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## **Why Have the KC Wheat Futures and Cash Prices Not Converged? <sup>1</sup>**

The cash basis differential between Kansas cash wheat prices and JULY 2010 Kansas City Board of Trade (KCBT) wheat futures has widened sharply since mid June, increasing to as much as \$1.20 - \$1.40 per bushel under futures in western Kansas and to \$1.00 - \$1.20 under futures in central Kansas. These basis levels were as much as \$0.55-\$0.60 per bushel wider than Kansas cash wheat basis bids have been during June since at least 1998.

Wide cash basis levels have raised questions about the factors that are affecting the relationship between cash and futures markets for hard red winter (HRW) wheat. Questions have arisen about; a) the degree to which local, domestic and world wheat supply-demand factors explain the difference in local cash and futures markets, and b) how well the delivery mechanisms designed to bring about convergence between cash HRW wheat prices and KCBT futures are functioning. This article discusses issues associated with the function of the delivery process for sellers of KCBT wheat futures contracts, the impact of wide and variable cash HRW wheat basis levels on farmers and agribusiness, possible solutions to the non-convergence of cash and futures prices in the HRW market, and implications of volatile basis levels on farm marketing decisions.

Some of the topics addressed include; 1) how cash HRW wheat markets are reflecting real market value for wheat and have been diverging from KCBT wheat futures, 2) potential profits from delivery on short positions on KCBT wheat futures, 3) the availability of warehouse receipts required in the delivery process, 4) the impact of fixed and variable grain storage rates on delivered wheat at regular delivery facilities, 5) the effect of wider than expected basis levels on farmers, grain elevators and crop revenue-based insurance coverage, and 6) potential solutions to the issue of non-convergence in HRW wheat cash and KCBT wheat futures markets.

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1. **Cash Markets Reflecting Wheat Supply-Demand:** It is the authors' consensus that the cash hard red winter wheat prices have been reflecting the real market value of wheat, i.e. the export value of HRW wheat plus the transportation costs to bring it to port in competition with the value of HRW wheat processed by U.S. millers for consumption in domestic food markets. If true, then futures would need to decline by 50 cents or more for convergence that is necessary for efficient hedging of grain (given market conditions in Kansas in late June – early July, 2010). Historically wide cash wheat basis levels have occurred because there is no effective way to deliver enough HRW wheat to force convergence between cash and KCBT futures prices.
2. **Potential Profits from Delivery of KCBT HRW Wheat:** The futures contract specifies a locational differential for Wichita that is 6 cents under the KCBT futures price (compared to no discount for delivery to Kansas City MO), a 9 cent discount to Hutchinson, a 12 cent discount for delivery to Salina/Abilene. On June 29, 2010 the cash price in Wichita was \$1.13 under the July 2010 futures contract price. This would suggest that one could make delivery on the futures contract in Wichita at \$1.07 per bushel over the cash price. However, the gain may be slightly less because of in and out charges and other expected market "inefficiencies".
  - a. In theory, the delivery facility or other short position holders would buy cash wheat, make delivery on the futures market and "capture" the \$1.07 per bushel gain. Repeating this arbitrage process should put upward pressure on the cash price and downward pressure on the futures price, eventually bringing about convergence. However, in full carry markets, those taking delivery of the futures do not have economic incentives to load-out. If a regular facility issues new receipts that are delivered onto the futures market, the delivery taker has the incentive to either store the grain indefinitely or redeliver it on a subsequent contract.
3. **Availability of Registered Warehouse Receipts for Delivery:** It is legal for a regular delivery grain elevator facility to refuse to issue a registered warehouse receipt for futures delivery. The law does not make any specific mention of registered receipts. As such, an elevator can offer warehouse receipts that do not meet futures' delivery requirements, but then firms/farmers cannot use those receipts to make delivery. The Warehouse Act (7 CFR 735.300(b)) simply states that federally-licensed facilities may not discriminate between firms/farmers requesting warehouse receipts.
  - a. In practice, in order to execute delivery on a KCBT wheat futures contract, short sellers must find a warehouse willing to issue a warehouse receipt that meets KCBT wheat futures contract specifications.
  - b. It is the author's consensus that terminal elevators refusal to grant warehouse receipts to farmer hedgers could be explained and/or understood on economic grounds. These facilities appear to be reluctant to fill their storage space with registered stocks of wheat, which they may have difficulty moving out of their

facilities in a timely manner and which may interfere with their normal grain merchandising activity.

