Poor Convergence Performance of CBOT Corn, Soybean, and Wheat Futures Contracts: Causes and Solutions

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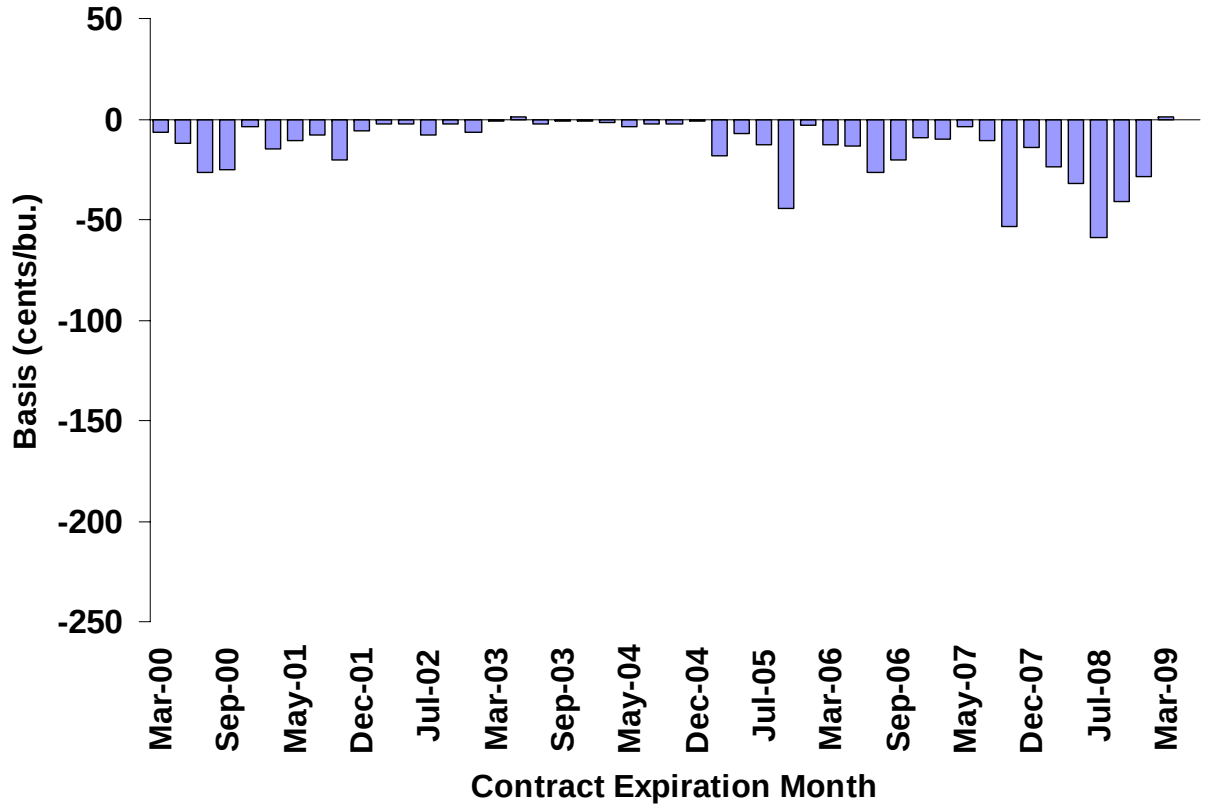
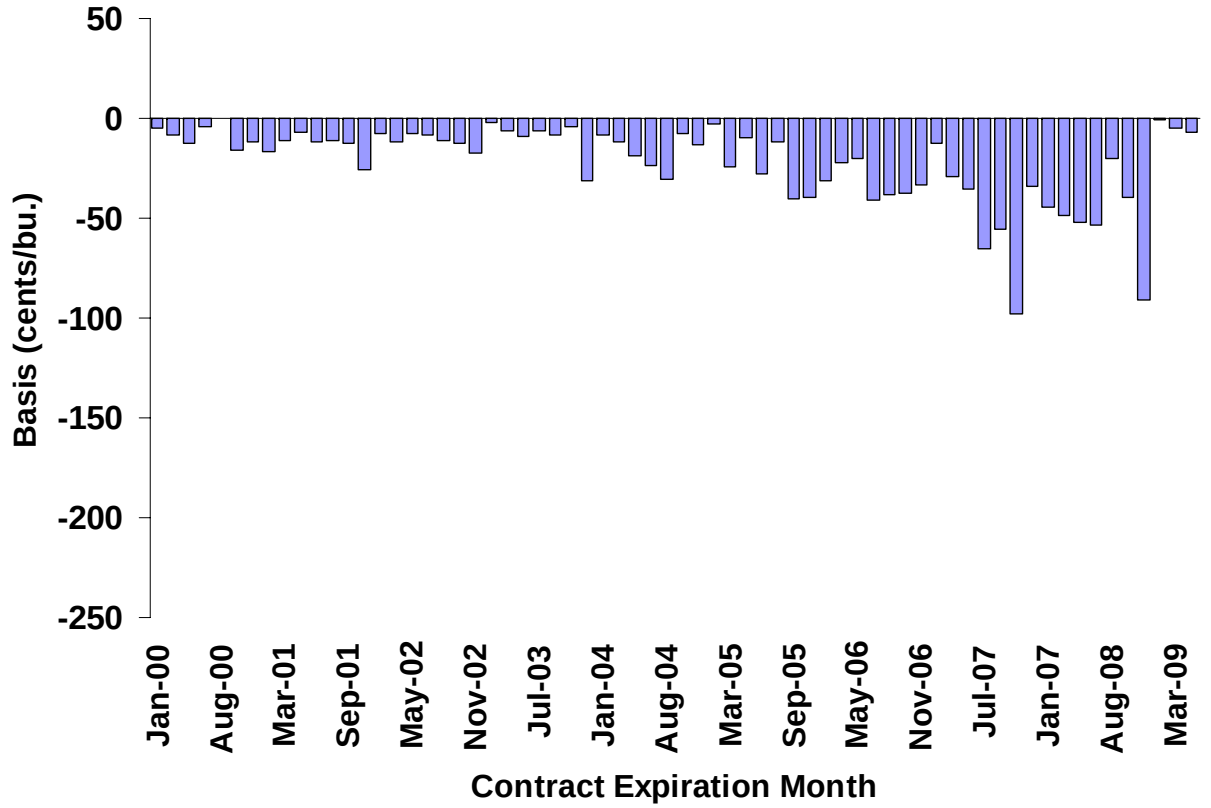
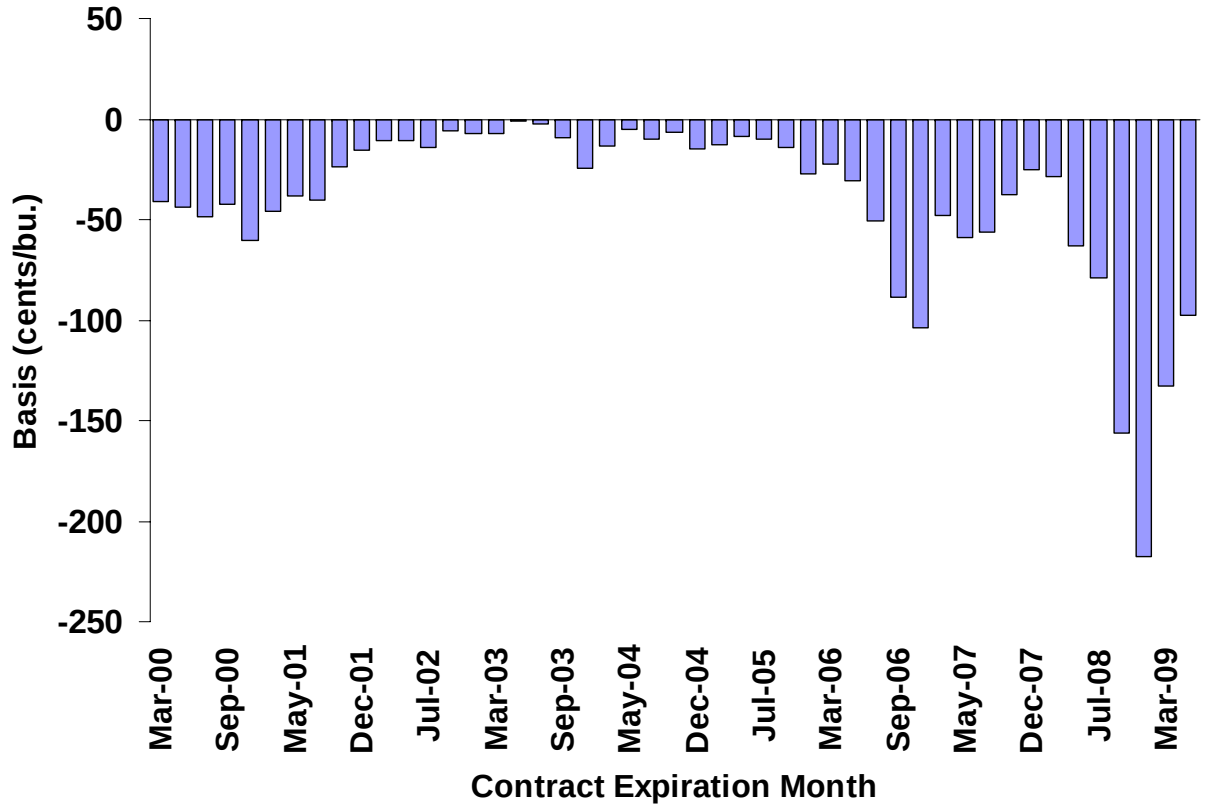
Delivery Location Basis on the First Day of Delivery for CBOT Corn Futures, Illinois River North of Peoria, March 2000 - May 2009



