

## **1. HRW Wheat Basis and Cash/Futures Convergence Issues**

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*Daniel O'Brien was raised on a grain and livestock farm in south central Nebraska, in which he still has an interest with his father and three brothers. He received both Bachelor of Science (1978) and Master of Science (1980) degrees in Agricultural Economics from the University of Nebraska-Lincoln. The focus of his M.S. thesis was on analyzing the impact of agricultural cooperatives on rural Nebraska fertilizer markets. O'Brien then worked as an extension agent in western (Lincoln County) and northeastern (Pierce County) Nebraska for seven years beginning in early 1981. While attending graduate school at Iowa State University beginning in 1987, O'Brien worked as an Extension Assistant in Agricultural Marketing, focusing on analysis of grain and livestock markets and price risk management strategies. He completed his Ph.D. in December 1993, focusing his dissertation research on developing a method by which to forecast the probability of alternative U.S. harvest time corn futures price outcomes. While working as Extension Farm Management Specialist in Northwest Iowa during 1993 through early 1995, he became heavily involved in analysis of the structural changes in the Iowa livestock industry associated with contract hog production. From March 1995 through May 2003, O'Brien worked as the Extension Agricultural Economist in Northwest Kansas based out of the Northwest Research and Extension Center in Colby. He held the position of Northwest Area Extension Administrative Director starting in June 2003 before returning to his Extension Agricultural Economist position in January 2007. Daniel O'Brien's ongoing extension and applied research interests and efforts are in the areas of a) grain market supply-demand analysis, bioenergy impacts and price-income risk management strategies, b) grain industry market structure, conduct and performance – focusing on grain handling and transportation issues, and c) economic analysis of irrigated and dryland cropping systems, and associated cropland leasing arrangements..*

### **Abstract/Summary**

*This panel discussion will revolve around the recent wheat basis/futures/cash convergence issue. There is a perception of the Kansas grain industry that the KCBT wheat futures contract is being influenced by financial and other outside market interests in addition to wheat market supply-demand, though some researchers disagree as well. This discussion will examine the chronology and impact of recent specification changes to flexible storage rates and changes in delivery points and/or mechanisms that have occurred in the CBOT wheat contract, and evaluate whether the KCBT contract (with its fixed maximum storage rates - different now from CBOT) has a hand in some of the non-convergence issues that are happening. There is much to discuss on this issue, with the likelihood that slow wheat movement this summer is setting things up for full elevators and little room for fall crop harvest issues later in the year.*

# HRW Wheat Basis & Cash/Futures Convergence Issues in 2010

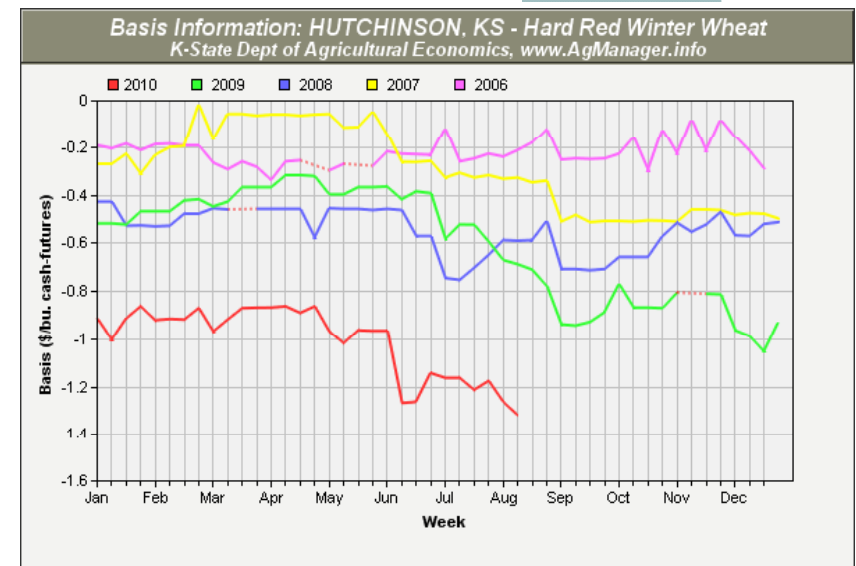
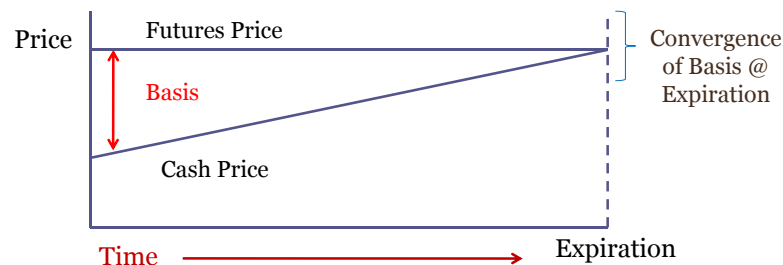
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## Situation: Widening Wheat Basis