4. **Impact of Fixed vs Variable Storage Rates & Additional Delivery Points:** Kansas City wheat futures have a fixed storage rate of \$0.00148 per bushel per day (i.e., about 4 ½ cents per month) for the past several years while production has expanded considerably. Although more grain storage is being built, storage capacity is fixed in the near term. Large supplies of wheat in MY 2010-11 combined with expectations of large feedgrain and oilseed harvests this fall has lead to increased demand for available grain storage space in Kansas and other parts of the central and southern plains.
- a. Given the current strong demand for grain storage and the possibility of increasing wheat storage fees being charged, regular delivery point grain elevator could find themselves forced to accept “below market” grain storage fees on grain that has been delivered by short or sell position holders. This situation may occur if long position holders who receive physical delivery decide that instead of immediately selling in the cash market they will store at the regular delivery facility, paying the rate of storage specified in the KCBT wheat futures contract (i.e., about 4 ½ cents per month).
  - b. Even if the storage charges specified in the KCBT wheat contract are nearly equal to market rates of storage at these delivery point terminal elevators, it may still be profitable for long position receivers of wheat to store rather than immediately sell the cash commodity in this market environment if month-to-month carrying charges in the futures market are wide enough relative to monthly storage charges. If futures market carrying charges are larger than the cost of storage it may be profitable to execute storage hedges that could make money by storing the grain rather than selling it in the cash market.
  - c. The Chicago Board of Trade (purchased by the Chicago Mercantile Exchange and now part of the CME Group) changed the specifications of their wheat futures contract in fall 2009 to allow for a variable market-based storage rate (i.e., variable storage rates with the cost of storage either expanding or contracting based on the level of futures carry).
  - d. As part of a previous contract changes, the CBOT also added delivery points, changed quality specification, and allowed shipping receipts to be used in favor of warehouse receipts for delivery. It is a general consensus that additional delivery points for KCBT wheat futures are not needed and that shipping receipts can be used as simulated storage with no real grain, as long as the holder of the shipping receipt pays the elevator the storage rate. One question to consider is whether the storage rate in the futures contract specifications should be above/greater than market rate to discourage longs from receiving the wheat and storing it rather than immediately selling that same delivered wheat in the cash market.

5. **Impact of Wide Basis on Country Elevators:** The wide hard red winter wheat cash basis levels that have existed in spring to early summer 2010 have had large impacts on the grain marketing system in Kansas and other U.S. HRW wheat producing regions. If convergence between cash and futures prices had taken place this would increase the profitability of short hedges and offset more of the decline in cash wheat prices.
- a. Some agricultural lenders providing financing for country grain elevators in Kansas have indicated that the lack of convergence between cash and futures prices has caused Kansas grain elevators not to be fully hedged on the wheat they are handling. Dramatically lower than expected cash values for grain in storage has unexpectedly widened the basis causing financial losses for these elevators' net position. The impact of the weaker basis has reduced the equity position of country elevators below expected levels, and consequently has increased their working capital requirements. According to one Kansas lender, in the past they were willing to finance an elevator at 80% of the market value of grain based on futures. The non-convergence may have cost their customers as much as 40 cents a bushel on their cash grain with this loss being caused by the non-predictable change in basis. In their view, lack of convergence between cash and futures had the same net effect as the grain elevator not being fully hedged in their grain merchandising and price risk management practices. These grain elevators had used sound risk management practices in covering their price risk utilizing KCBT futures, but were inadequately covered in terms of the risk caused by extremely wide and non-predictable local basis.
  - b. According to these same lending sources, as a result of the wide wheat basis bids in 2010, in the future many agricultural banks that provide grain elevators with operating loans are likely to either; a) reduce loan limits from 80% down to 60% of stored grain's market value, or b) make other changes to increase loan equity requirements.
  - c. The lack of convergence that leads to restricted credit for grain elevators will likely cause local country grain elevators to bid an even wider basis for cash sales and on their forward contract bids than they have in past years. In the final analysis, restricted loan value to the elevators has the net effect on country grain elevators of widening local grain basis bids and constraining their ability to competitively bid for local grain, perhaps even limiting their ability to purchase grain in local markets (depending on the competitive structure of their local-regional grain market).
6. **Effect of Non-convergence on Cash vs Futures Price Levels:** If convergence between cash and futures prices had occurred; it is assumed KCBT wheat futures prices would have fallen to meet cash prices. Higher futures prices caused several KCBT July wheat put strikes to expire worthless that would have had value if convergence had occurred (i.e., if wheat futures prices had declined to "normal" historical basis levels relative to cash prices). Farmers who purchased puts at those