Delivery Location Basis on the First Day of Delivery for CBOT Soybean Futures, Illinois River North of Peoria, January 2000 – May 2009

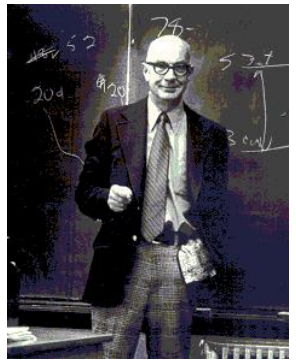


Delivery Location Basis on the First Day of Delivery for CBOT Wheat Futures, Toledo, March 2000 - May 2009



Problems Created by Non-Convergence

- Wedge between futures and cash prices indicates out-of-balance contracts
  - Hieronymus (1977, p. 340) warns, "When a contract is out of balance the disadvantaged side ceases trading and the contract disappears."
- Increased basis uncertainty and loss in hedging effectiveness
  - Long-run viability of markets is threatened



Outline of Presentation

- Causes of non-convergence
- Explaining the large carry in futures markets
- Potential solutions

Major Factors Contributing to Non-Convergence

- Spreads reflecting a relatively high percent of full carry
  - Corn, soybeans, and wheat
- Structural issues related to the delivery process
  - Wheat

CBOT Delivery Instruments

- Corn and Soybeans
  - Shipping certificates since March 2000
  - Provides taker the right to load out barge on Illinois river within 3 days of notification
  - No expiration date

- Wheat
  - Warehouse receipt before July 2008
  - Shipping certificate starting in July 2008

% Full Cost of Carry Calculation

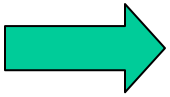
% = [(F2 – F1)/(Storage + Interest Costs)]*100

- F2 = Price of next nearest to expiration futures contract
- F1 = Price of nearest to expiration futures contract
- Storage = CBOT contract rate x # days
- Interest = (3 mo. LIBOR rate)/365 x # days

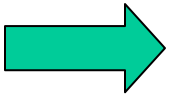
100% of Full Carry occurs when:
(F2 – F1)=(Storage + Interest Costs)

Full Carry and the Decoupling of Cash and Futures Markets

Spreads Go to 100% of Full Carry



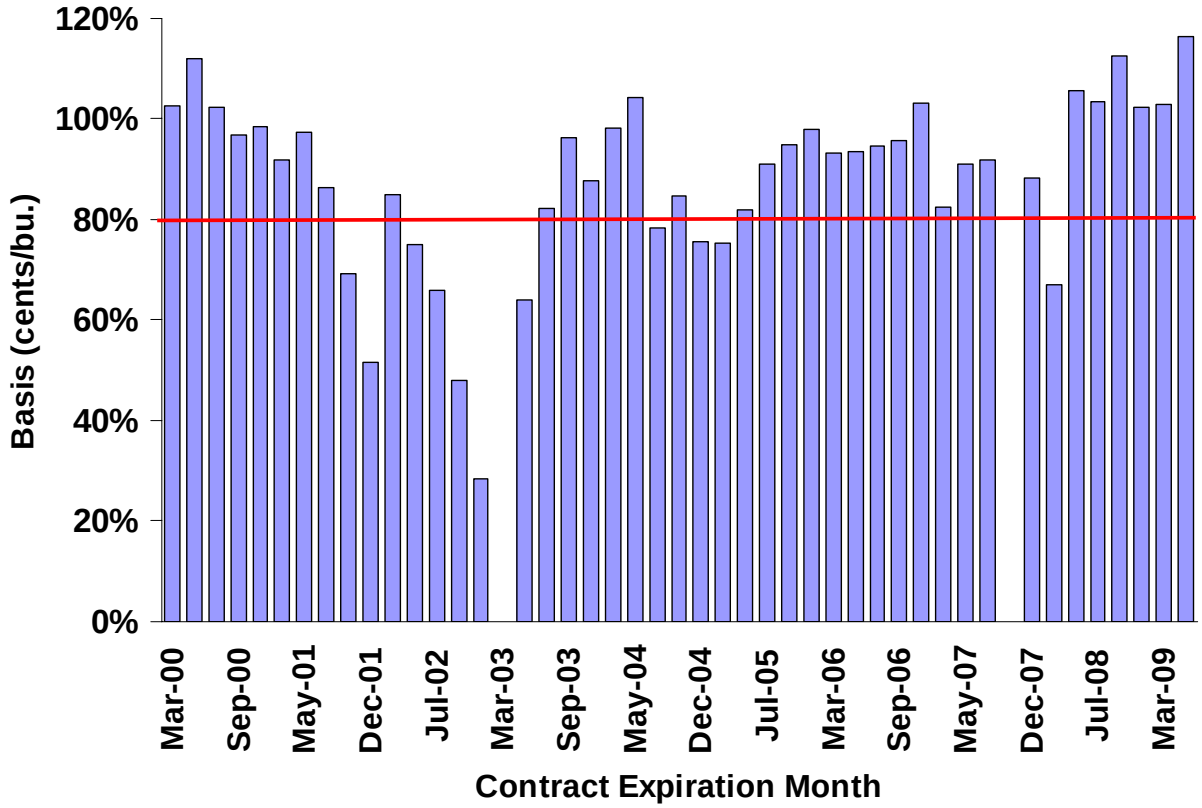
Delivery Takers Hold Certificates and Sell Deferred Futures