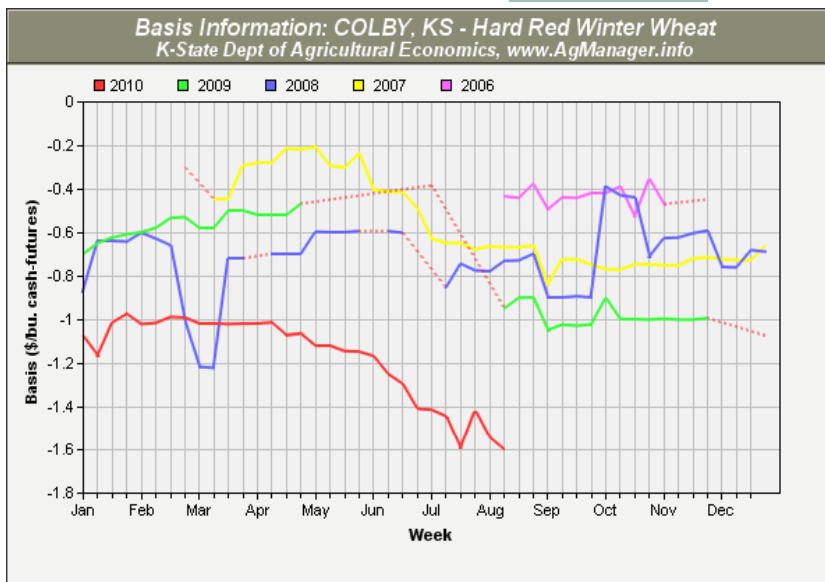
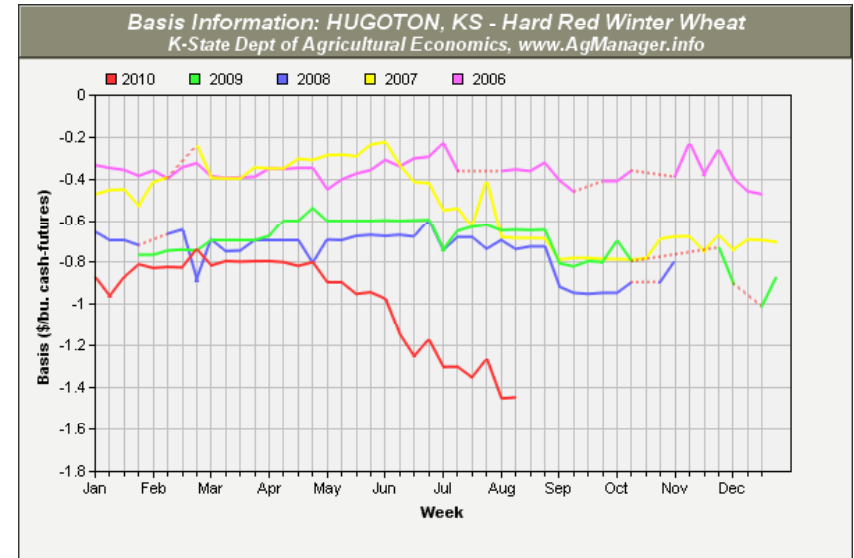
- The cash basis differential between Kansas cash wheat prices and the July - September 2010 Kansas City Board of Trade (KCBT) wheat futures contracts has widened sharply since mid-June, 2010
  - Central KS: \$1.20 - \$1.30 /bu under KCBT
  - Western KS: \$1.50 - \$1.60 /bu under KCBT
- These wheat basis levels were as much as \$0.40-\$0.80 per bushel wider during June-August 2010 than any time since at least 1998.

## Convergence of Cash & Futures

- The pattern of cash & futures prices tending to come together at contract expiration
  - In efficiently functioning markets, **Grain Basis** will tend to approach **zero** at the delivery market as the nearby futures contract expires



# Wheat Basis Spread @ Country Elevator Near Hutchinson, KS (August 2009 - August 2010)



## What is affecting HRW Wheat Basis?

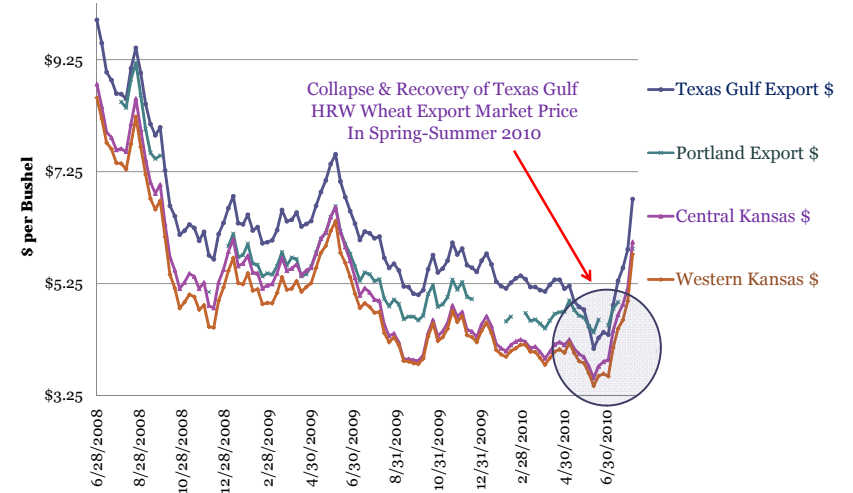
- Question #1:
  - Do local, domestic & world wheat supply-demand factors explain the difference in local cash and futures markets?
- Question #2:
  - Are the delivery mechanisms designed to bring about convergence between cash HRW wheat prices and KCBT futures actually functioning? If so, then how well?