strikes for price protection lost their put premiums and received a lower cash price too.

7. **Effect of Non-convergence on Insurance Indemnity Payments**: The lack of convergence also reduced indemnity payments from revenue insurance for farmers with yields “near” their APH. Those with yields that are significantly above their APH would still have received no indemnity payments, even with convergence. Those with significant yield losses were paid \$5.42 for every indemnity bushel that is about \$1.00 to \$1.50 higher than the cash price. The worst outcome for insured farmers is half of a crop. Farmers are better off with a zero yield or a bumper crop.
8. **Effect of Full Carrying Charges in Futures on Wheat Basis Levels**: According to the University of Illinois analysis<sup>2</sup>, when grain futures markets have full monthly carrying charge differences from nearby to deferred contracts, then the convergence of futures and cash prices suffers. Irwin et al. reported that when the Chicago Board of Trade (CBOT) wheat spreads exceed 80% of full carry the relatively large carry created incentives for takers of delivery (longs) to hold delivery instruments rather than canceling via load out. At this point a disconnect occurs between the grain and the delivery instrument, and futures are no longer valuing grain but are valuing the delivery instrument.
  - a. The change made in the CBOT wheat contract in 2009 of instituting variable storage rates was meant to discourage longs (receivers of delivered wheat) from holding wheat to capture storage returns rather than selling wheat in the cash market, and thereby helping to bring about convergence of cash and futures prices.
  - b. Periods of large crops with abundant grain supplies and ending stocks prospects are most likely to be associated with low cash prices and full carrying charges in grain futures markets. The current market environment for HRW wheat seems to fit this scenario, with low cash wheat prices, full carrying charges between upfront and deferred KCBT wheat futures contract prices, and a seeming disconnect between cash and futures prices as reflected in historically wide cash basis bids.
  - c. In this abundant grain market situation, it is hypothesized that storage of grain by longs or “receivers” of deliveries may actually isolate grain supplies from availability to the cash market, and improve cash price levels, at least in the short run. This could cease if deliveries of HRW wheat were large enough to make significant wheat supplies available to the market. However, it is unlikely that this action of “supply isolation” would markedly affect cash wheat prices. If it were more costly for the longs to store grain, then just the threat of delivery would likely cause most to exit their futures position rather than take delivery. If there is

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<sup>2</sup> Irwin, Scott H., Philip Garcia, Darrel L. Good, and Eugene L. Kunda, “Poor Convergence Performance of CBOT Corn, Soybean and Wheat Futures Contracts: Causes and Solutions”, Marketing and Outlook Research Report 2009-02, FarmDoc, link at [http://www.farmdoc.illinois.edu/marketing/morr/morr\\_09-02/MORR\\_09-02.pdf](http://www.farmdoc.illinois.edu/marketing/morr/morr_09-02/MORR_09-02.pdf)

a disincentive to take delivery, then there would likely be economic incentive to cause convergence.

9. **Lack of Delivery, Non-convergence, and Dysfunctional Futures Contracts:**

Given that: a) there is an economic explanation for delivery point elevators to deny warehouse receipts to farmers for delivery; b) that farmers are motivated to deliver grain in fulfillment of short futures positions but can't for lack of necessary warehouse receipts, and; c) that KCBT futures represent the consensus price levels arrived at through an open bid, publicly accessible market process, then it appears that all parties are seeking to behave in an "economic manner", each trying to better their economic interests.