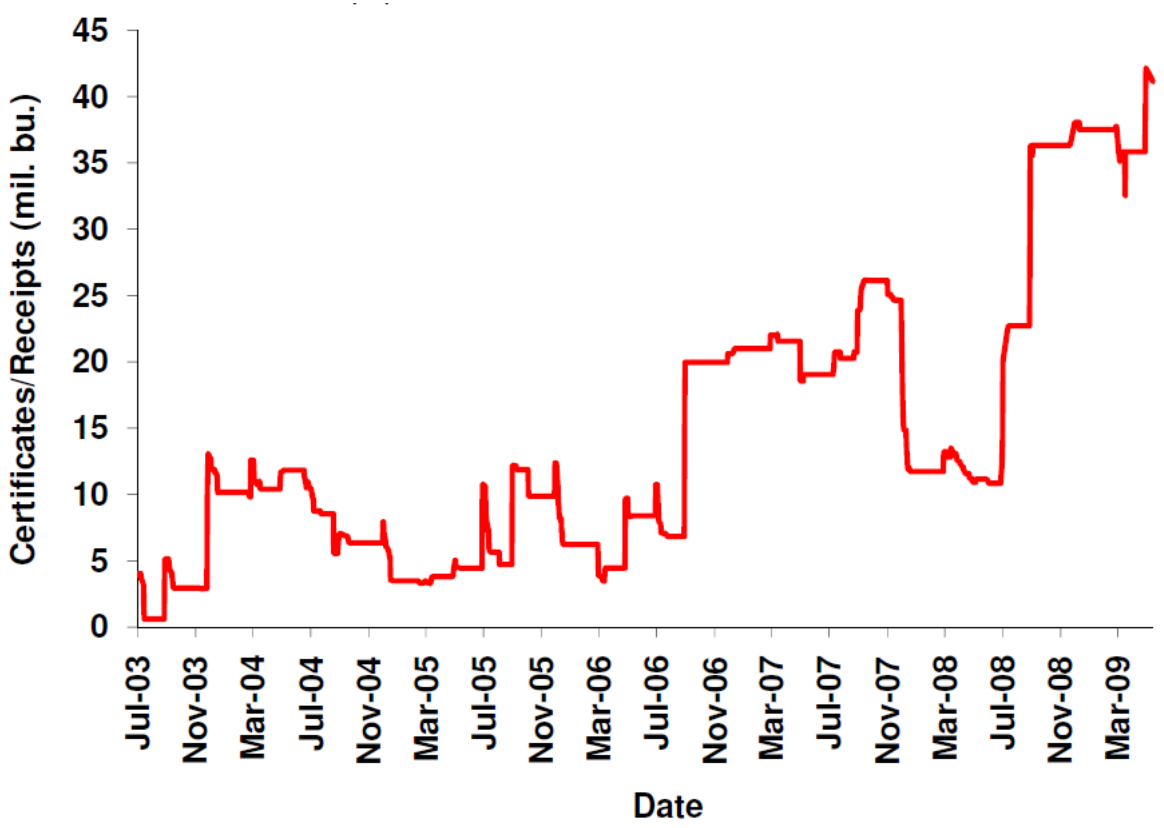
No Load Out to Cancel Certificates

Bottom line: Arbitrage link between cash and futures broken

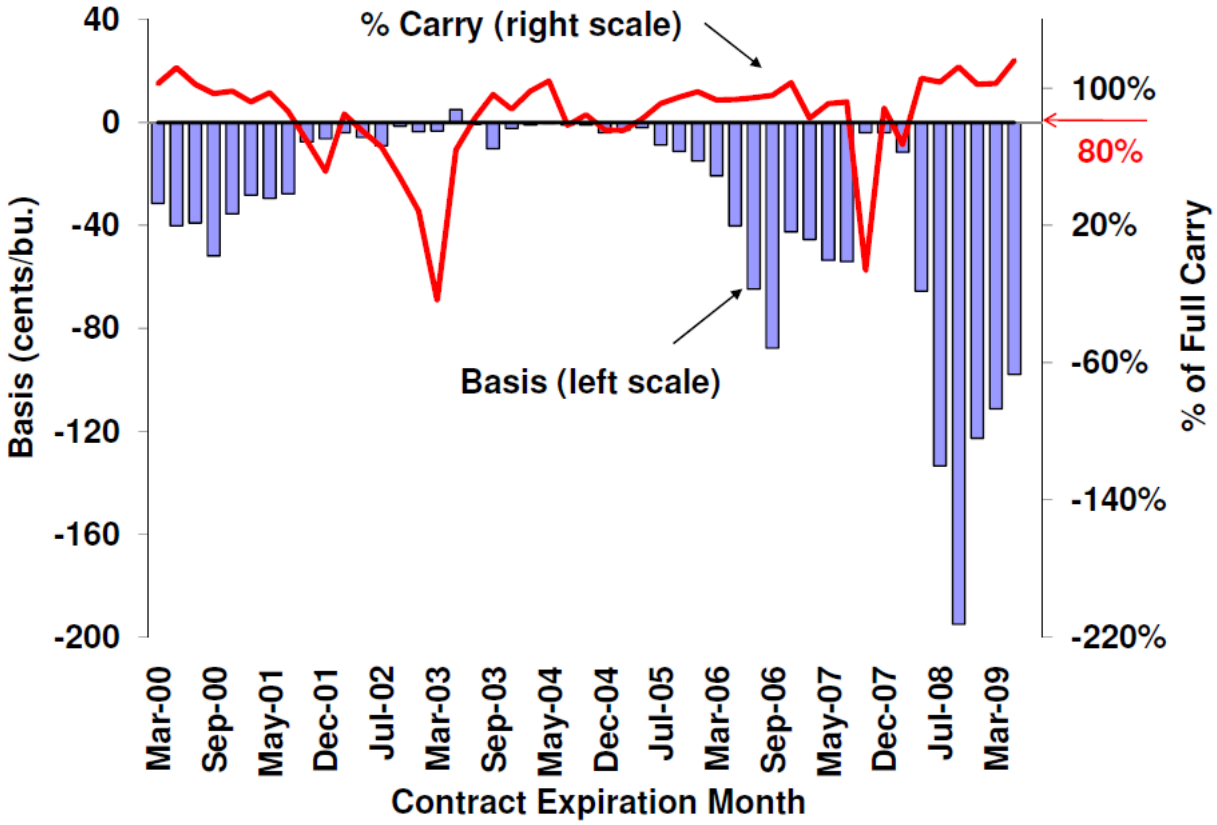
Spread on the First Day of Delivery between Prices of the Expiring and Next-to-Expire Contracts for CBOT Wheat Futures, March 2000- May 2009



Daily Total of Registered Shipping Certificates or Warehouse Receipts for CBOT Wheat Futures, July 2003 - May 2009



Basis and Percent of Full Carry on First Day of Delivery for CBOT Wheat Futures, Toledo, March 2000 – May 2009