## To Be Discussed...

- 1) How cash HRW wheat markets are reflecting real market value for wheat & have diverged from KCBT wheat futures
- 2) Potential net prices from delivery on short positions on KCBT wheat futures
- 3) Availability of warehouse receipts from delivery point elevators that are required in the delivery process
- 4) Effect of wider than expected basis levels on farmers, crop revenue-based insurance coverage, grain elevators, & ag financial institutions
- 5) Potential solutions to the issue of non-convergence in HRW wheat cash & KCBT wheat futures markets.

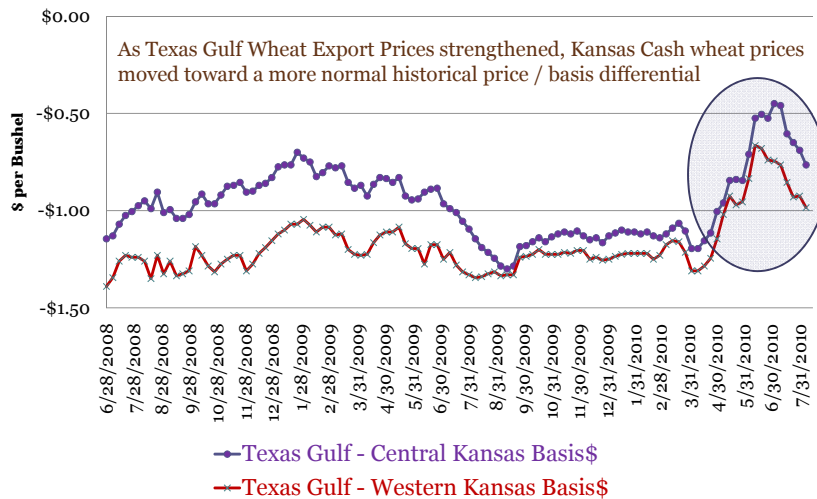
## KS Wheat \$s vs Texas Gulf & Portland

Weekly (June 28, 2008 thru August 14, 2010)



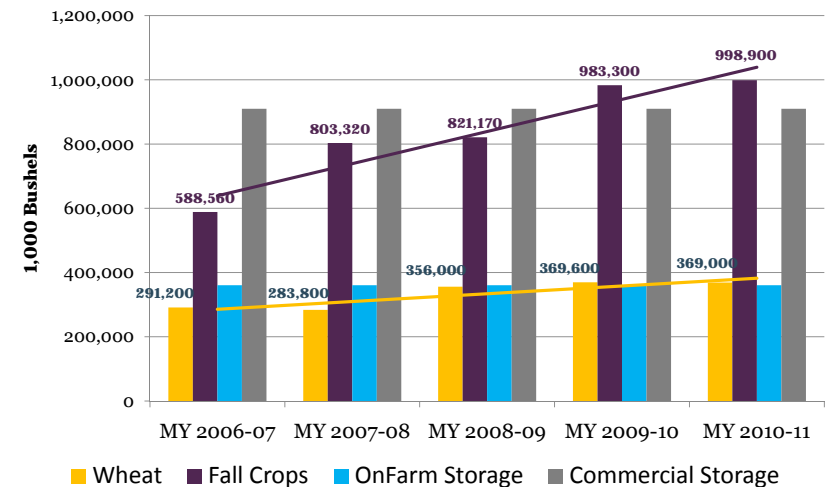
## Kansas Wheat Prices vs Texas Gulf

Weekly (June 28, 2008 thru August 14, 2010)



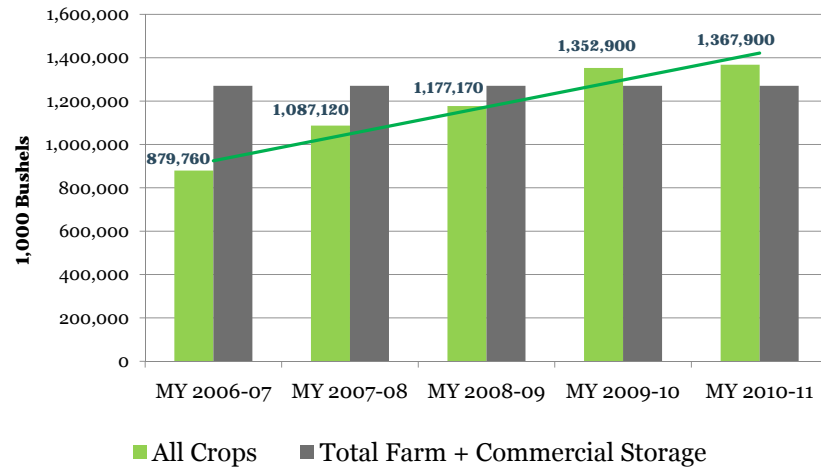
## KS Crop Production vs Storage Capacity