- a. The fact that all parties are pursuing their best economic outcomes under the current structure of the KCBT wheat futures contract, and still deliveries and convergence between cash and futures aren't occurring is indicative of a dysfunctional KCBT wheat futures contract that creates a disconnect between future prices and cash prices.
- b. Restated, when all parties are operating in good faith but still delivery and price convergence aren't occurring, it is indicative of the need for changes in the structure of the KCBT wheat futures contract if KCBT futures are to remain as an effective hedging instrument for grain elevators and wheat farmers.

**Possible Solutions to Lack of Cash-Futures Convergence:**

1. **Variable Storage Rates:** The KCBT could either; a) allow the storage rate to increase to a market level, or b) implement a variable storage rate (VSR). This may encourage more elevators to issue more registered warehouse receipts for delivery. The KCBT would need to make the change. However, it has been argued by some market participants that this change in contract specifications may not cause the markets to converge either, and could adversely affect commercial longs (wheat millers, others) who regularly need to store wheat for later use.
  - a. For the VSR option, the possible need to allow for increases in the grain storage rates specified in the KCBT wheat futures contract depends on whether or not those rates are less than those charged at regular grain elevator delivery facilities.
2. **Use of Shipping Certificates or Demand Certificates in the Grain Futures Delivery Process:** Recently the CBOT wheat futures contract changed from requiring a warehouse receipt to allowing a shipping certificate as substitute for a warehouse receipt acceptable for delivery. This was a move designed to encourage cash market sales of wheat delivered on the CBOT wheat futures contract. However, shipping certificates of grain can still be held by longs or receivers of grain for later cash sale, and under certain conditions do not have to immediately be loaded out or sold into the cash market.

- a. Requirement of demand certificates for delivered grain would be an even more deliberate step towards requiring immediate cash market sales of grain deliveries. Those critical of the use of demand certificates for deliveries worry about the disruptive nature of the binding, forced cash sales associated on regular delivery grain facilities.
  - b. If demand certificates were used for deliveries, regular delivery elevators could find themselves forced or constrained to sell and arrange transportation for grain in situations when either grain transportation is in short supply or there is a lack of willing buyers in the cash grain market. Forced cash sales associated with demand certificates could detract from the ability of these regular delivery facilities to perform their normal daily functions as they would be forced to prioritize the sale and transport grain delivered by means of a demand certificate in a timely manner.
  - c. Allowing for these criticisms, the use of demand certificates in the delivery process would be one means of forcing grain that has been delivered by short futures position holders into the cash grain market in a timely manner, and thereby helping to bring about convergence of cash and futures grain prices.
3. **Cash Settlement:** Minneapolis Grain Exchange (MGEX) trades a hard red winter wheat index contract that is cash settled based on DTN reported cash bids. The cash settlement process would inherently force convergence. However, cash bids reported on DTN do not necessarily mean or represent actual cash sale prices. Also, the HRW wheat cash bids are from across the country, not just in the major production areas. In other words, there may be questions about the weighting of HRW wheat production and subsequent proportional representation of HRW wheat sales in regards to the aggregate HRW cash price index.
- a. The MGEX HRW wheat index is not large enough (low trade volume to date) for major elevators to hedge. That said, gain from hedging would have been less than expected because in the fall of 2009 the basis between MGEX and KC wheat was over 90 cents. The HRW wheat basis has widened by about 24 cents since last fall, so MGEX would have generated a hedge profit that was 24 cents larger.
  - b. If crop insurance had used the MGEX HRW wheat index for price discovery, then the initial price would have been about 90 cents lower than the current CRC/RA price. The change in price would have been 24 cents greater using MGEX HRW wheat index for price discovery and would have caused revenue indemnity payments to be slightly larger for farmers with yields “near” their APH crop yield. However, it would have cut the indemnity payments by about 90 cents per indemnity bushel for farmers with severe yield losses. The lack of trading volume would be a major problem with using the MGEX HRW wheat index contract for price discovery in the revenue insurance contract.
4. **Experience from CBOT Wheat & SRW Wheat Cash-Futures Markets:** The changes that were made to the Chicago wheat contract appear to be helping with

convergence. If the CBOT wheat contract starts providing better convergence (i.e., better performance relative to cash wheat market prices) then it is possible that over some time period HRW wheat hedges by grain elevator could shift to Chicago from Kansas City. This result could be constrained in the long run by the ability of grain elevators in the central and southern plains to find some means of delivering grain on the CBOT contract.