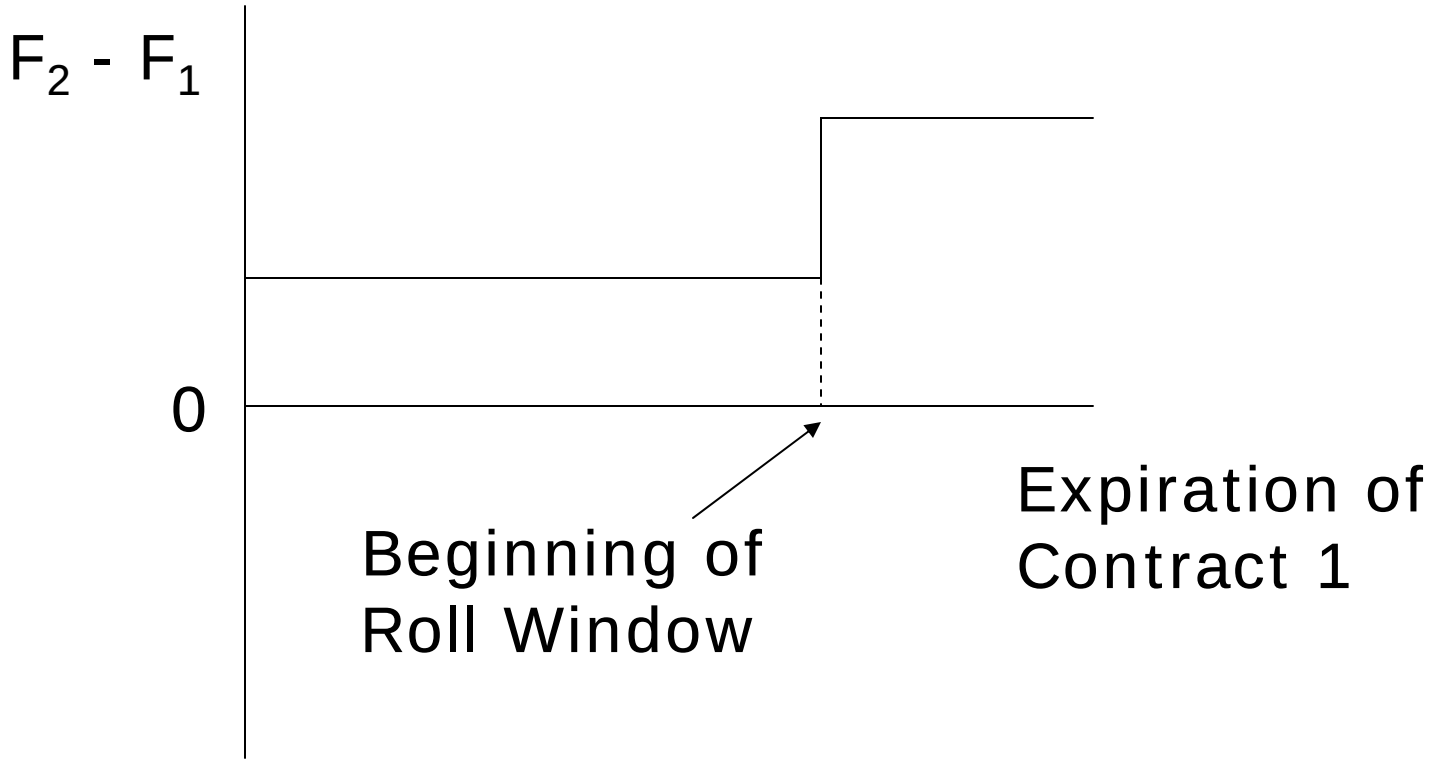
Explaining the Large Carry

1. CBOT maximum storage rates below actual commercial storage costs
2. Presence of large “long-only” index funds
3. Risk premium due to increased uncertainty

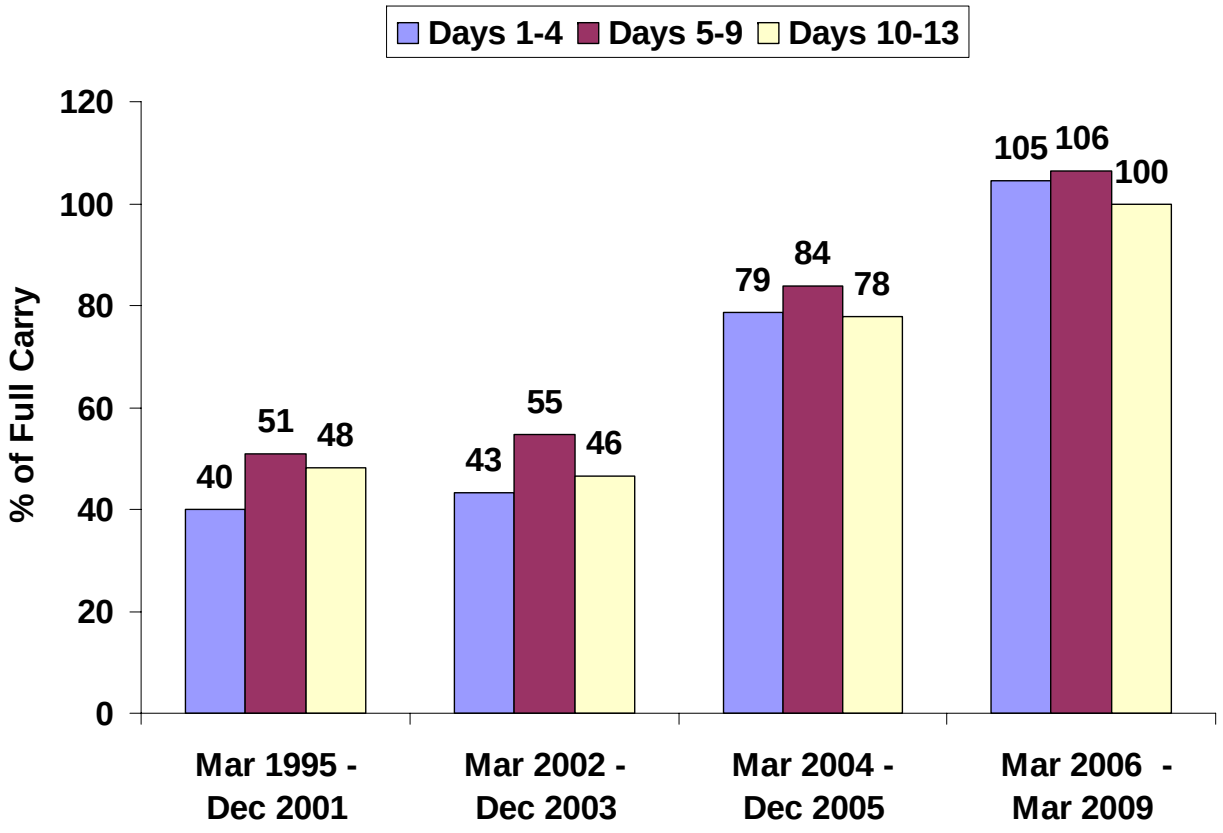
Mid-2008 Comparison of Commercial Storage Costs and CBOT Contract Rates

	CBOT Survey	Contract Rates
Corn	4.3 cents	4.5 cents
Soybeans	4.6 cents	4.5 cents
Wheat	7.1 cents	4.5 cents

"Goldman Roll" Effect on the Nearby Futures Spread



Average Nearby Spreads for CBOT Wheat Futures during the Roll Window of Long-Only Index Funds, March 1995 – March 2009 Contracts



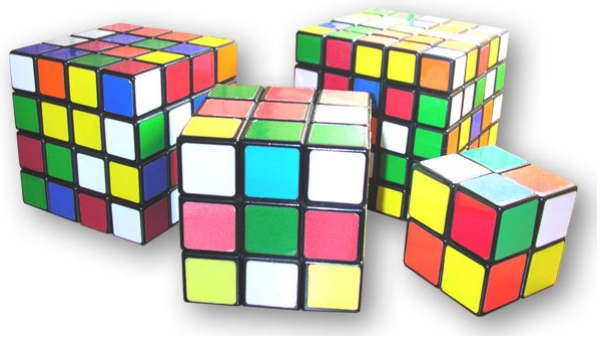
Risk Premium in the Carry – Craig Pirrong

- Positive shock to volatility of fundamental uncertainty increases the precautionary demand for grain inventories
  - Like increased demand for cash in uncertain times
- Leads to an increase in the expected price of storage, as reflected in the spreads between near and deferred futures
  - Adds a risk premium component to spreads

Spread = Storage + Interest - Convenience + Risk Premium

Proposed Solutions to Convergence Problems

- Address the carry
  - Increase contract storage rates
- Address decoupling of cash and futures markets
  - Cash settle
  - Forced load out/demand certificates
  - Limit speculative ownership of certificates
- Address structural issues
  - Additional delivery locations



Revised CBOT Wheat Delivery System (starting with July 2009 contract)

