Recent Delivery Performance of CBOT Corn, Soybean, and Wheat Futures Contracts

Statement to the CFTC Agricultural Forum, April 22, 2008

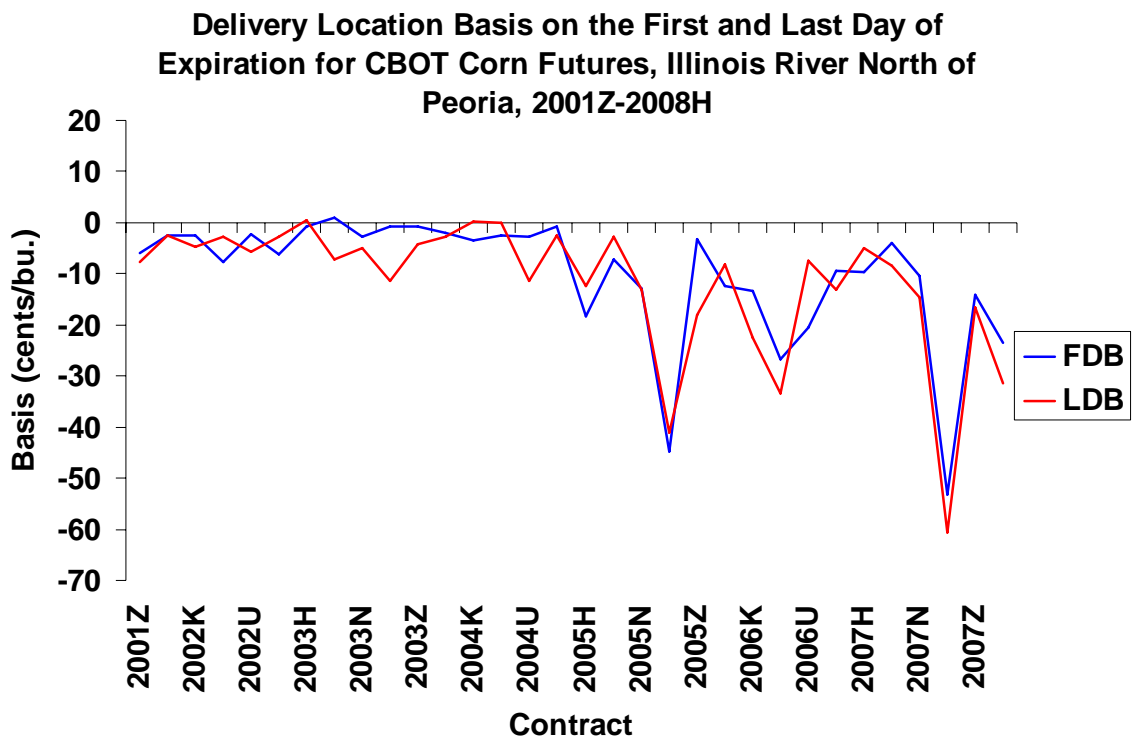Scott H. Irwin, Philip Garcia, Darrel L. Good, and Eugene L. Kunda

University of Illinois at Urbana-Champaign

Mr. Chairman, my name is Eugene Kunda, and I am here today to provide a statement based on research conducted at the University of Illinois regarding recent convergence behavior of CBOT (CME Group) corn, soybean, and wheat futures contracts. In this testimony, we focus on the nature and consequences of recent convergence problems. We also briefly comment on proposals for changing the contracts to address the problems that have surfaced recently. Please note that a comprehensive set of charts related to convergence performance is provided in the Appendix. In the interest of brevity, we only refer to a few of the charts in this statement.

To begin, it is important to note a few basic points about the delivery process. It is an essential component of futures contracts with physical delivery, as it ties the futures price to the cash price at delivery locations. In a perfect market with costless delivery at one location and one date, arbitrage should force the futures price at expiration to equal the cash price. Otherwise a violation of the law of one price would exist. In reality, delivery on grain futures contracts is not costless and is complicated by the existence of grade, location, and timing delivery "options" that have a demonstrated value to sellers of contracts. A more realistic approach is to think of a zone of

convergence between cash and futures prices during delivery periods, with the bounds of convergence determined by the cost of participating in the delivery process.

The following charts show the difference between cash and futures prices (the basis) on the first and last day of the delivery period for corn and wheat futures contracts expiring between December 2001 and March 2008 and soybean futures contracts expiring between November 2001 and March 2008. Note that a negative basis means the futures price is greater than the cash price and a positive basis means that futures price is less than the cash price. For these calculations, grade and location adjustments are made to the cash prices where appropriate (see Appendix Table 1). Convergence patterns at the presented location are representative of the convergence patterns at other locations.

Delivery Location Basis on the First and Last Day of Expiration for CBOT Corn Futures, Illinois River North of Peoria, 2001Z-2008H

