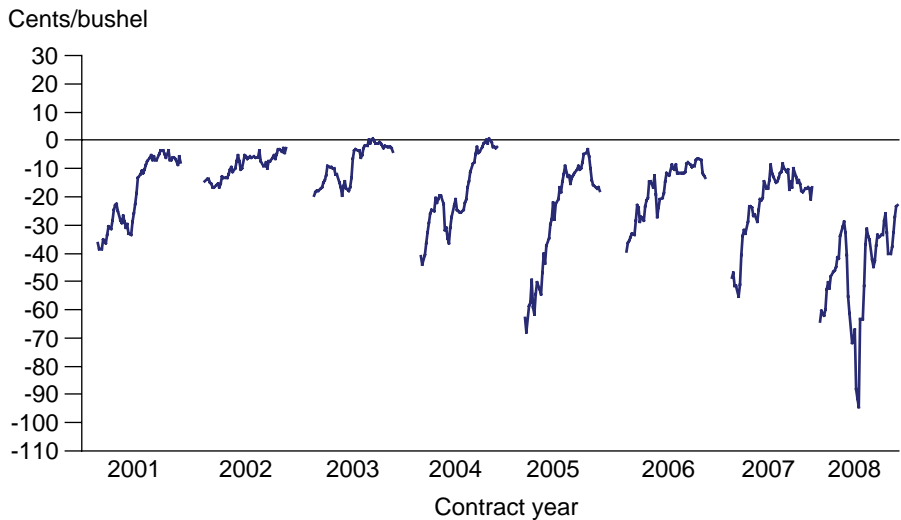
**Divergence** is shown in alternative 3. Since the basis at the time of terminating the hedge (March 1) is greater than the basis at the time of initiating the hedge (November 1), the gross return becomes negative (alternative 3, column 4). Thus, the anticipated storage return turns into a loss instead of the anticipated gain. The grain elevator loses \$0.10 per bushel, or 5,000 bushels x \$0.10 per bushel = \$500 on the transaction, because cash and futures prices have not converged as expected.

The critical unknown variable that determines gross hedging returns when entering a hedge is the basis when the hedge is terminated. Partial convergence reflects a smaller basis when the hedge is terminated than when it is entered, but the basis is larger than expected. This results in positive gross hedging returns but smaller than expected. Divergence results in a larger basis when the hedge is terminated than when initiated and results in negative gross returns.

Effects of alternative futures: Cash convergence patterns on the gross returns of a grain elevator's corn storage hedge				
Column 1	Column 2	Column 3	Column 4	
Alternative convergence patterns	Basis at hedge initiation November 1 (Cash less futures price)	Basis at hedge termination March 1 (Cash less futures price)	Gross returns from storage hedge	
			Cash transactions	Futures transactions
(1) Full convergence	$(\$3.50 - \$3.65) = -\$0.15/\text{bu}$	$(\$3.75 - \$3.75) = \$0.00/\text{bu}$	November 1 purchased cash $-\$3.50/\text{bu}$ March 1 sold cash $+\$3.75/\text{bu}$	November 1 sold short March contract $\$3.65/\text{bu}$ March 1 bought long March contract $-\$3.75/\text{bu}$
			Gross return = $\$0.15/\text{bu} = (+\$0.25/\text{bu cash} - \$0.10/\text{bu futures})$	
(2) Partial convergence	$(\$3.50 - \$3.65) = -\$0.15/\text{bu}$	$(\$3.70 - \$3.75) = -\$0.05/\text{bu}$	November 1 purchased cash $-\$3.50/\text{bu}$ March 1 sold cash $+\$3.70/\text{bu}$	November 1 sold short March contract $\$3.65/\text{bu}$ March 1 bought long March contract $-\$3.75/\text{bu}$
			Gross return = $\$0.10/\text{bu} = (+\$0.20/\text{bu cash} - \$0.10/\text{bu futures})$	
(3) Divergence	$(\$3.50 - \$3.65) = -\$0.15/\text{bu}$	$(\$3.50 - \$3.75) = -\$0.25/\text{bu}$	November 1 purchased cash $-\$3.50/\text{bu}$ March 1 sold cash $+\$3.50/\text{bu}$	November 1 sold short March contract $\$3.65/\text{bu}$ March 1 bought long March contract $-\$3.75/\text{bu}$
			Gross return = $-\$0.10/\text{bu} = (+\$0.00/\text{bu cash} - \$0.10/\text{bu futures})$	