MY 2006-07 through MY 2010-11



# Total Kansas Crops vs Storage

MY 2006-07 through MY 2010-11

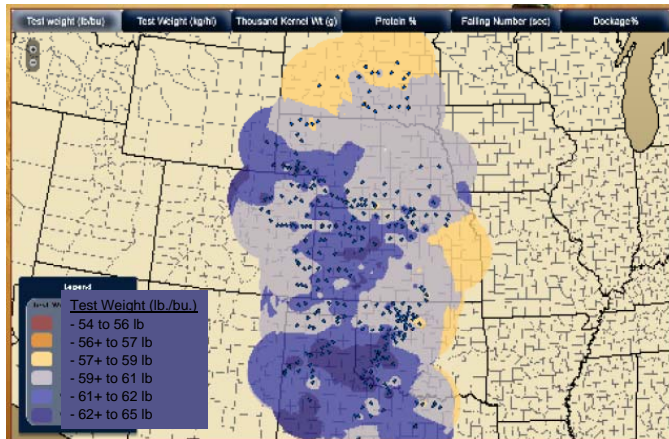


# Kansas Wheat Protein: 2006 - 2010\*

Area of Kansas	2006	2007	2008	2009	2010 Average	2010 Low	2010 High
K1 – Hugoton	12.5%	9.0%	13.4%	12.4%	12.6%	11.7%	13.6%
K2 – Garden City	13.0%	9.6%	13.4%	12.0%	12.4%	11.1%	14.1%
K3 – Dodge City	13.2%	9.9%	13.1%	11.9%	12.2%	11.0%	13.2%
K4 – Great Bend	11.7%	10.8%	11.6%	11.4%	12.2%	11.2%	13.1%
K5 – Wichita	12.0%	10.5%	12.2%	11.4%	12.5%	10.7%	13.6%
K6 – Colby	12.9%	9.9%	13.1%	11.8%	11.6%	10.3%	12.4%
K7 – Hill City	12.9%	9.8%	12.6%	11.6%	11.5%	11.0%	12.2%
K8 – Salina	11.9%	10.5%	11.9%	11.9%	11.9%	10.6%	12.9%
K9 – Concordia	12.6%	10.0%	12.1%	11.9%	11.5%	11.2%	11.8%
K10 – Topeka/NE KS	na	na	12.5%	11.4%	12.1%	11.4%	12.6%

