

**Report and Recommendations of the Subcommittee on Convergence in Agricultural
Commodity Markets
to the Agricultural Advisory Committee of the
Commodity Futures Trading Commission
on Convergence in Wheat with Implications for Other Commodity Markets**

Executive Summary

Since 2006, intense scrutiny has been placed on the performance of agricultural commodity futures contracts, due to persistent lack of convergence between the cash and futures markets.

In response to continued concerns, the Commodity Futures Trading Commission (CFTC) formed the Subcommittee on Convergence in Agricultural Markets on March 9, 2009. The Subcommittee's purpose is to identify the causes of poor cash-futures convergence in select agricultural commodity markets and advise the Agricultural Advisory Committee of the CFTC on actions to remedy the situation. The work undertaken by the of the Subcommittee during April-September 2009, mainly focused on the Chicago Board of Trade's (CBOT's) wheat contract as the agricultural commodity contract with the most pronounced convergence problem. However, many of the underlying causes and concerns, as well as recommendations extend to other agricultural commodities, especially corn and soybeans.

This report outlines the issue of convergence in the CBOT wheat contract, describes the CFTC's historical involvement with convergence and delivery specification concerns in the agricultural futures market, and proposes measures to alleviate the convergence problem in wheat.

The Convergence Problem in CBOT Wheat

The United States is the leading global exporter of wheat and one of the top ten countries for both production and consumption of wheat. The cash market is the primary market in which sellers and buyers exchange cash for wheat; the futures market is rarely used for delivery from seller to buyer, but the reliable linkage between the cash and futures market is critical for price discovery and risk transfer.

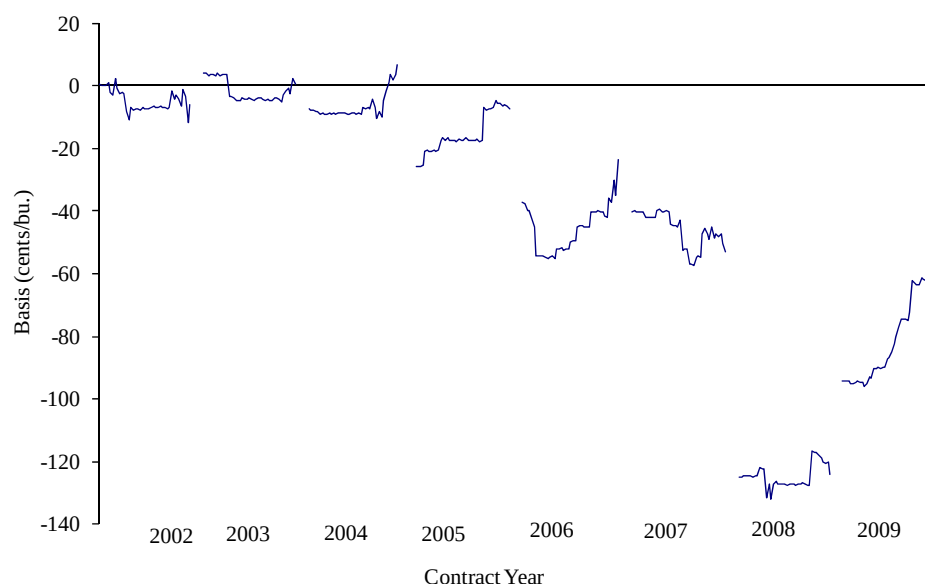
The most active wheat futures contract in the United States is on the Chicago Board of Trade.¹ The type of wheat traded on the exchange is soft red winter wheat, but the price of the soft red winter wheat contract is commonly treated as the world price because of the contract's liquidity and volume. The delivery months for the futures contract are July (new crop contract), September, December, March and May. The delivery locations specified by the exchange are Chicago, Illinois; Toledo, Ohio; Northwest Ohio; the Ohio River between Cincinnati and the Mississippi River; and the Mississippi River below St. Louis to Memphis. In these locations, only exchange-approved facilities are eligible to deliver grain.