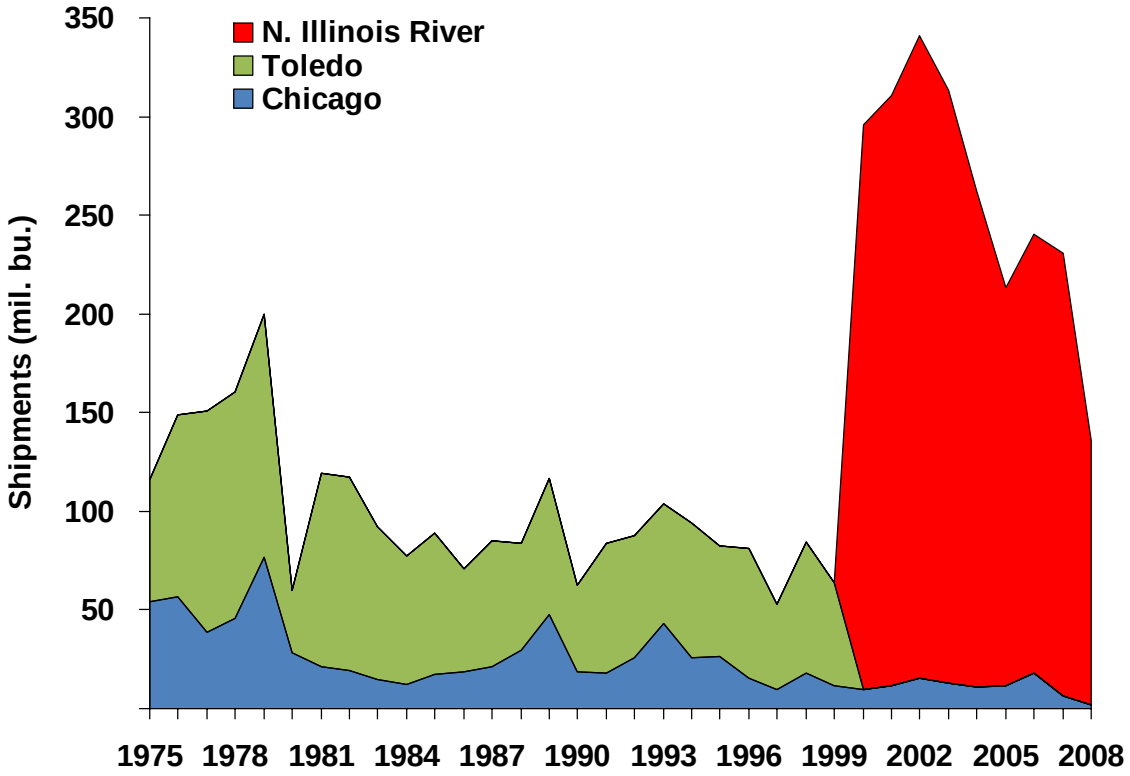
- Seasonal storage rates
- Added delivery locations in Northwest Ohio (shuttle trains)
- Added selected Ohio and Mississippi River barge shipping stations as delivery locations
- Key: "safety-valve" pricing differentials relative to Chicago and Toledo

Ideal Physical Delivery System

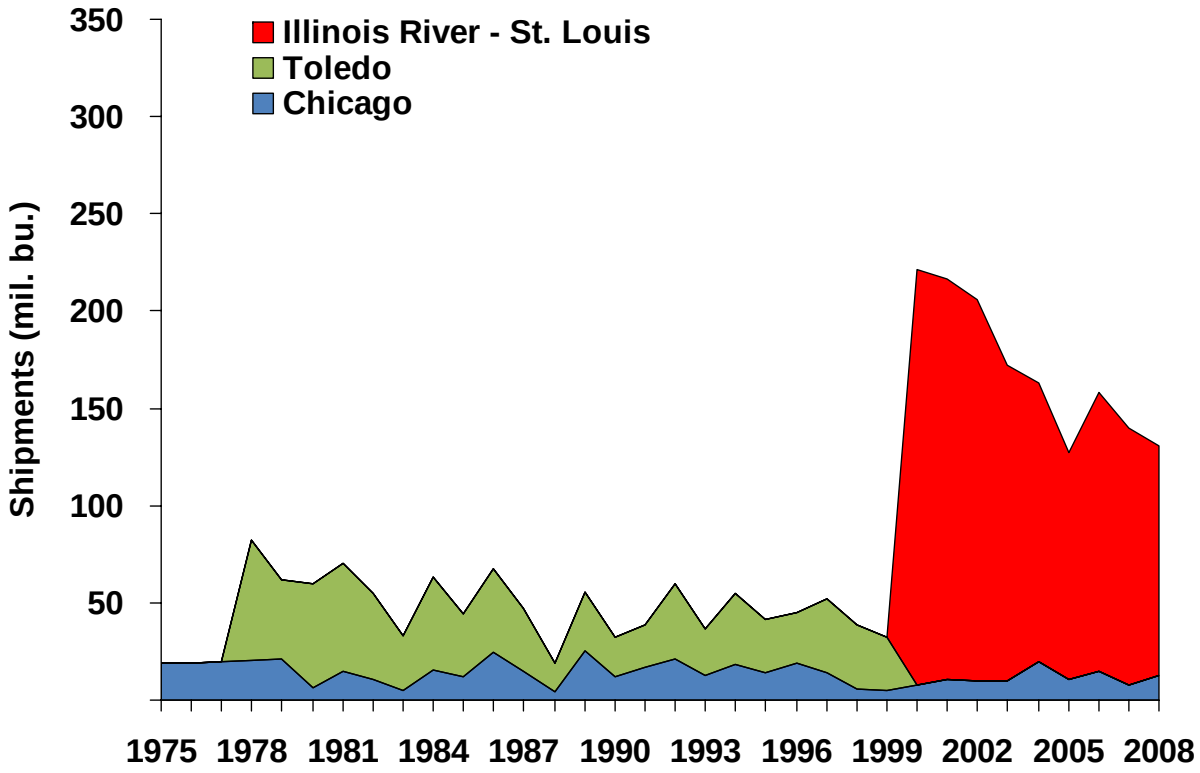
"Delivery on futures contracts is a sampling of value process. The objective is to get a representative sample. There must be a sufficient **amount** of the commodity move to and through the delivery points that no one can control and distort the price. The amount must be large enough that the price is **representative** of the value of the commodity generally so that the **relationship** with prices at other points of commerce are rational."

Hieronymus (1977, p. 341)

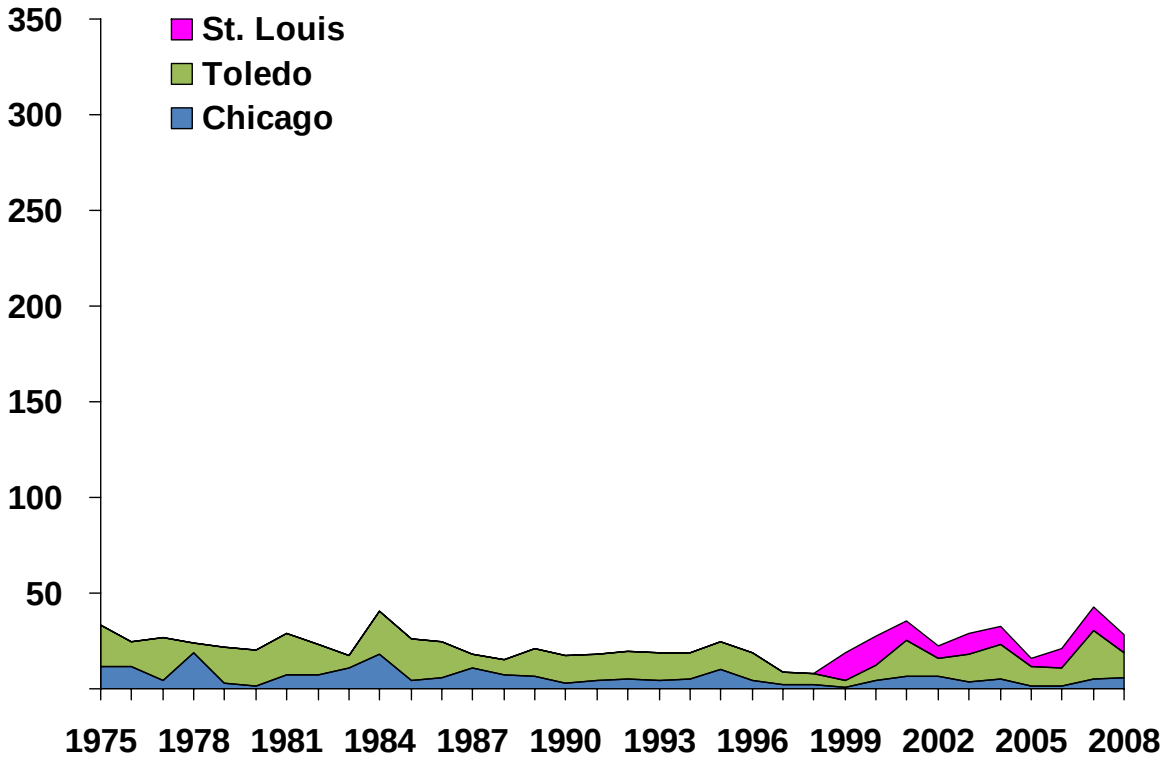
Annual Shipments at Facilities Regular for Delivery of CBOT Corn Futures, 1975 - 2008