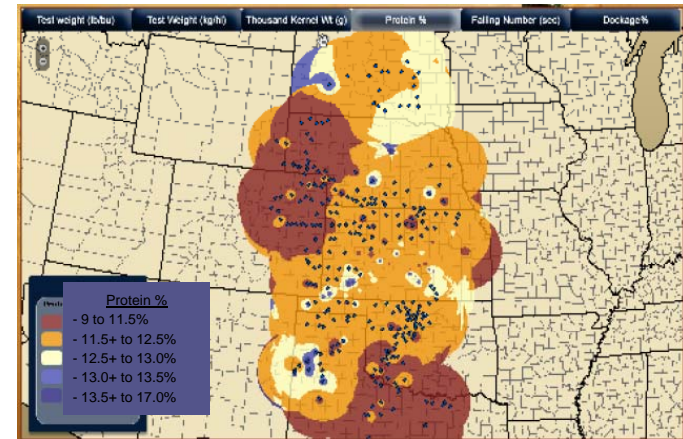
# Grain Plains Wheat Test Weight Map

Source: Plains Grains Inc., August 9, 2010



# 2010 Grain Plains Wheat Protein Map

Source: Plains Grains, Inc., August 9, 2010



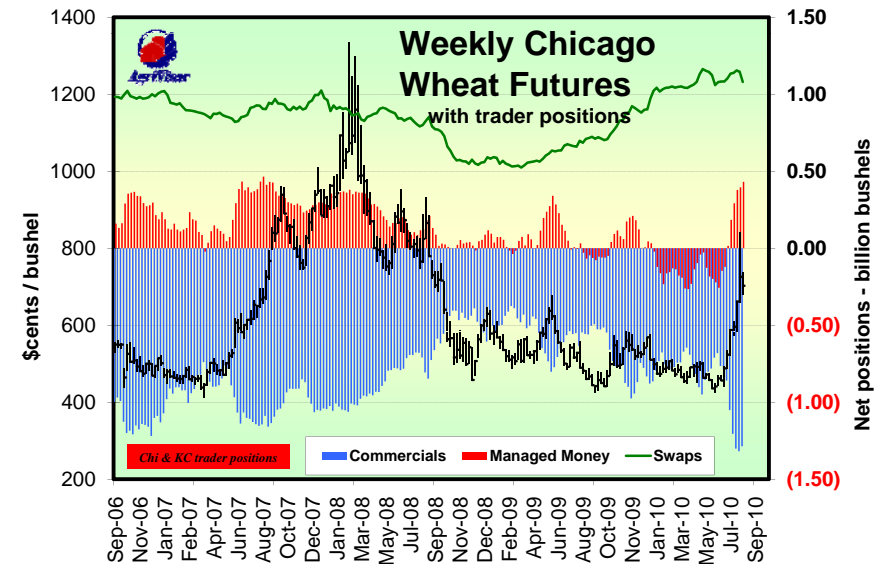
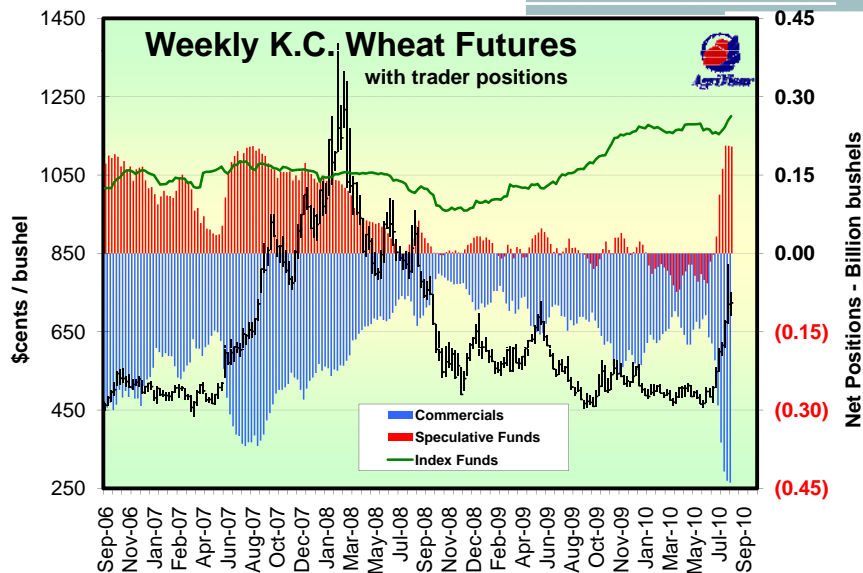
## Cash Markets Reflecting Wheat S-D

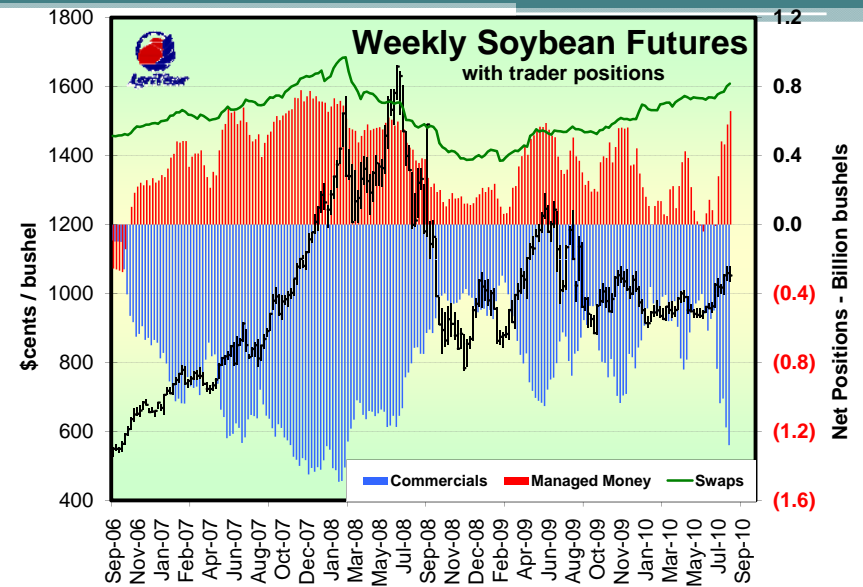
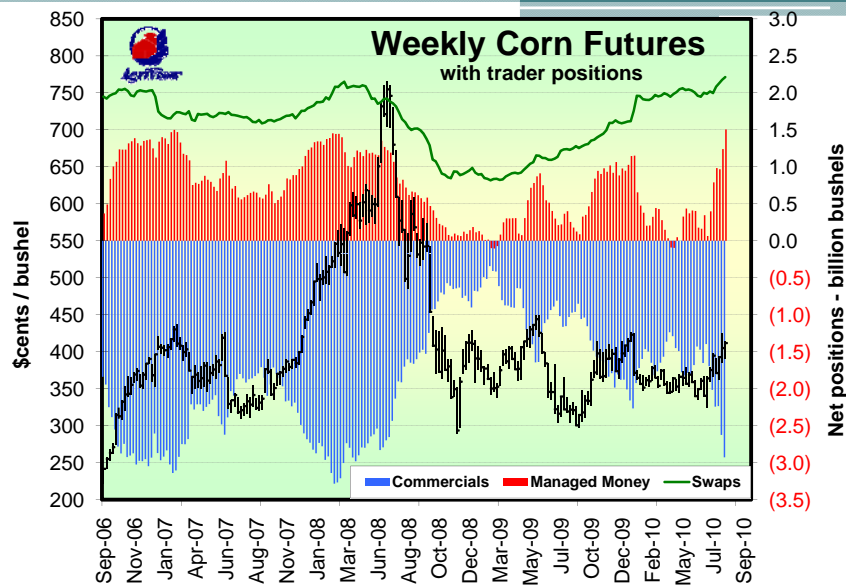
- Cash hard red winter wheat prices have been reflecting the real market value of wheat (Barnaby & O'Brien)
  - **Market Value** = the export value of HRW wheat plus the transportation costs to bring it to port in competition with the value of HRW wheat processed by U.S. millers for consumption in domestic food markets.
- **If** cash prices reflect wheat S-D, **then** current KCBT wheat futures would need to **decline** for **convergence** to occur
  - Convergence of cash & futures is necessary for effective grain hedging / risk management of wheat
    - Non-convergence impacts farmers, grain elevators, ag lenders, wheat millers, grain exporters, etc.