Figure 14

**December corn basis (Illinois River, Peoria North cash less corn CME Group/CBOT futures)**



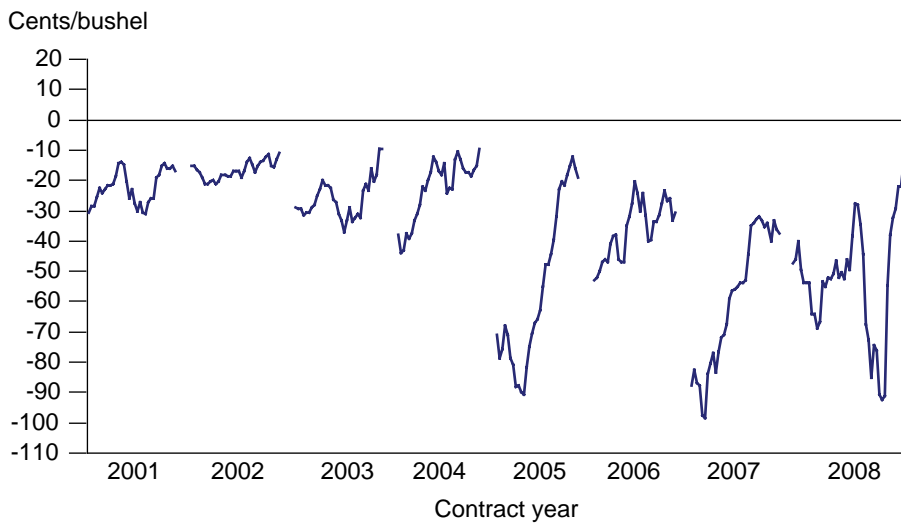
CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is the day after the preceding contract expires, around the 15th of the month. The last observation for each contract year is the expiration day for the given contract, again around the 15th of the month.

Sources: Cash prices, USDA, Agricultural Marketing Service, <http://marketnews.usda.gov/portal/lg/>; futures prices, CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Figure 15

**November soybean basis (Illinois River, Peoria North cash less soybean CME Group/CBOT futures)**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.

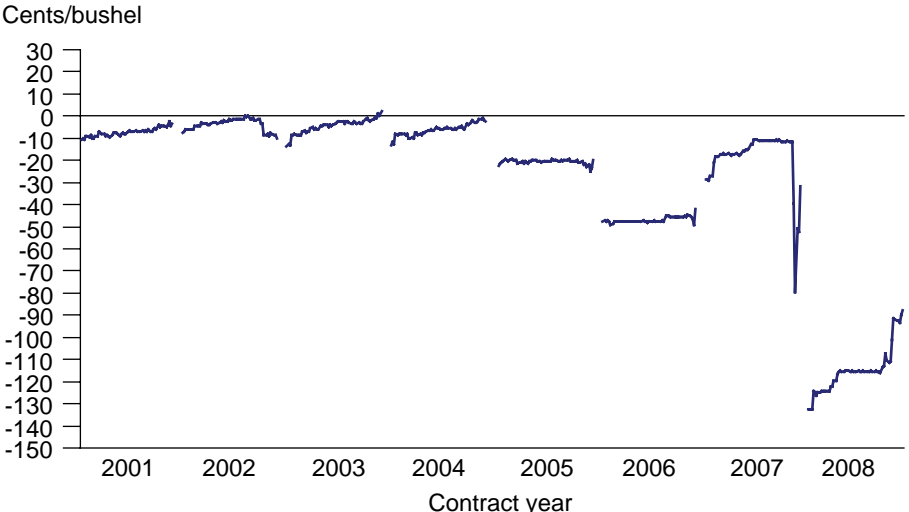
Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is the day after the preceding contract expires, around the 15th of the month. The last observation for each contract year is the expiration day for the given contract, again around the 15th of the month.

Sources: Cash prices, USDA, Agricultural Marketing Service, <http://marketnews.usda.gov/portal/lg/>; futures prices, CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

Poor convergence may also suggest that futures markets are poor proxies for the underlying commodity cash price (Coyle, 2008). Futures prices that are higher than historically typical relative to cash prices, or a weaker basis, suggest that futures prices are biased upwards of true market value. Some commercial market participants have suggested that this phenomenon indicates a classic market “bubble,” in that futures prices no longer reflect market fundamentals and that price levels will eventually collapse, leading to major losses for traders with long positions (Irwin et al., 2009a).