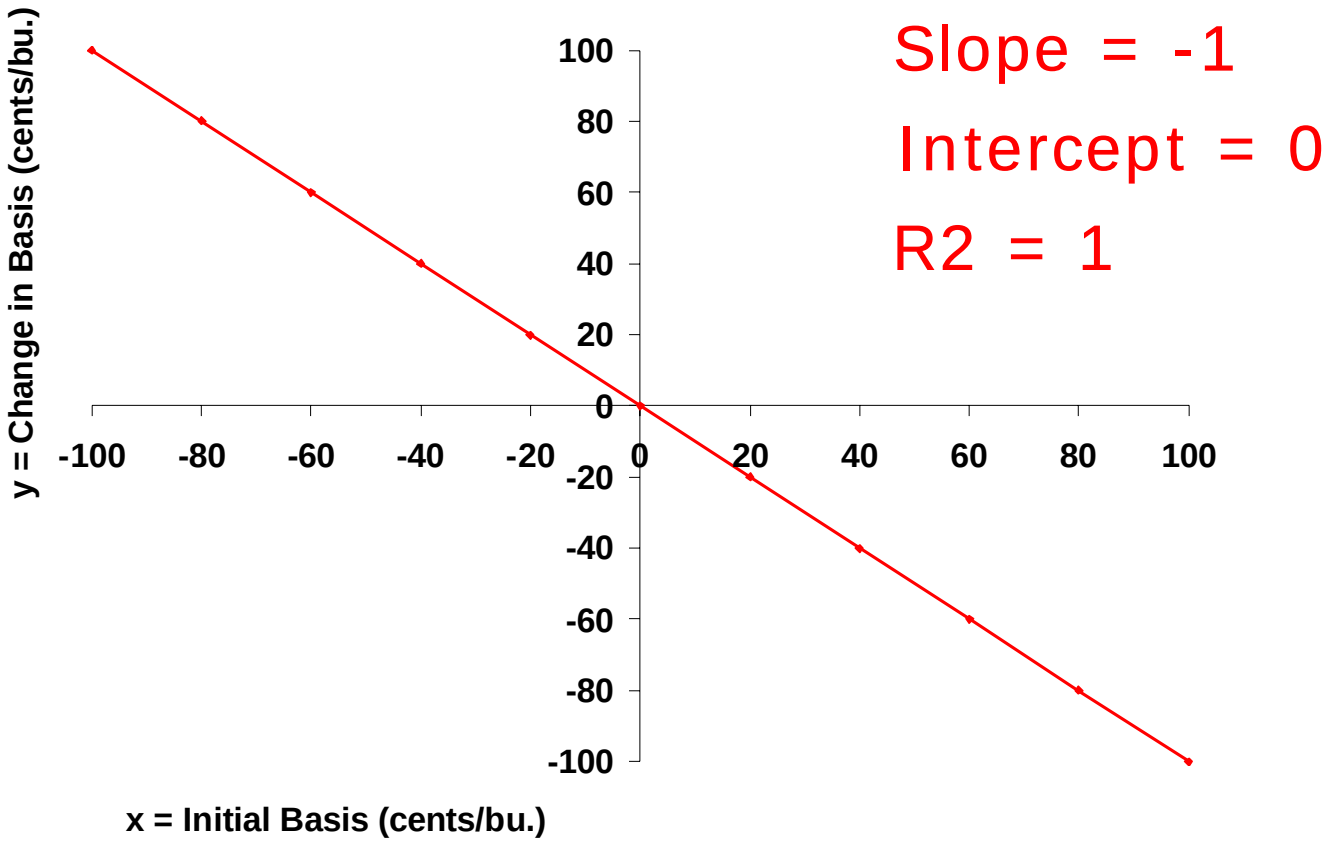
Annual Shipments at Facilities Regular for Delivery of CBOT Soybean Futures, 1975 - 2008



Annual Shipments at Facilities Regular for Delivery of CBOT Wheat Futures, 1975 - 2008