## Why has HRW Wheat Basis Widened?

### A combination of 2 factors:

- Influence of Wheat Supply-Demand Factors
  - Weak U.S. wheat exports in early 2010
  - Storage supply-demand issues & oversupply in the U.S.
  - HRW wheat protein concerns
- Dysfunctional delivery mechanism for HRW Wheat futures contracts
  - There is no effective way to deliver enough HRW wheat to force convergence between cash & KCBT futures prices





## Potential Price Benefits of Delivery

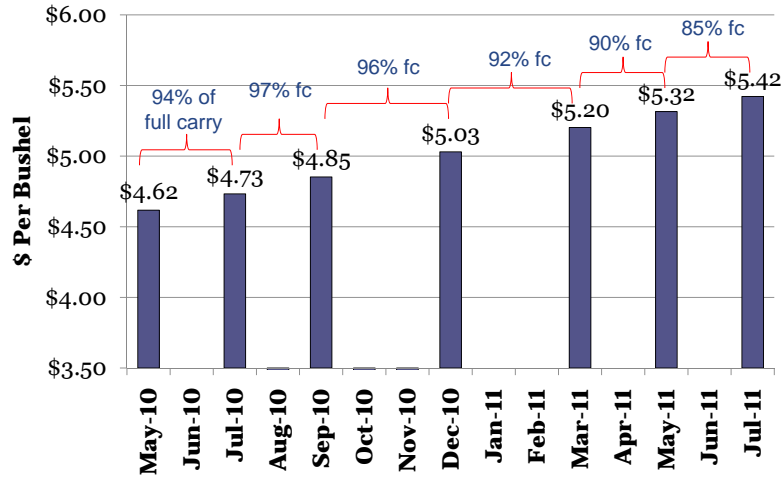
- The KCBT wheat futures contract specifies a locational differential for Hutchinson that is 9 cents under the KCBT futures price
  - On August 10<sup>th</sup> the cash price in Hutchinson was **\$6.02 /bu** or **\$1.10 under** the **KCBT Sept 2010 wheat** futures (\$7.12 /bu)
- Delivery Price\$ @ Hutchinson (8/10/2010) = \$6.95 /bu
  - KCBT Sept 2010 Wheat = \$7.12 /bu
  - Less max. load out fee (KCBT contract) = (\$0.08 /bu)
  - Less Hutchinson \$ differential = (\$0.09 /bu)
  - **Delivery Price @ Hutchinson = \$6.95**
  - Gain over local \$6.02 cash price = \$0.93 /bu

## Delivery-Arbitrage & “Full Carry” Issues

- In theory, the delivery facility or other short position holders would buy cash wheat, make delivery on the futures contract and “capture” the \$0.93 per bushel gain
  - Repeating this arbitrage process should put *upward pressure* on the cash price & *downward pressure* on the futures price, eventually bringing about cash-futures convergence
- Convergence Problems with “Full Carry” Futures
  - Those taking delivery of the futures do not have economic incentives to “load-out” or sell in the cash market (*instead, they store & capture the full futures “carrying charges”*)
    - Delivery “takers” (“long” or buy positions) have incentive to a) store grain indefinitely, or b) redeliver on later contracts