- a. If the CBOT were to add the Gulf as a delivery point, that would make it feasible to deliver HRW on the Chicago contract. This would only happen if HRW wheat prices at the Gulf were out of line with soft wheat prices.

5. **Wheat Production & Supply Responses – More Grazing & Less Wheat**

**Production in Southern-Central Plains:** In some areas of the southern and central plains, wide wheat basis levels will likely lead to increased grazing of wheat. According to Texas A&M Extension economists, wheat producers with few alternative cropping options are likely to respond to wide wheat basis levels by grazing the crop or using it as a forage source. As they shift focus towards forage use and away from grain production in the wheat enterprise, less fertilizer and higher priced certified seed will likely be used this fall. These production changes and the possibility of sharply lower HRW wheat acres seeded in fall 2010 would be anticipated to begin the process of supply-demand adjustments that are likely over time to impact cash wheat prices. That said, whether adjustments in basis bids occur back toward historical levels will likely depend on the delivery process and financial management factors discussed above.

## **Conclusions & Implications for Farmers' Marketing Decisions**

In the short run, Kansas grain basis levels are expected to remain wide because of a combination of wheat market supply-demand factors and the likelihood that KCBT HRW wheat futures delivery mechanisms designed to bring about convergence of cash and futures prices aren't functioning as well as designed and intended. Furthermore, with limited available storage space in Kansas and a sizable 2010 HRW wheat crop, large feedgrain and oilseed harvests in fall 2010 could lead to wider than normal harvest basis levels for those crops as well.

If tight grain storage conditions persist in Kansas and other HRW wheat producing regions, it may encourage construction of more on-farm storage. Should wide basis levels and low prices / profitability continue for the HRW wheat enterprise over a long period of time as had occurred for SRW wheat in the eastern Corn Belt, it would likely lead to changes in the composition of crop acreage in HRW wheat production regions, with acres shifting away from wheat to other crop enterprises.

**Implications for Farmers Grain Marketing Decisions:** The current market conditions have created additional basis risk because hedgers can no longer count on cash-futures convergence at delivery points. If hedgers could count on the wide basis to remain, then efficient hedging could continue. One would just add 50 cents to the historical basis. The new source of risk that has been introduced is the non-predictability of the

basis due in part to delivery issues that limit the economic forces causing convergence. In addition there is clearly no way to guarantee that wheat basis will remain stable at currently wide levels. It is very possible that market forces will cause wheat basis to narrow or even return to historically “normal” levels in the future.

**Therefore, it is important that farmers avoid being caught on the wrong side of the wheat basis if and when it narrows.** Contrary to normal, farmers now may be facing a much larger risk of a stronger (i.e., narrower) wheat basis if they forward contract grain for future delivery to country grain elevators. Wheat basis is likely to strengthen if supply-demand factors such as a major U.S. or foreign wheat crop failure or a dramatic reduction in U.S. winter wheat acreage occurs. If at the same time with this short crop scenario, farmers who pre-harvest forward contracted at wide basis levels were to have a crop failure on their own operation, then they would be forced later on to fill their forward contract obligations by purchasing higher priced grain during a period of higher futures prices and stronger basis levels than reflected in their forward contracted price.

For these reasons, farmers may want to avoid locking in wide basis levels as they forward price grain in 2010-11. Forward pricing of wheat without locking in wide basis levels can be accomplished by using short hedges, by purchasing puts, or in some cases by finding a grain elevator offering an open basis contract, also call hedge-to-arrive contract. These grain marketing tools allow for protection from volatile futures prices without commitment to wide cash basis levels.