Perfect Basis Predictability

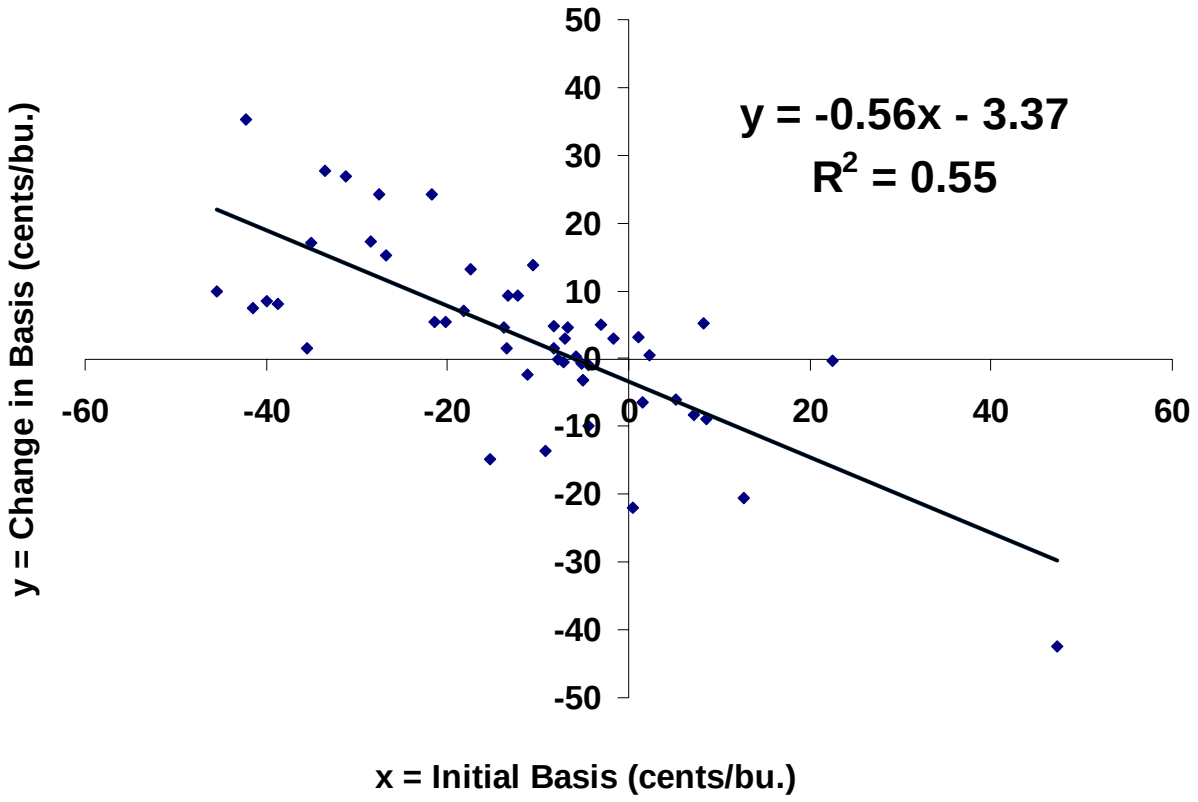


Slope = -1

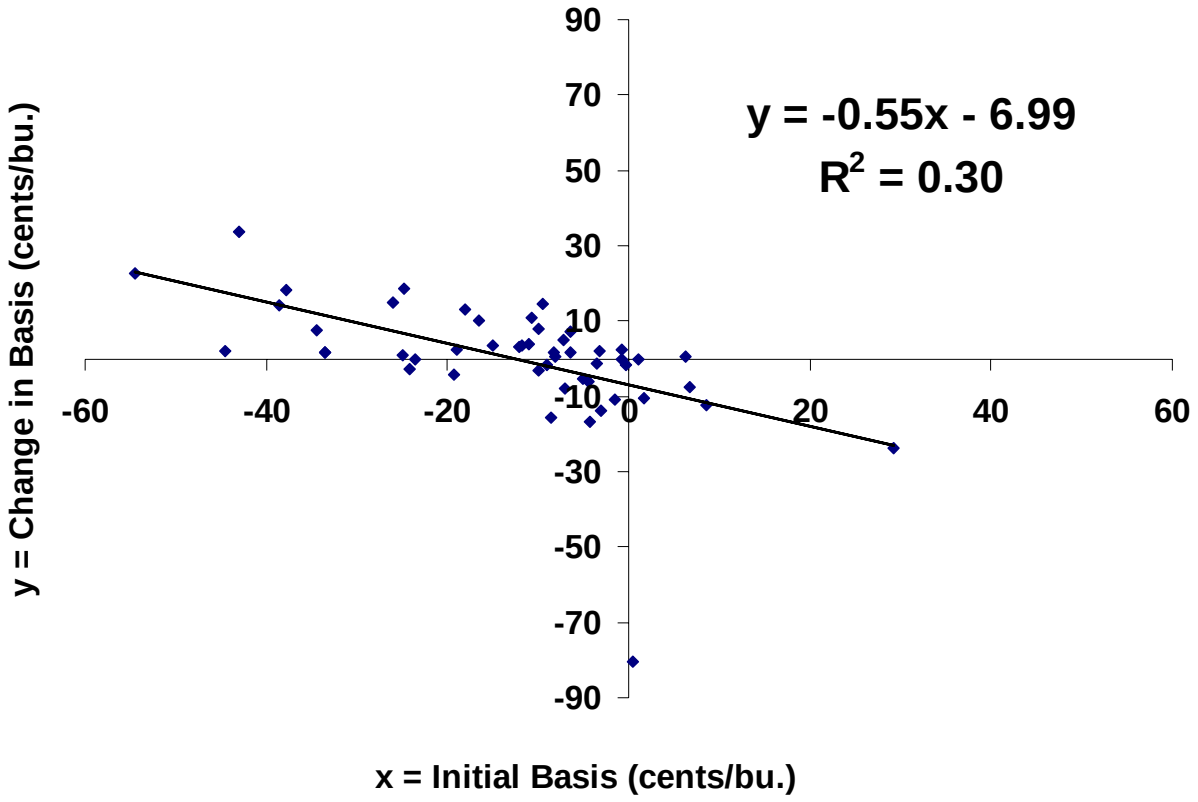
Intercept = 0

R2 = 1

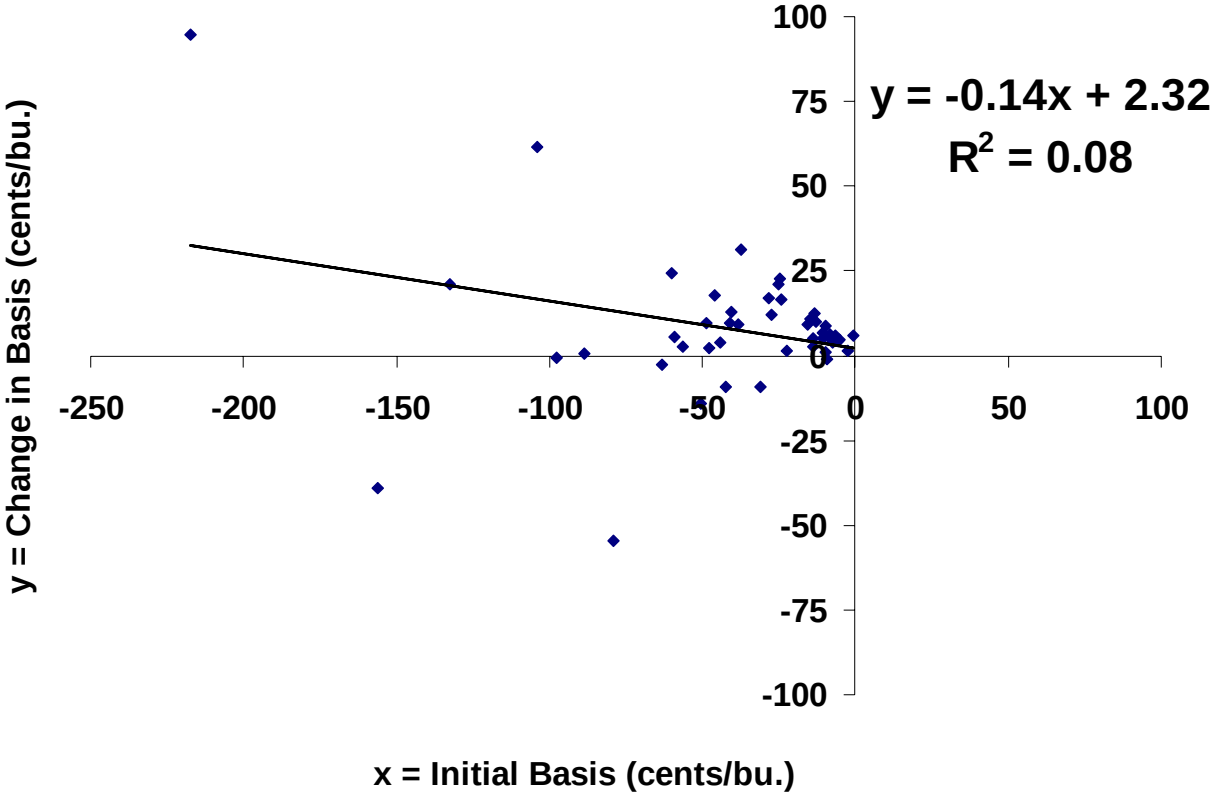
Predictability of CBOT Wheat Basis Change to First Day of Delivery, Toledo, March 1980 – December 1989



Predictability of CBOT Wheat Basis Change to First Day of Delivery, Toledo, March 1990 – December 1999