¹ In 2008 the Chicago Board of Trade merged with the Chicago Mercantile Exchange forming the CME Group.

Since 2006, renewed scrutiny has been placed on the performance of CBOT wheat futures contracts, because convergence has repeatedly failed to occur between the cash and futures markets. Convergence generally refers to the pattern of cash and futures prices tending to come together at the delivery market as the futures contract expires. In theory, arbitrage with the cash market should force the prices to converge. If futures were above the cash price, the cash commodity would presumably be bought, futures sold, and delivery made. If the cash price exceeded futures, users could buy futures and stand for delivery.²

Figure 1 presents evidence of poor cash-futures convergence for the CBOT wheat delivered in Chicago delivery locations for the expiration month of July 2002-2009.³ Basis (the cost or benefit of being long or short the underlying commodity), computed as cash minus futures, is plotted daily. 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. The figure shows a considerable lack of convergence starting in 2006, with continued performance problems through the 2009 expirations of the contract.

Figure 1: July CBOT Wheat Basis (Chicago)



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. Cash price source: Agricultural Marketing Service (<http://marketnews.usda.gov/portal/lg/>). Futures price source: Commodity Systems Inc. (<http://www.csidata.com/>).

² Convergence does not necessarily require a strict zero basis, but rather a zone of convergence commonly less than 10 cent per bushel due to transaction, storage, and interest opportunity costs.

³ Other months and delivery locations show similar a similar lack of convergence.

Lack of convergence in the CBOT wheat contract is nothing new. Gray and Peck (1981) documented the problems in the Chicago wheat futures markets for the previous 50 years. Ten years later, Peck and Williams (1991) wrote again about problems with the delivery performance of CBOT wheat, corn and soybeans contracts.

Most recent convergence problems were analyzed by a number of academic researchers, both executive and legislative branches of the government, and a private consulting firm commissioned by an exchange. Academic researchers from the University of Illinois issued a series of research papers (Irwin et. al 2007, 2008, and 2009) that conclude that the wheat contract needs to undergo major changes in delivery structure to address the ongoing performance problems. Specifically, they suggest setting the Mississippi River Gulf as par delivery, with other delivery locations (barge shipping facilities from the Illinois River to the Gulf) set at differentials based on the costs of barge shipment over each distance. This solution would address the fundamental problem, which is that wheat production patterns, transportation logistics, and trade flows have left the contract with an increasingly narrow commercial flow of wheat upon which to draw in the delivery process (Irwin et. al 2009).

Other academic researchers argue the delivery instrument – the shipping/delivery certificate – has option-like qualities (Fishe et al, 2009). When pricing futures contracts, investors consider the value of the option to exchange these certificates for delivery against another futures contract. Fluctuations in value of these options at maturity seem to offer a consistent explanation for the lack of convergence and the size of the cash and futures price differential (Aulerich 2009).

The United States Senate Report (2009) argues that excessive speculation in the wheat market has caused the lack of convergence by artificially inflating prices. The Economic Research Service (part of the USDA) issued a report, “Issue and Prospect in Corn, Soybeans, and Wheat Futures Markets” (Aulerich, Hoffman, and Plato, 2009) documenting the non-convergence episodes, the effect on market participants, and possible solutions. Finally, a private consulting firm, Informa Economics, was commissioned by the CME group to conduct a study on the influence of large reporting traders on futures market performance (Informa, 2008). The study concluded that “no trader group was found to apply pressure to routinely help or hinder the convergence of the futures to cash.”