Some actions approved by the CFTC may improve the convergence of cash and futures prices. First, on December 4, 2008, the CFTC released a general press release saying that it had approved amendments to the CME Group/CBOT’s wheat futures contract (see CFTC, 2008d for more information). This action has the potential to increase deliverable supplies, delivery capacity, and the number of shipping certificate issuers for the futures contract, thereby strengthening the relationship between cash and futures prices for wheat. Second, on February 13, 2009, the CFTC announced that it approved a request by the CME Group/CBOT to limit the number of delivery instruments an entity can hold for noncommercial purposes. This limit applies to the corn, soybean, wheat, and other CME Group/CBOT contracts and limits the number of certificates/receipts anyone can hold to an amount equal to the spot month speculative position limit (CFTC, 2009). The amendments are intended to reduce the potential for significant accumulation of delivery instruments by participants employing strategies not directly related to commercial activities and that negatively impact contract performance. Implementation was scheduled to begin on February 17, 2009, with a final

Figure 16  
**March wheat basis (Toledo, OH, cash less wheat CME Group/CBOT futures)**



CME = Chicago Mercantile Exchange; CBOT = Chicago Board of Trade.  
 Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is the day after the preceding contract expires, around the 15th of the month. The last observation for each contract year is the expiration day for the given contract, again around the 15th of the month.  
 Sources: Cash prices, USDA, Agricultural Marketing Service, <http://marketnews.usda.gov/portal/lg/>; futures prices, CME Group/CBOT, Historical Data, <http://www.cmegroup.com/market-data/datamine-historical-data/datamine.html>.

date of May 31, 2009, for those affected parties to come into full compliance of the amendment. Whether these actions will actually improve future convergence will require continued analysis.

A recent study by Irwin et al. (2009b, p. 8) found convergence of the futures and cash price to perform well for the January and March 2009 soybean contracts and March 2009 corn contract. Reasons for this improved performance were not fully known but the increase in CBOT storage rates on delivery certificates was thought to be at least one possible reason. Whether this improved performance continues remains to be seen. However, they also found poor convergence to continue for the March 2009 wheat contract, despite an increase in CBOT storage rates on delivery certificates. Future storage rate increases are planned, but whether future convergence performance will improve is uncertain.

Another perceived performance problem in futures markets is the purported increase in volatility. As discussed earlier, an increase in price volatility was found for corn, soybeans, and wheat, but this increase was not found to be statistically significant. However, the Informa study (2008) found increased volatility in corn, wheat, and cotton by using a different methodology than presented here. The argument that increased volatility is harmful to the market stems from the reasoning that higher volatility leads to higher margins and larger directional price moves, which require significant continuing margin payments. To exacerbate the situation, the increase in margin payments occurred at a time when the credit markets were tight. High volatility also presents resource allocation challenges for firms and policymakers. Volatility is not in and of itself detrimental to the market if prices are reacting to fundamentals, such as increased uncertainty about production, stocks, and use, but volatility is detrimental if prices fluctuate without regard to fundamental factors.



## Risk Management Challenges for Market Participants

In an environment with increased price volatility and changing price levels across corn, soybeans, and wheat, how do market participants manage price risk? What are the prospects for new risk management products? Commercial traders (merchants/elevators) have difficulty hedging when convergence fails. They must also cope with large margin calls on short hedges that quickly absorb working capital.

Commercials who have long positions in the cash market hedge their risk in the futures market by taking opposite positions (short). Ideally, if prices decline, merchants make money in the futures market to compensate for the lower price received in the cash market. If the futures price increases, the merchant with the short futures position still realizes the same hedge return because the losses in the futures market are offset by gains in the cash market. However, during the first half of 2008, the margin calls on short positions could have quickly depleted a firm's working capital, making it difficult for firms to hold short positions in futures. Firms unable to meet margin requirements must liquidate their future positions, negating their risk management efforts and exposing them to even greater risk than had they not hedged in the first place. A survey conducted by the Federal Reserve Bank of Kansas City in 2008 found that 76.5 percent of commercial traders indicated that they have enough cash to manage current margin calls or ample cash and reserves to manage future margin calls; 23.5 percent indicated that they were struggling to acquire cash needed to manage margin calls (George, 2008).

Commercials have navigated these turbulent waters by requesting additional lines of credit and offering a limited array of forward price options to producers. In 2008, some elevators quit offering forward contracts altogether. More recently, others have offered forward contracts for the current crop year only. Still other elevators have created new forward contracts that pass the futures margin and transportation costs to the producer; the result is a quoted basis that may be adjusted downward depending on the circumstances (Mark et al., 2008).