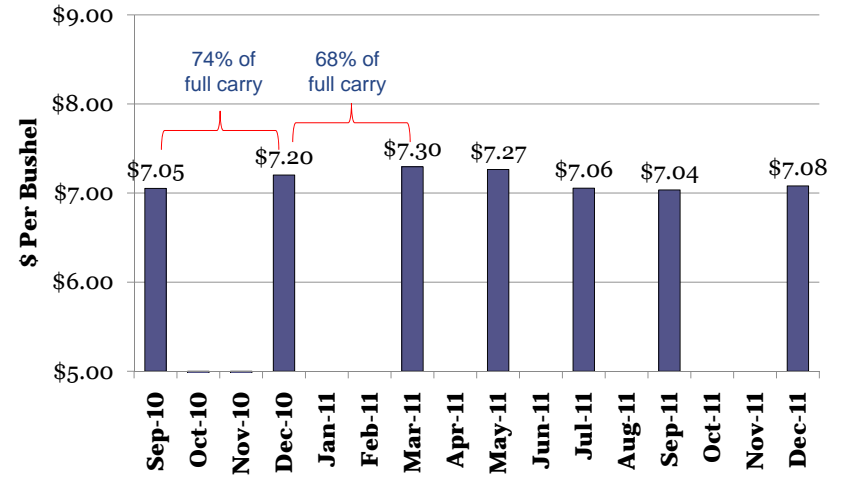
## KCBT Wheat Futures

Monthly Carrying Charges: March 31, 2010



## KCBT Wheat Futures

Monthly Carrying Charges: August 19, 2010



## KCBT Wheat Futures Contract Specifications – Open Outcry

- **COMMODITY:** Hard Red Winter Wheat Futures
- **Contract Unit:** 5,000 bushels.
- **Delivery Months:** July, September, December, March, May.
- **Delivery Mechanism:** Physical; registered warehouse receipt issued by regular elevators.
- **Deliverable Grades:** No. 2 at contract price with a maximum of 10 IDK per 100 grams; No. 1 at a 1 1/2-cent premium.
- **Delivery Points:** Kansas City, Missouri-Kansas; Hutchinson, Kansas at a 9 cent discount, *Salina/Abilene, Kansas at a 12 cent discount; Wichita, Kansas at a 6 cent discount.*
- **Delivery Standards:** When warehouse receipts are surrendered to the issuer for load-out, the taker of delivery shall have the option to, at the taker's expense, request in the written load-out instructions that the wheat contain no more than 4 ppm of deoxynivalenol (vomitoxin).
  - A determination of the level of vomitoxin shall be made at the point of origin by the Federal Grain Inspection Service or such other third party inspection service mutually agreeable to the maker and taker of delivery.
  - A determination of the level of vomitoxin shall be based on the average test results of the wheat loaded in a single day from a single warehouse for each taker of delivery.

## KCBT Wheat Futures Contract Specifications (more)

- **Load-out / Storage Rates:** The maximum load-out fee for regular elevators on grain delivered on futures contracts is established at 8 cents per bushel.
  - The maximum insurance and storage charge for regular elevators on grain delivered on futures contracts is established at \$0.0148 per bushel per day.
    - 28 days/month = \$0.04<sup>144</sup> per bushel per month
    - 30 days/month = \$0.04<sup>44</sup> per bushel per month
    - 31 days/month = \$0.04<sup>588</sup> per bushel per month
- **Delivery Notices:** Must be issued and delivered to the KCBT Clearing Corp. before 4:00 p.m. on the second business day preceding the day of delivery, except on the last notice day of the delivery month, when delivery notices may be delivered to the Clearing Corp. until 2:00 p.m. on the last notice day (business day preceding the last delivery day).
- **Last Trading Day:** There is no trading after the business day preceding the 15th calendar day of the liquidating month.
- **First Notice Day:** The business day preceding the first business day of the liquidating month.
- **First Delivery Day:** The first business day of the liquidating month.
- **Last Notice Day:** The business day preceding the last business day of the liquidating month.

## Warehouse Receipts for Futures Delivery

- 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
- It is legal for a regular delivery grain elevator facility to refuse to issue a registered warehouse receipt for futures delivery
  - The Warehouse Act (7 CFR 735.300(b)) simply states that federally-licensed facilities may not discriminate between firms/farmers requesting warehouse receipts

## Operators (Grain Elevators) Regular for Delivery for KCBT Wheat Futures (Revised as of May 21, 2010)

Location	Number of Grain Elevators	Range in Grain Elevator Storage Capacity	Total Grain Elevator Storage Capacity
Kansas City, MO/KS	7	927,000 bu. to 10,083,000 bu.	34,176,000 bu.
Hutchinson, KS	6	1,869,000 bu. to 18,307,000 bu.	37,899,000 bu.
Salina/Abilene, KS	4	1,304,000 bu. to 30,289,000 bu.	44,813,000 bu.
Wichita, KS	3	5,824,000 bu. to 22,459,000 bu.	36,771,000 bu.

## Deliverable Wheat vs Operator Elevator Capacity

(As of May 21, 2010)

Delivery elevators were unwilling to take delivery & “lose control” of the facilities

Location	Date	Deliverable Wheat Stocks (bushels)	Undeliverable Wheat Stocks (bushels)	Total Wheat Stocks (bushels)	Total Grain Storage Capacity (bushels)	% Total Wheat Stocks of Storage Capacity
Kansas City	6/18/2010	10,961,000	145,000	11,110,000	34,176,000	32.5%
	6/19/2009	5,412,000	149,000	5,557,000	34,176,000	16.3%
Hutchinson	6/18/2010	16,823,000	0	16,823,000	37,899,000	44.4%
	6/19/2009	6,639,000	0	6,639,000	37,899,000	17.5%
Salina/Abilene	6/18/2010	16,508,000	773,000	17,281,000	44,813,000	38.6%
	6/19/2009	8,726,000	896,000	9,622,000	44,813,000	21.5%
Wichita	6/18/2010	19,583,000	1,999,000	21,582,000	36,771,000	58.7%
	6/19/2009	6,957,000	2,434,000	9,391,000	36,771,000	25.5%
Total 4 Locations	6/18/2010	63,875,000	2,917,000	66,792,000	153,659,000	43.5%
	6/19/2009	27,734,000	3,479,000	31,213,000	153,659,000	20.3%