CFTC Involvement

The CFTC has a long history of involvement with convergence and delivery specification concerns in the agricultural futures market. In 1926, prior to the birth of the CFTC, the Federal Trade Commission (FTC) expressed concerns over Chicago delivery and suggested to Congress that “the Chicago Board of Trade be requested to permit the delivery of grain on futures contracts at other important markets (other) than Chicago.” (FTC, 1926, p.286)⁴ The CFTC took a bolder action in March 1979, when the agency ordered the termination of trading in the

⁴ In the 1970s, the Chicago Board of Trade (CBOT) added the additional delivery points of Toledo for wheat and St. Louis for corn without specific direction from a government agency.

expiring March wheat futures contract at Chicago, which had three trading days remaining. Some of the reasons for the termination were (i) a shortage of transportation facilities by which additional wheat may be moved into deliverable position to allow for deliveries to be made, (ii) a significant shortage of warehouse facilities to accommodate additional wheat, and (iii) a perceived distortion of price relationship between the March contract and other values of wheat (Gray and Peck 1981).

In 1991, the CFTC staff released a study analyzing the performance of corn, wheat, and soybean futures contracts traded at the CBOT, titled “An Analysis of the Delivery-Point Provisions of CBOT’s Corn, Wheat and Soybean Futures Contracts.” This research eventually resulted in a CFTC notification to the CBOT on December 19, 1996, that the delivery terms of its corn and soybean futures contracts did not satisfy the statutory objectives of Section 5a(a)(10) of the Commodity Exchange Act: “permit[ting] the delivery of any commodity...at such point or points and at such quality and locational price differentials as will tend to prevent or diminish price manipulation, market congestion, or the abnormal movement of such commodity in interstate commerce.” This action resulted in the creation of the Illinois Waterway delivery system for corn and soybeans, which is the delivery system these futures contracts have today.

The issue of convergence resurfaced yet again in 2008. The CFTC responded by convening industry and academic roundtables on convergence in April 2008 and December 2008 (jointly with ERS/USDA). However, as the convergence problems persisted, the CFTC formed the Subcommittee on Convergence in Agricultural Markets on March 9, 2009. The Subcommittee on Convergence’s purpose is to identify the causes of poor cash-futures convergence in select agricultural commodity markets and advise the CFTC on actions to remedy the situation.

Main Recommendations

Having studied the issue of convergence, the Subcommittee on Convergence in Agricultural Commodity Markets agreed to make a number of recommendations to the Agricultural Advisory Committee of the CFTC on how to remedy the situation in wheat. The recommendations fall into three main categories: recommended, not recommended, and suggested for a possible further study.

The Subcommittee recommends that the CME Group adopts a variable storage rate mechanism for the CBOT wheat starting with the December 2009 contract.⁵ The Subcommittee does not at this point recommend the implementation of concepts of a modified compelled load out or moving par locations for the CBOT wheat contract to other locations. The Subcommittee recommends to further study the possibility of cash settlement for the CBOT wheat contract and/or making the delivery certificates for the contract decay in value. The details of the recommendations are below.

⁵ David Lehman, the member of the Subcommittee on Convergence representing the CME Group, disagreed with the Subcommittee’s recommendation to implement the variable storage rate starting with the December 2009 contract.

1. Variable storage rate.

Members of the Subcommittee on Convergence support the adoption of a variable storage rate for the CBOT wheat starting with the December 2009 contract. The introduction of a variable storage rate is currently under review by the CME Group. This document outlines the background on storage rates, recent changes in storage rates, and the new variable storage rate concept of the CME Group.

A commodity that is placed in an approved storage facility, referred to as a regular facility, is subjected to a storage fee determined by the exchange. Starting in 2000, wheat storage rates on the Chicago exchange were set at \$.0015 per bushel per day. This rate remained until a very recent increase (starting with the July 2008 contract) to \$.00165 per bushel per day. This increase reflected the industry-wide increase in storing physical commodity. To address the convergence problem, this rate was replaced by the introduction of the seasonal storage rate, first implemented in July 2009, which divides the marketing year into two sets, each subject to a different storage rate.⁶ The new seasonal storage rate schedule establishes a storage rate of \$.00265 per bushel per day from July 18th to December 17th. From December 18th to July 17th, the storage rate is decreased to its original level of \$.00165 per bushel per day.