Cash-settled futures contracts and swap contracts for corn, soybeans, and wheat offer additional options to manage price risk. Cash-settled futures contracts for corn, soybeans, and wheat that trade on the Minneapolis Grain Exchange (MGE) are settled to a national spot price index for each commodity calculated by the Data Transmission Network (DTN). The contract is designed to reflect first-handler or elevator-level pricing and therefore may provide a more predictable and stable basis for producers and local elevators than the existing terminal-level futures contract. These contracts have been shown to theoretically reduce nearby basis variability and increase hedging effectiveness (Sanders and Manfredo, 2002). The downside to the MGE contracts is that they are not attractive to commercials, as demonstrated by their much lower volume and, therefore, lower liquidity than the corresponding deliverable contracts that trade on the CME Group/CBOT.

New derivative designs, such as basis swaps, or calendar swaps can also be employed. Corn basis swaps and corn, soybeans, and wheat calendar swaps

have recently been approved by the CFTC and can be cleared by the the CME Group/CBOT. Basis swaps are cash-settled contracts based on the difference between a local price index and a futures price. They are designed to reduce basis risk at nondelivery locations for farmers, elevators, and processors. Calendar swaps are also cash-settled contracts based on the average futures price in the month before contract delivery. The basis swaps and calendar swaps would be negotiated privately off-exchange between trading partners, but cleared by the CME Group/CBOT clearinghouse, which reduces counterparty risk by daily marking-to-market. (See glossary for definition of terms.)

Farmers must also reevaluate their pricing and risk management strategies in light of changes in risk management and pricing alternatives offered by merchants and elevators. During periods of price volatility, merchants and elevators may discount contracts by widening the basis (cash-futures), resulting in lower-than-normal cash prices relative to futures prices. One alternative for producers is to hedge directly in futures markets and bypass the forward contracts offered by merchants and elevators. However, farmers would still be left with margin costs and basis risk. Farmers could also enter into a basis contract with a grain merchant to alleviate basis risk, although these contracts may be as limited as forward contracts. Another tool available to farmers is to buy options on futures contracts, although options do not protect against adverse basis moves and require a paid premium.<sup>26</sup> Options are also not heavily traded in deferred months, so it may be difficult to secure options months or years in advance of the cash market transaction. Crop revenue insurance is yet another risk management alternative that, for a cost, may guarantee minimum revenue (Mark et al., 2008).

Noncommercials and speculators are also exposed to rapid price swings and increased volatility. During upward movement in prices, they build long positions, and in periods of decreasing prices, including the recent period, they reduce their positions. Index funds, although concerned with maintaining a long-term perspective and providing exposure to commodities for clients, have also reduced their long positions during the recent period of declining prices, although their share of the long positions have generally stayed the same. Generally, investors reduce investments in commodity funds as prices decline and profits disappear.

<sup>26</sup>Option buyers are not required to make margin payments.

## Government's Regulatory Response

In response to market concerns about commodity futures market performance, the CFTC held an Agriculture Forum on April 22, 2008, to begin addressing concerns expressed by industry participants (CFTC, 2008a). The forum covered issues that included convergence, or the lack thereof, in futures and cash prices, the impact of higher margin requirements, and the role of speculators and commodity index traders in the marketplace.

As a result of this forum, the CFTC announced several policy initiatives on June 3, 2008, to address issues raised at the forum. The initiatives include the following (CFTC, 2008b):

1. A review of trader reporting and classifications (index traders and swaps dealers in the futures markets) to determine if classifications accurately reflect trading patterns of participants.
2. Withdrawal of proposals to increase the Federal speculative position limits on certain agricultural futures contracts and for a risk management hedge exemption from the Federal speculative position limits for agricultural futures and option contracts.
3. A review and improvement of agricultural trade options to provide producers with an alternative to hedge price risk.
4. An initiative to clear agricultural swaps to provide farmers and merchants with another alternative for managing price risk.
5. Creation of a new report to increase greater transparency of trader information.
6. Continuation of the cotton market investigation of the February/March 2008 price increase in the cotton futures markets. Commission enforcement inquiries are focused on ensuring that the markets are properly policed for manipulative and abusive practices.
7. An investigation of agricultural lending to ensure that adequate credit is available to maintain futures positions.

An additional discussion on convergence and basis, settlement prices, margin requirements, credit, agricultural swaps, and ongoing CFTC research was held at a CFTC Agricultural Advisory Committee Meeting on July 29, 2008. Legislation was introduced to place further regulations on the commodity market, the Commodity Markets Transparency and Accountability Act of 2008; it failed to pass in the House of Representatives on July 30, 2008. This Act aimed to curb speculative trading and create greater transparency in the markets, including offshore trading, over-the-counter transactions, and index fund investment.