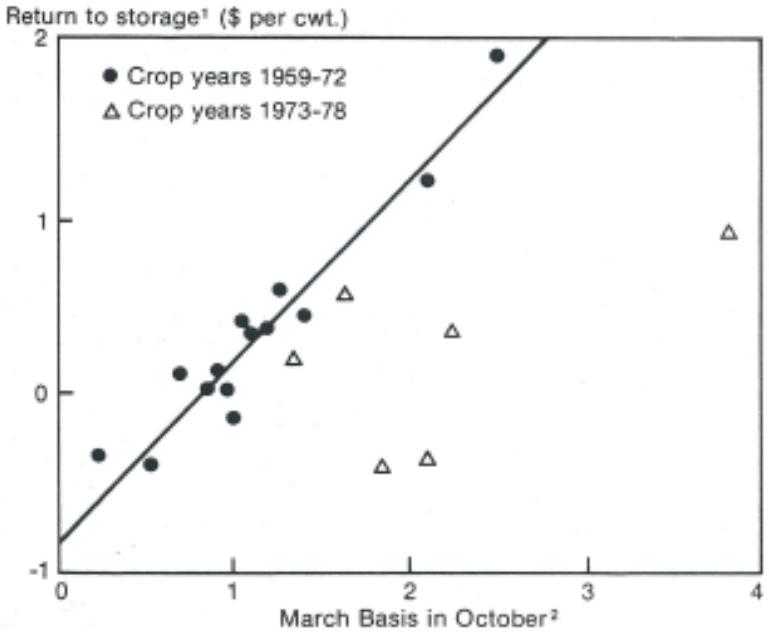
Predictability of CBOT Wheat Basis Change to First Day of Delivery, Toledo, March 2000 – May 2009



Maine Potato Futures

Figure 11

Relation Between March Basis in October and Return to Storage



1959-72: y = 1.03x - 0.83, R2 = 0.92
1973-78: y = 0.35x - 0.57, R2 = 0.30

" Few traders are likely to use a bad market, and the market could very well die of natural causes." (p. 177)

Committee on Agriculture, Nutrition, and Forestry, United States Senate, "Potato Futures Study", November 5, 1979

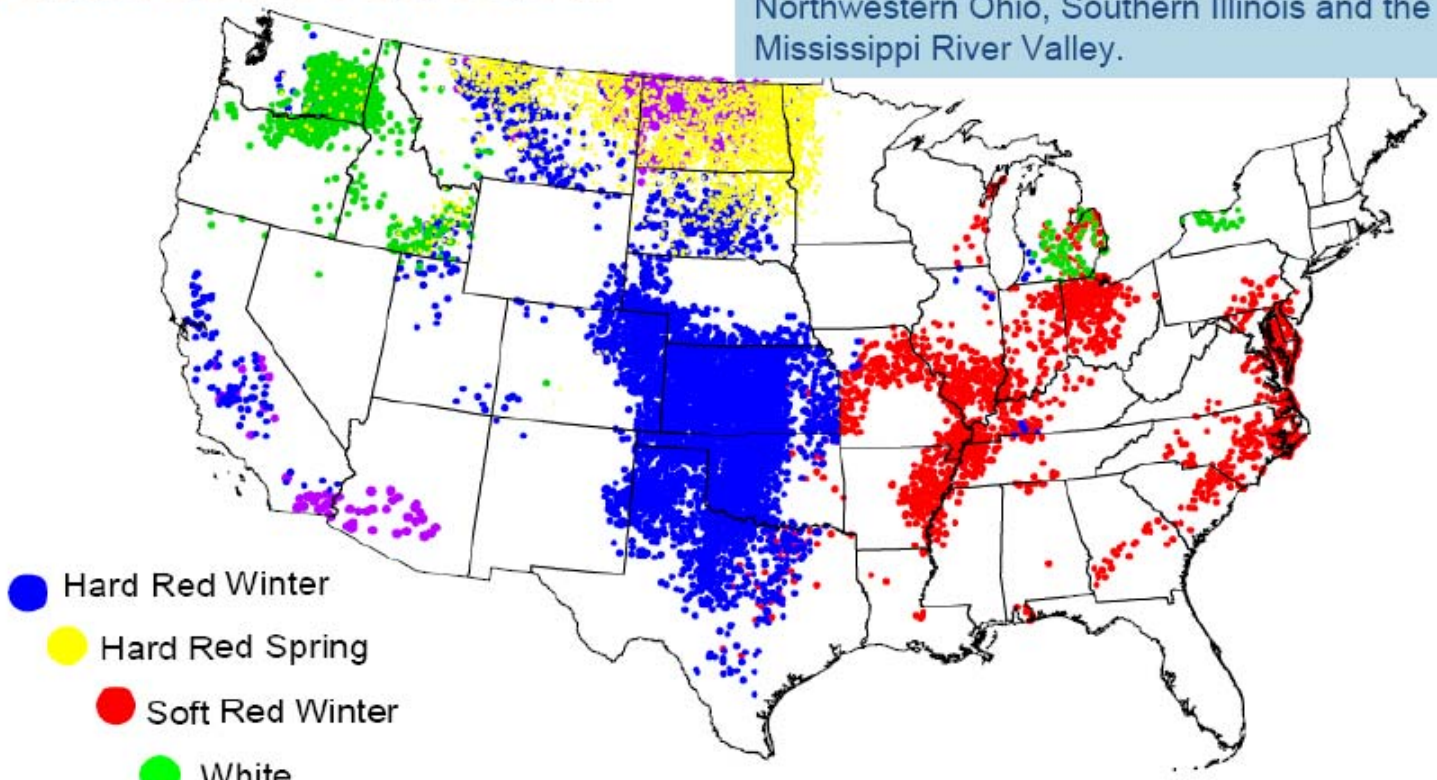
Source: Paul, Kahl, and Tomek, 1981

Proposal: Mississippi River Waterway Delivery System for Wheat

- Eliminate Chicago and Toledo as delivery locations
- Add NOLA as par
- Shipping certificates
- Barge shipping locations on Mississippi River deliverable from Illinois River to NOLA
- Differentials from NOLA based on barge shipping rates

U.S. Wheat Production

SRW Production is Concentrated around Northwestern Ohio, Southern Illinois and the Mississippi River Valley.



1 dot = 5,000 acres at the county level
(counties with less than 5,000 acres do not appear)

Source: Economic Research Service, USDA.

Shipments of Wheat Through the Mississippi Gulf, 2003/04 - 2007/08 Marketing Years

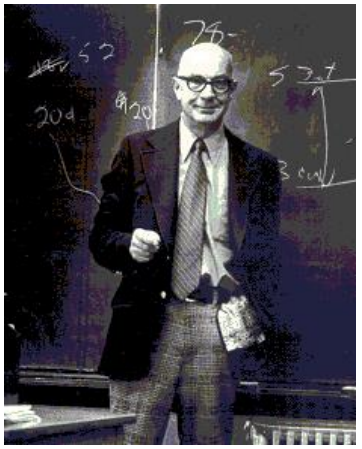
Marketing Year	Class of Wheat: Hard Red Winter	Soft Red Winter	Hard Red Spring	Hard and Soft White	Durum	Total
	---mil. bu.---					
2003/04	58	114	74	1	10	257
2004/05	65	106	60	1	8	240
2005/06	55	52	37	0	6	150
2006/07	46	91	27	0	4	168
2007/08	47	130	35	0	6	217
Average	54	99	47	0	7	206

Terminal Elevators in the Proposed Delivery System

- 77 terminal elevators
- 181 mil. bu. of storage
- 10 mil. bu. of barge loading capacity/day
- Largest 4 firms control 69% of loading capacity (80% in corn and soybeans)

We Have Been Here Before!

"The Chicago wheat futures market has been criticized from time to time for not keeping contract terms current with the changing commerce in wheat. There have been major changes during the past 20 years. Formerly, the predominant movement of wheat was from **west to east for flour milling** and eastern states were more important than they now are in wheat production. At this time, a higher proportion of U.S. wheat is produced **west of the Mississippi River** and **exports** are now about two-thirds of total use. The bulk of exports move through **Texas Gulf ports** and **New Orleans**. These changes have reduced the representativeness of Chicago as a pricing and delivery point."



Tom Hieronymus

May 1978

1974 CBOT Gulf HRW Contract