Initial changes regarding the seasonal storage rates were proposed on September 4, 2008 and approved on December 4, 2008. The recently expired July 2009 contract was the first to have this storage rate schedule, and exhibited somewhat improved, but still poor convergence. This has led the exchange to consider different options, including the variable storage rate.

The storage rate along with forgone interest determines the cost of carry. Full carry is commonly defined as the cost of storing the commodity between contract expirations. If the spread between two nearby contracts is equal to full carry (storage + interest), then the percent of full carry equals one hundred and an individual should be indifferent to storing the commodity.

The variable storage rate concept uses the futures market spreads to determine the appropriate storage rate based on the size of the carry. This change is currently under research and development and is designed to address the poor convergence in the Chicago wheat futures. If this concept is implemented, it would replace the seasonal storage rates in wheat futures.

A brief summary of the concept is provided, followed with a more detailed explanation. On each trading day, two numbers (*full carry* and *the spread*) are calculated. These calculations are outlined in the next section. These two numbers are then used to calculate the percent of full carry. These percentages are then grouped together based on the contract expiration schedule and a running average is calculated. An upper (80 percent) and lower (50 percent) threshold for this average will determine if the storage rate will be adjusted or held constant.

Under the proposal issued by the CME Group on August 26, 2009, the calendar year would be divided up into calculation periods where trading dates are grouped together. For each date, the percentage of full carry is calculated using the formulas outlined in the current proposal and

⁶ The marketing year for soft red winter wheat starts on June 1st. For example the 2008 – 2009 marketing year is June 1, 2008 through May 31, 2009.

presented below. A running average of this percent is calculated. Calculation periods are determined by the contract expiration schedule. A period starts on the 18th calendar day of a delivery month.

Since wheat has five delivery months, there are five calculation periods. The calculation period ends with the nearby contract option expiration date. For example, one period will always run from March 18th through April 26th.⁷ Similarly, the next calculation period will run from May 18th through June 26th. The average on April 26th will determine the storage rate implemented on May 18th, which will apply to all outstanding shipping certificates until June 26th. On the last day in the calculation period, the average percentage of full carry is used to determine if the storage rate will remain or be adjusted.

The proposal suggests if this average is 80 percent or greater, then the storage charges will increase by ten one hundredths of one cent per bushel per day. If the average is 50 percent or less, then storage charges would be decreased by ten one hundredths of one cent per bushel per day. Changes in storage rates are implemented on the 18th of the delivery month. This ensures that the approaching delivery period will not be subjected to storage rate changes if adjustments are triggered.

Storage rate adjustments cannot push the rate below \$.00165 per bushel per day. The current proposal suggests there not be an upper limit on storage rates. Thus, the continued persistence of large carry markets would be met with a continued increase in storage rates.

Full carry is calculated according to the following formula:

$$\#Days * \left[\left(\frac{r}{360} * FP_{nearby} \right) + Storage_{daily} \right] = Full\ Carry$$

Where:

#Days is the number of days between the first delivery date of the nearby and the next nearby contract.

r is the one month LIBOR rate plus 200 basis points.

FP_{nearby} is the settlement price for the nearby contract.

Storage_{daily} is the current daily premium charge.

The *spread* is defined as the difference between the nearby contract and contract following the nearby contract. Thus for each trading day,

$$Percent\ of\ Full\ Carry = Spread / Full\ Carry$$

The above variable rate storage concept was applied to historical settlement price data from January 2000 through December 2008 to investigate the frequency of likely rate changes given the proposed thresholds. Information regarding the one month LIBOR and futures settlement prices was used, along with the assumption of a fixed storage rate of \$.00165 per bushel per day. Incorporating eight years of data provided 45 calculation periods assumed to start on the business day closest to the 18th of the delivery month and end on the business day closest to the 26th prior

⁷ April 26th and June 26th are estimates of the nearby contract option expiration date.

to a delivery month. The results show patterns of successive high carry periods. In total there were 16 calculation periods in which the average exceeded 80 percent and seven calculation periods where the average was below 50 percent.