As mentioned earlier, On December 4, 2008, the CFTC released a general press release saying that it had approved amendments to the CME Group/CBOT's wheat futures contract (see CFTC 2008d for more information). This action has the potential to increase deliverable supplies, delivery capacity,

and the number of shipping certificate issuers for the futures contract, thereby strengthening the relationship between cash and futures prices for wheat.

Also mentioned earlier, the CFTC announced on February 13, 2009, that it approved a request by the CME Group/CBOT to limit the number of delivery instruments an entity can hold for noncommercial purposes. This limit applies to the corn, soybean, wheat, and other CME Group/CBOT contracts (CFTC, 2009). The amendments are intended to reduce the potential for the significant accumulation of delivery instruments by participants that employ strategies not directly related to commercial activities and that might negatively impact contract performance. Implementation was scheduled to begin on February 17, 2009, with a final date of May 31, 2009, for those affected parties to come into full compliance of the amendment.

On April 24, 2009, the CFTC announced the selection of members to the Subcommittee on Convergence in Agricultural Commodity Markets, a new subcommittee of the CFTC's Agricultural Advisory Committee. The subcommittee will identify the causes of poor cash-futures convergence in select agricultural commodity markets and advise on actions to remedy the situation.

## Conclusion

The emergence of commodities as an asset class has caused a structural change in the level of open interest and composition in futures markets. New players, such as commodity funds, index funds, managed funds, and swap dealers trading with commercial funds have altered the mix of participants in commodity futures markets. The performance of futures markets in their traditional roles of risk transfer and price discovery has been called into question as cash and futures markets have experienced convergence problems in recent years. Issues surrounding price levels, price convergence, and price volatility have caused commercial users of futures markets, such as elevators, merchandisers, and producers, to re-evaluate their pricing and risk management strategies.

The question remains: Are the recent changes in futures market participation and price performance transitory or permanent? The managed and index funds built long positions as prices increased, but their long positions have declined in recent months as prices have declined and become less volatile. These traders do not typically have positions in the underlying cash commodity market, although this too could change. Evidence does show that the link between futures and cash prices has weakened, but market participants continue to use futures markets as a price discovery mechanism.<sup>27</sup> Risk managers have encountered difficulties in managing their price risk due to changing market conditions, but elevators and merchandisers have adapted to the new conditions and have resumed providing risk management products. Regulatory agencies and exchanges have implemented modifications to contract specifications and have acted swiftly to identify the performance problems and discuss or enact solutions. Time and further research are needed to assess whether performance concerns will continue or dissipate in futures markets and whether further modifications in contract design and market regulation are warranted.

<sup>27</sup>While convergence for the wheat contract continues to have problems, convergence for the March 2009 corn and soybean contracts is reported to have performed well (Irwin et al., 2009b). Continued monitoring of this performance will be required to determine whether this improvement is temporary or permanent.

## References

- Abbott, Philip C., Christopher Hurt, and Wallace E. Tyner. *What's Driving Food Prices?* A Farm Foundation Issue Report, July 2008.
- Ash, Mark, and Erik Dohlman. *Oil Crops Outlook*, Outlook Report OCS-04g, U.S. Department of Agriculture, Economic Research Service, July 2004.
- Black, Fisher, and Myron Scholes. "The Pricing of Options and Corporate Liabilities," *Journal of Political Economy* 81:637-59, 1973.
- Carlton, Dennis. "Future Markets: Their Purpose, Their History, Their Growth, Their Successes and Failures," *The Journal of Future Markets* 4(3):237-71, 1984.
- Chicago Mercantile Exchange Group (CME)/Chicago Board of Trade (CBOT). Glossary, <http://www.cmegroup.com/education/glossary.html#O>.
- Commodity Futures Trading Commission (CFTC). *Commodity Futures Trading Commission: Commission Actions in Response to the "Comprehensive Review of the Commitments of Traders Reporting Program" (June 21, 2006)*, December 5, 2006, <http://www.cftc.gov/stellent/groups/public/@commitmentsoftraders/documents/file/noticeonsupplementalcotrept.pdf>.
- Commodity Futures Trading Commission (CFTC). Agricultural Forum, April 22, 2008, Presentations, 2008a, <http://www.cftc.gov/newsroom/cftcevents/2008/oeaevent042208.html>.
- Commodity Futures Trading Commission (CFTC). "CFTC Announces Agricultural Market Initiatives," Press Release No. 5504-08 June 3, 2008b, <http://www.cftc.gov/newsroom/generalpressreleases/2008/pr5504-08.html>.
- Commodity Futures Trading Commission (CFTC), Office of the Chief Economist. Personal Communication with Dr. Jeff Harris, July 2008c.
- Commodity Futures Trading Commission (CFTC). "CFTC Approves Amendments to the CBOT's Wheat Futures Contract," Press Release No. 5579-08, December 4, 2008d, <http://www.cftc.gov/newsroom/generalpressreleases/2008/pr5579-08.html>.
- Commodity Futures Trading Commission (CFTC). *Staff Report on Commodity Swap Dealers & Index Traders with Commission Recommendations*, September 2008e, <http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/cftcstaffreportonswapdealers09.pdf>.
- Commodity Futures Trading Commission (CFTC). "CFTC Approves Limits on the Number of Agricultural Delivery Instruments that can be Held for Non-Commercial Purposes," Press Release No. 5613-09, February 13, 2009, <http://www.cftc.gov/newsroom/generalpressreleases/2009/pr5613-09.html>.