## Fixed Storage Rates on KCBT Deliveries

- KCBT Wheat contract specifies a **fixed storage rate** of \$0.00148 per bushel per day ( $\approx 4 \frac{1}{2}$  cents/bu/month) on wheat delivered to delivery point elevators
  - Given tight grain storage in 2010, regular delivery point grain elevator could be forced to accept “below market” grain storage fees on wheat that has been delivered by short or sell position holders
- If “longs” who receive physical delivery choose **not to sell in the cash market** but instead to **store at the regular delivery facility**, they pay (**only**) the KCBT specified storage rate ( $\approx 4 \frac{1}{2}$  cents /bu/month).

## Storage Hedges in “Full Carry” Futures

- If **full carrying charges** exist in KCBT wheat futures, it may be profitable for “long” position receivers of wheat to store rather than sell the cash commodity
  - True **even if** the storage charges specified in the KCBT wheat contract on delivered grain are nearly equal to delivery elevator storage charges
- Storage Hedge Opportunities in Full Carry Markets
  - By **selling deferred futures** & paying **predetermined storage costs**, it may be profitable for “longs” who received delivery to store than to sell cash wheat

## Recent CBOT Wheat Contract Changes

- Increased # of Delivery Points
  - Added “River Market” Delivery points
    - Chicago, Toledo not in regular “downstream” grain flow
- Changed to “Variable Storage Rates” (VSR)
  - Allowed storage rate on delivered wheat to vary based on the level of futures carrying charges
    - To discourage storage & encourage “load out” cash sales
- Allowed use of “Shipping Certificates”
  - To encourage “shipping” instead of “storing” wheat
    - Effect??? **Now** shipping certificates being held @ mkt value
- Changed Wheat Quality Specifications in Contract

## Wheat Basis Affected by Futures Carry

- **Convergence** of cash & futures **suffers** when futures markets have full monthly carrying charge differences between nearby & deferred contracts
- **When CBOT wheat spreads > 80% of full carry**, then takers of delivery (longs) have incentive to **hold delivery instruments** (i.e., warehouse receipts, etc.) rather than “load out” cash sales (Irwin et al., U. of Illinois)
  - At **80% of full carry** a **market disconnect** occurred between the cash grain & the delivery instrument
    - Futures no longer valued the cash grain – instead they valued the delivery instrument (for its storage returns)

## Why Use a Variable Storage Rate (VSR) for CBOT Wheat?

- **To discourage “longs”** (receivers of grain deliveries) from holding wheat to capture storage returns **rather than** selling wheat in the cash market
  - Increased cash sales from deliveries could help to bring about cash-futures convergence & narrower basis levels
- **Impact on Delivery Point Elevators**
  - **If** the threat of delivered wheat being stored is reduced, **then** Delivery Elevators may be more willing to handle delivered grain & grant warehouse receipts needed in the KCBT wheat delivery process

## Lack of Delivery & Economic Motives

- Given that...
  - Delivery point elevators *deny* warehouse receipts to farmers for delivery for economic reasons
  - Farmers are motivated to deliver grain in fulfillment of short futures positions *but can't* for lack of necessary warehouse receipts
  - KCBT futures represent the consensus price levels arrived at through an *open bid, publicly accessible* market process
- All parties are seeking to behave in an “economic manner”, each following their own economic interests

## Dysfunctional KCBT Wheat Futures

- Even with farmers, delivery elevators & the KCBT all pursuing their *best economic outcomes* under the current KCBT wheat futures contract terms, deliveries & cash-futures convergence are not occurring
  - KCBT wheat futures appears to be dysfunctional, with a *disconnect* occurring between cash & futures markets
- In other words...
  - When all parties are operating in good faith *but still* delivery & cash-futures price convergence are **not occurring**, *then* adjustments seem to be needed in the structure of the KCBT wheat futures contract

## Impacts of Nonconvergence (Wide Basis)

- **Wheat Producers**
  - Price risk management issues
    - Wider, less reliable basis levels in forward contracts & other price risk management tools
  - Crop revenue-based insurance
    - Reduced indemnity payments when harvest period basis is wide (higher futures vs cash prices)
- **Country Grain Elevators**
  - Wider than expected & more volatile local grain basis increases equity / borrowing requirements
    - Risky/lower storage hedge returns in grain merchandising
    - Likely to offer wider basis bids for forward contracts

## Issues to Consider with Solutions

- Variable Storage Rate (VSR) on Delivered Grain
  - Replacing Fixed Storage Rates in KCBT Wheat
- Shipping or Demand Certificates
  - Replacing Warehouse Receipts; Local impacts??
- Cash Settlement of Futures Contracts
  - Need reliable, accurate record of cash transactions
- Long-term Supply-Demand Adjustments
  - Possibly negative to U.S. HRW wheat acreage & enterprises in the long term



## Questions? Comments?

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