2. Moving par delivery locations to the Mississippi River Gulf.

Recent research has identified the underlying structural issue with the delivery system as one of the main factors contributing to the lack of convergence for CBOT wheat.⁸ According to this line of research, historic delivery locations do not adequately reflect the commercial flow of wheat in the United States.

Partly in response to this, in July 2009, additional delivery points were added by the CME Group to address poor convergence in the CBOT wheat. These new delivery points include shuttle train loading facilities in a 12-county area of Northwest Ohio, barge loading facilities on the Ohio River from Cincinnati to the Mississippi River, and barge loading facilities on the Mississippi River from south of St. Louis to Memphis. Price differentials are set at Northwest Ohio: 20 cent discount; Ohio River: par; Mississippi River: 20 cents premium.

However, recent research by Irwin et al (2009) questions the impact of this change on the performance of the contract due to the price differentials established by the exchange. The researchers argue that these new delivery locations will only be utilized under unusual market conditions and do not address the changed pattern of commercial flows of the underlying commodity.

Irwin et al. (2009) propose a fundamental change in delivery terms which they feel is necessary to properly address the underlying structural problems in the CBOT wheat contract. The change would center the delivery process in the Gulf, where the main export interest in the market takes place. To support their views, the researchers cite that in the last five marketing years, an average of 206 million bushels of wheat was shipped for export through the Mississippi Gulf, compared to only 30 million bushels through the Chicago and Toledo locations.

The proposal suggests to replace Chicago and Toledo as par delivery points for the CBOT wheat contract and to establish the Mississippi River Waterway Delivery System. This new system would retain the use of shipping certificates and set Mississippi River Gulf (NOLA) as par delivery. The differentials with other locations would be based on barge rates to NOLA from barge shipping facilities from the Illinois River. This new system would continue to rely on physical delivery for contract settlement and allow for an increase in the number of elevators designated regular for delivery.⁹

⁸ See, Poor Convergence Performance of CBOT Corn, Soybean, and Wheat Futures Contracts: Causes and Solutions, by Scott H. Irwin, Philip Garcia, Darrel L. Good, and Eugene L. Kunda, March 2009, Marketing and Outlook Research Report 2009-02.

⁹ For example, Irwin et al. state that within the new proposed delivery space “there are 77 terminal elevator facilities with 181 million bushels of total storage capacity, 10 million bushels of total barge shipping capacity, and ownership distributed among 23 different firms.”

3. Modified compelled load out.

In November 2008, The National Grain and Feed Association (NGFA) proposed to the CME Group a concept of modified compelled load out. The concept's originators envisioned the adoption of demand certificates for each delivery location of the CBOT wheat futures. The demand certificates would require those holding long futures positions to load the physical wheat out of delivery elevators. In order to avoid being forced to load out physical grain, those holding long futures would liquidate some of their positions, pushing down the price of the front month futures.

The exact details of the NGFA proposal, which included modifications to reflect the views of both long and short holders of the wheat futures contract, were as follows. The warehouse facility issuing the demand certificates would have a 24-hour period following the last trading day of each wheat contract month in which to declare whether the taker must load out (after the contract expires but before 8:00 pm the following business day). Demand certificates could not be re-tendered for delivery. Moreover, demand certificates, on which the issuer has declared that loadout will be compelled, could not be re-tendered against a subsequent contract month.

The maximum amount that could be compelled would be fifteen percent of each facility's registered loadout capacity. The fifteen percent limit would be specific to each warehouse location, not company-wide. This limit is to help ensure that the marketplace can absorb supplies in the unlikely event of maximum deliveries.

Under modified compelled load out, load out is to occur within 60 days, during which time storage would be paid by the taker. If loadout did not occur within 60 days, accelerated storage would be paid by the taker (an additional one cent per bushel per day the first month following the 60-day loadout period, and doubling each subsequent month that loadout is not accomplished).