Cooper, Mark. "Oversight of Energy Markets and Oil Futures Contracts," Joint hearing for Senate Appropriations Subcommittee on Financial Services and Committee on Agriculture, Nutrition, and Forestry, U.S. Senate, June 17, 2008, [http://216.40.253.202/~usscanf/index.php?option=com\\_events&task=view\\_detail&agid=13&year=2008&month=06&day=17&Itemid=44](http://216.40.253.202/~usscanf/index.php?option=com_events&task=view_detail&agid=13&year=2008&month=06&day=17&Itemid=44).

Cooper, R.N., and R.Z. Lawrence. "The 1972-75 Commodity Boom," *Brookings Papers on Economic Activity* 3(1975):671-723.

Coyle, Tom, National Grain and Feed Association. Statement of the National Grain and Feed Association to the Commodity Futures Trading Commission Agricultural Forum, April 22, 2008, [http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208\\_coyle.pdf](http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208_coyle.pdf).

Domanski, D, and A. Heath. "Financial Investors and Commodity Markets," *Bank for International Settlements Quarterly Review*, pp 53-67, March 2007.

Fortenbery, T.R, and R.J. Hauser. "Investment Potential of Agricultural Futures Contracts," *American Journal of Agricultural Economics* 72(3):721-26, August 1990.

*Futures Industry Magazine*. "100 Years of Futures Trading: From Domestic Agricultural to World Financial," December 1999/January 2000, <http://www.futuresindustry.org/fi-magazine-home.asp?a=607>.

George, Esther, Senior Vice President, Supervision and Risk Management, Federal Reserve Bank of Kansas City. Remarks for CFTC Public Meeting, Commodity Futures Trading Commission Agricultural Forum, April 22, 2008, [http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208\\_george.pdf](http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208_george.pdf).

Gorton, G., and K.G. Rouwenhorst. "Facts and Fantasies about Commodity Futures," *Financial Analysts Journal* 62(2):47-68, 2006.

Hepworth, Doug, Gresham Investment Management. Comments at the Commodity Futures Trading Commission Agricultural Forum, April 22, 2008, <http://www.cftc.gov/newsroom/cftcevents/2008/oeaevent042208.html>.

Hieronimus, T.A. *Economics of Futures Trading for Commercial and Personal Profit*, New York, NY: Commodity Research Bureau, 1971.

Informa Economics. *An Evaluation of the Influence of Large Reporting Traders on Futures Market Performance*, A study commissioned in May 2008 by the CME Group for the benefit of a consortium of futures exchanges that included the CME Group, Kansas City Board of Trade, Minneapolis Grain Exchange, New York Mercantile Exchange, and the International Exchange, October 2008, <http://www.informaecon.com/TraderStudy/traderstudy.htm>.

Irwin, S.H., P. Garcia, and D.L. Good. *The Performance of Chicago Board of Trade Corn, Soybean, and Wheat Futures Contracts After Recent Changes in Speculative Limits*, Chicago Board of Trade Working Paper, May 2007, <http://www.farmdoc.uiuc.edu/irwin/research/CBOTFuturesPerformance.pdf>.

Irwin, S.H., P. Garcia, D.L. Good, and E.L. Kunda. "Recent Convergence Performance of CBOT Corn, Soybean, and Wheat Futures Contracts," *Choices*, American Agricultural Economics Association, 2nd Quarter 2008, pp. 16-21.

Irwin, S.H., Sanders D.L., and R.P. Merrin. *Devil or Angel: The Role of Speculation in the Recent Commodity Price Boom (and Bust)*, Invited paper at the Southern Agricultural Economics Association Meetings, Atlanta, GA, January 31-February 3, 2009a, <http://www.farmdoc.uiuc.edu/irwin/research/DevilAngelSpeculation.pdf>.

Irwin, S.H., P. Garcia, D.L. Good, and E.L. Kunda. *Poor Convergence Performance of CBOT Corn, Soybean and Wheat Futures Contracts: Causes and Solutions*, Marketing and Outlook Research Report 2009-02, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, March 2009b, [http://www.farmdoc.uiuc.edu/marketing/morr/morr\\_09-02/morr\\_09-02.pdf](http://www.farmdoc.uiuc.edu/marketing/morr/morr_09-02/morr_09-02.pdf).

Kohlmeyer, Bob. "Risk Management," News Letter, World Perspectives, Inc., March 20, 2008, <http://www.worldperspectives.com>.

Labys, W.C., and H.C. Thomas. "Speculation, Hedging and Commodity Price Behavior: An International Comparison," *Applied Economics* 7(1975):287-301.

Mark, D.R., B.W. Brorsen, K.B. Anderson, and R.M. Small. "Price Risk Management Alternatives for Farmers in the Absence of Forward Contracts with Grain Merchants," *Choices*, American Agricultural Economics Association, 2nd Quarter 2008, pp. 22-25.

Peck, Anne E. "The Economic Role of Traditional Commodity Futures Markets," Chapter 1, *Futures Markets: Their Economic Role*, Edited by Anne E. Peck, American Enterprise Institute, Studies in Government Regulation, 1985.

Petzel, T.E. "A New Look at Some Old Evidence: The Wheat Market Scandal of 1925," *Food Research Institute Studies* 18(1981):117-28.

Riley, T.H. "In Praise of Commodity Speculators," *The Wall Street Journal Online*, pp. 1-2, July 11, 2008, <http://online.wsj.com/>.

Sanders, D.R., S.H. Irwin, and R.P. Merrin. *The Adequacy of Speculation in Agricultural Futures Markets: Too Much of a Good Thing?* Marketing and Outlook Research Report 2008-02, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, June 2008, [http://www.farmdoc.uiuc.edu/marketing/morr/morr\\_08-02/morr\\_08-02.pdf](http://www.farmdoc.uiuc.edu/marketing/morr/morr_08-02/morr_08-02.pdf).

Sanders, D.R., S.H. Irwin, and R. Merrin. *Smart Money? The Forecasting Ability of CFTC Large Traders*, Paper presented at the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, Chicago, IL, April 16-17, 2007, [http://www.farmdoc.uiuc.edu/nccc134/conf\\_2007/pdf/confp01-07.pdf](http://www.farmdoc.uiuc.edu/nccc134/conf_2007/pdf/confp01-07.pdf).



Sanders, D.R., and M.R. Manfredo. *Modeling Contract Form: An Examination of Cash Settled Futures*, Paper presented at the NCR-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management, St. Louis, MO, April 22-23, 2002, <http://ageconsearch.umn.edu/handle/19069>.

Stallman, Bob, President of American Farm Bureau Federation. Statement of the American Farm Bureau Federation to the Commodity Futures Trading Commission Agricultural Forum, April 22, 2008, [http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208\\_stallman.pdf](http://www.cftc.gov/stellent/groups/public/@newsroom/documents/file/event042208_stallman.pdf).

Streeter D.H., and W.G. Tomek. "Variability in Soybean Futures Prices: An Integrated Framework," *The Journal of Future Markets* 12(6):706-28, 1992.

Trostle, R. *Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices*, Outlook Report No. WRS-0801, U.S. Department of Agriculture, Economic Research Service, May 2008, <http://www.ers.usda.gov/Publications/WRS0801/>.

U.S. Senate. *Excessive Speculation in the Wheat Market*, Permanent Subcommittee on Investigations, Committee on Homeland Security and Governmental Affairs, June 24, 2009, <http://levin.senate.gov/newsroom/supporting/2009/PSI.WheatSpeculation.062409.pdf>.

## Glossary

**Arbitrage:** A strategy involving the simultaneous purchase and sale of identical or equivalent commodity futures contracts or other instruments across two or more markets in order to benefit from a discrepancy in their price relationship. A theoretically efficient market has no opportunity for profitable arbitrage.

**Basis:** Difference between the cash price and the futures contract price.

**Carrying charges:** The cost of storing a commodity over time, including costs of storage space, insurance, and finance charges incurred by holding the commodity. Also referred to as cost of carry.

**Cash market:** A market in which commodities, such as grain, gold, or crude oil, are bought and sold for cash and delivered immediately. Also called spot market.