Milling quality specifications would be applicable to deliveries under modified compelled load out: maximum of ten insect-damaged kernels (IDK) in 100 grams, maximum of one percent dockage, and maximum of two ppm vomitoxin. These quality specifications would provide a higher quality, more merchantable product for the taker when compelled to load out. They would be applicable only when the issuer compels loadout. Current quality specifications still would apply when the taker initiates loadout.

4. Cash settlement.

Cash settlement is a potentially useful way to change contract design to achieve convergence. However, industry participants raised a number of concerns regarding the construction of a reliable price index—a critical requirement for a cash-settled contract. One of the main concerns was that there was not enough cash market activity – geographically and seasonally – to construct a reliable price series for a broad cross-section of market participants. Similarly, because of the great deal of industry concentration, large commercial firms were concerned that information on their cash transactions would make up a large part of the index and that they could be accused of manipulating the index. Finally, unlike in livestock, there is no mandatory

reporting of transaction data in the grain market. As a result, under the current regime, a cash index would have to rely on bid data from grain elevators. In some geographic areas, there are too few bids to construct a reliable cash price.

In spite of these concerns, there is a need to continue evaluating the possibility of a cash-settled grain contract. In this regard, starting in April 2009, CME Group has listed for clearing corn basis swaps that are cash settled using DTN-reported bid prices at various locations and CBOT futures prices, and calendar swaps using only CBOT futures prices, which could be used as indicators for demand for a cash-settled contract. So far, there has not yet been activity in the basis swaps, and open interest in the calendar swaps is relatively small, approximately 600 contracts.

In addition, the Minneapolis Grain Exchange (MGEX) currently lists five financially-settled cash index contracts for corn, soybeans, and wheat. These contracts settle to daily price indices based on DTN-reported elevator bids for each contract. The elevator bids included in the index are meant to ensure the creation of a viable indicator of national spot prices for the underlying commodities. At this time, there is very little open interest in any of these cash-settled contracts.

5. Design of delivery specifications.

Modifying the design of contract rules on physical delivery may also help alleviate convergence issues. For CBOT wheat, the delivery instrument is a delivery certificate. Delivery certificates are issued by warehouse facilities to holders of long futures contracts held to expiration. Holders of delivery certificates are entitled to demand load out of physical grain. Delivery certificates are infinitely lived, non-callable, and do not decay in value.

A potentially useful way to help with convergence is to make it progressively more costly for the holders of delivery certificates to keep them. Accumulating costs of holding delivery certificates would force the holder of a long position to either sell near expiration futures contracts, thus putting a downward pressure on the near nearby futures price, or remove the commodity from the warehouse facility, thus relieving potential pressures on limited storage space. The introduction of an accumulating cost – or penalty – could equalize the delivery stock value with the cash value of a commodity.

Some industry participants proposed to further study the design of decaying delivery instruments in cotton and coffee on the Intercontinental Exchange (ICE Futures US) as a potential template for wheat. Contract specifications for cotton and coffee – soft, perishable agricultural commodities – are designed to address the naturally declining value of the commodity in storage by imposing penalties for long-term storage. While grains, like wheat, do not naturally suffer from decline in value while in storage, a similar penalty mechanism could potentially provide an incentive to expedite and improve their delivery process.

Conclusion

Having studied the issue of convergence, the Subcommittee on Convergence in Agricultural Commodity Markets recommends to the Agricultural Advisory Committee of the CFTC that the CME Group adopts a variable storage rate mechanism for the CBOT wheat starting with the December 2009 contract.

The Subcommittee does not at this point recommend the implementation of modified compelled load out or moving the par locations for the CBOT wheat contract to other locations.

Subcommittee members request the Agricultural Advisory Committee of the CFTC to keep the Subcommittee on Convergence as a standing body to monitor cash-futures convergence in agricultural commodity markets, with a particular focus on the performance of the CBOT wheat contract.

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