**Cash-settled futures contract:** (1) A settlement method used, instead of physical delivery, for certain futures contracts where, upon expiration, the buyer does not receive the underlying commodity but pays or receives funds depending on whether the futures price changes were favorable or unfavorable. (2) Where the settlement at maturity is based on a price index constructed from prices at several locations. The futures price prior to contract maturity is the forecast of the price index at contract maturity. Payment at settlement is based on the difference between the futures price forecast of the price index when selling or buying the futures contract and the actual price index at contract maturity.

**Commercial trader:** Commonly referred to as a “hedger.” A person or organization that uses futures markets to manage price risk resulting from activity in the underlying cash futures market.

**Commodity fund:** Managed portfolio composed strictly of commodities.

**Convergence:** A term referring to cash and futures prices tending to come together as the futures contract nears expiration (i.e., the basis approaches zero).

**Exchange:** Public marketplace where commodities in predetermined units are bought and sold at an agreed-upon price for delivery at a specified date in the future. In this case, the exchange refers to CME Group—Chicago Mercantile Exchange, the Chicago Board of Trade (CBOT), and the New York Mercantile Exchange (NYMEX).

**Grain elevator:** Facility at which bulk grain is unloaded, weighed, cleaned, blended, graded, stored, and loaded. These services may vary by type of elevator.

**Hedge:** An equal and opposite buying or selling investment position taken in order to protect oneself from the risk of an unfavorable price move in a security or commodity.

**Hedge fund:** Private investment funds that typically require larger overall net wealth for investors to participate. Fund managers take buying or selling positions in a variety of assets and can typically invest in more complex and riskier investments than other investment funds.

**Index fund:** Index fund traders gain long-side exposure to a broad index of commodity prices in an unleveraged and passively managed manner. Their goal is to gain diversification in their investment portfolio.

**Initial margin:** Funds that must be deposited when a futures position is initially entered as a performance bond by a customer to help ensure the financial integrity of brokers, clearing members, and the exchange as a whole.

**Investment fund:** A portfolio with commodities in addition to traditional assets, such as equities and bonds.

**Liquidity:** A condition that describes the ability to execute orders of any size quickly and efficiently without a substantial effect on the price. Institutional investors are inclined to seek out liquid investments so that their trading activity will not influence the market price.

**Load out:** The act of loading a transport vehicle with the commodity.

**Long:** A position that an investor takes when he/she buys futures or call options contracts. Synonymous with buyer.

**Maintenance margin:** Minimum equity that must be maintained for each contract in a customer's account after deposit of the initial margin.

**Mark-to-market:** Part of the daily cash flow system used by U.S. futures exchanges to maintain a minimum level of margin equity for a given futures or option contract position by calculating the gain or loss in each contract position resulting from changes in the price of the futures or option contracts at the end of each trading session. These amounts are added or subtracted to each account balance. Thus, buyers and sellers are protected against contract default by additional required margin payments when margin accounts fall below a predetermined level.

**Nearby futures price:** The price of the futures contract with the closest settlement date.

**Noncommercial trader:** Commonly called "speculators." A person or organization that uses futures markets to speculate on future price movements and are generally sensitive to fundamental and/or technical factors that influence prices.

**Open interest:** The total number of futures contracts, long or short, in a delivery month, or a market contract that has been entered into but not yet offset or fulfilled by delivery. Also known as open contracts or open commitments. Each open transaction has a buyer and a seller, but to determine total open interest, only the totals from one side of the contract or the other is counted, not both.

**Performance bond:** A deposit to assure that the customer has enough cash or other acceptable collateral in his or her account to cover any losses that could result from ensuing market transactions.

**Regular for delivery:** Warehouses or shipping stations may be declared regular for delivery with the approval of the exchange. The firms must meet several financial and operational requirements to be approved as regular. Regular firms are allowed to issue shipping certificates, become a delivery point, and load out as specified by a commodity contract.

**Short:** A position that an investor takes when he/she sells futures or writes call options contracts. Synonymous with seller.

**Sovereign wealth fund:** Fund owned by the sovereign state or government as the key shareholder.

**Spread:** The price difference between two contracts.

**Spread trade:** Holding a long and a short position in two or more related futures or options on futures contracts, with the objective of profiting from a change in the price difference between the two.

**Swap:** Transaction in which a dealer sells an over-the-counter (OTC) swap contract to customers (such as a corn grower who wants to fix a price to sell corn at a future date) and in turn hedges his/her price exposure with short future positions in corn or other commodities. In essence, the two parties are “swapping” payment streams.

**Turnover ratio:** Volume required to change the ownership of a given number of contracts.

**Volume:** Number of purchases and sales of a commodity futures contract.