Delivery Location Basis on the First and Last Day of Expiration for CBOT Soybean Futures, Illinois River North of Peoria, 2001X-2008H
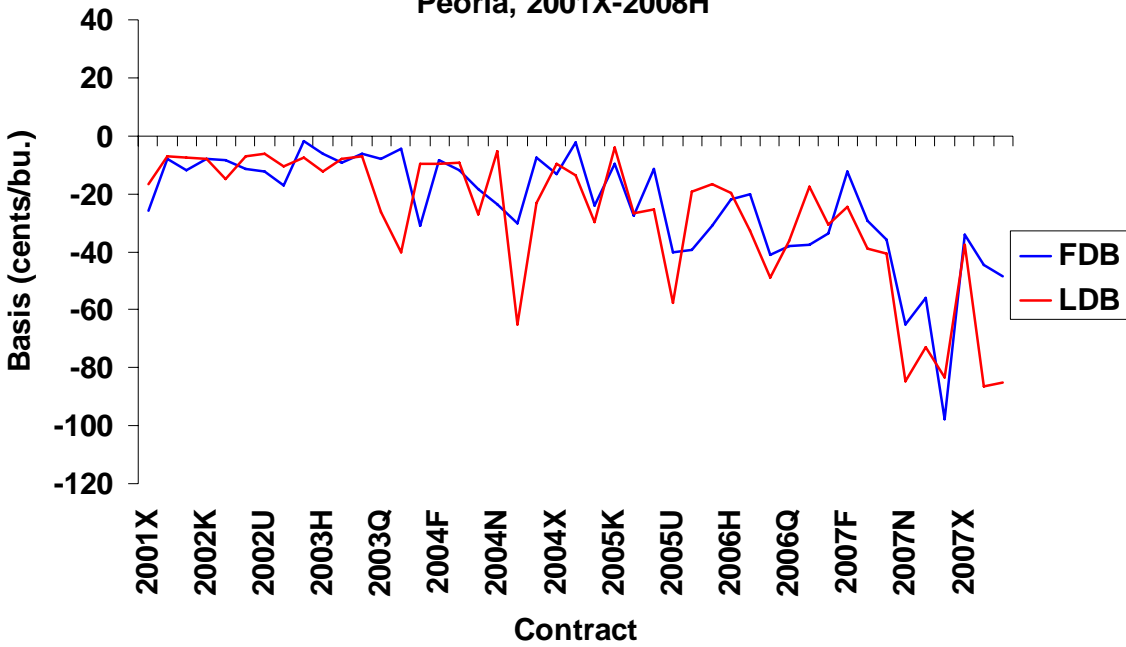
Delivery Location Basis on the First and Last Day of Expiration for CBOT Wheat Futures, Toledo, 2001Z-2008H
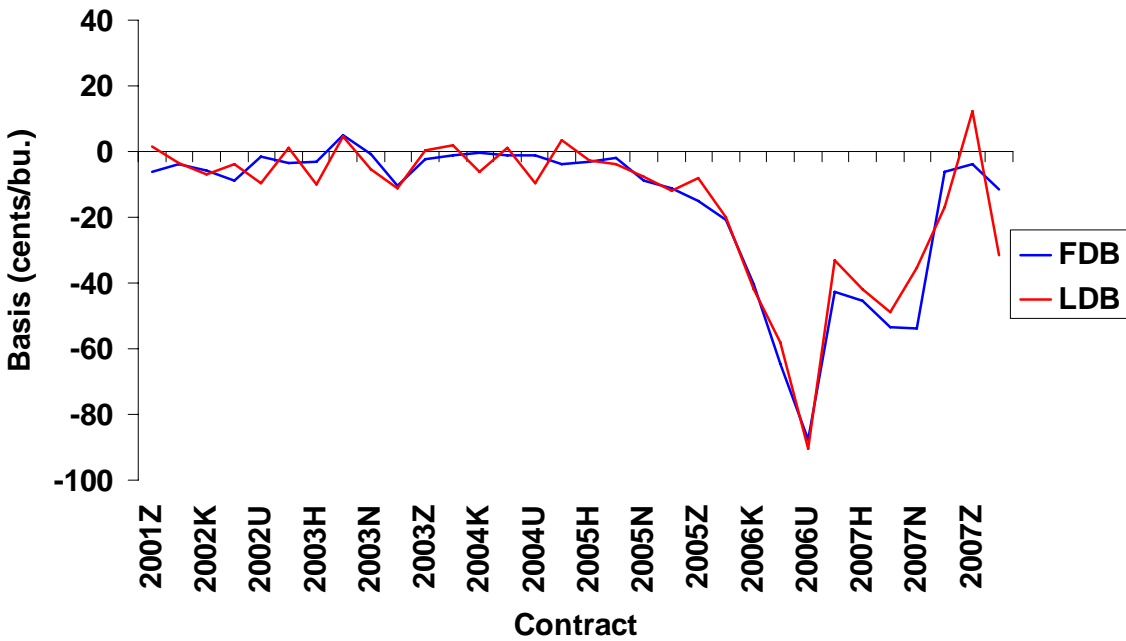
For each of the three commodities, convergence generally is within reasonable bounds through 2005 (ignoring problems created by hurricane Katrina in September 2005). Convergence weakness first surfaced with the July 2006 wheat contract. Non-convergence was extremely large by historic standards, reaching a low in September 2006 when the Toledo cash price ended up 90 cents below futures on the last day of the delivery period. This weakness in wheat persisted through the July 2007 contract. Convergence was relatively good for the September 2007, December 2007 and March 2008 wheat contracts at Toledo and at Chicago in December 2007, but was poor in March 2008 at Chicago. Convergence in soybeans was poor beginning with the March 2007 contract, especially poor for the September 2007 contract, improved to almost acceptable in November 2007, but returned to very poor performance in January and March 2008. In general, convergence since July 2006 has been better for corn than for wheat and soybeans. Convergence performance was weakest for corn in September 2007 and March 2008.

While recent convergence failures are dramatic, in isolation each episode is not necessarily damaging to the overall economic functioning of markets. Real economic damage is associated with increased uncertainty in basis behavior as markets bounce unpredictably between converging and not converging. As first noted by Holbrook Working many years ago, this is damaging because basis in storable commodity futures markets should provide a rational storage signal to commodity inventory holders. A weak basis should be a signal to store and vice versa. However, this depends on the predictability of the subsequent change in basis. That is, the basis should strengthen

over time thereby earning "the carry" for someone holding stocks of the commodity and simultaneously selling the futures.
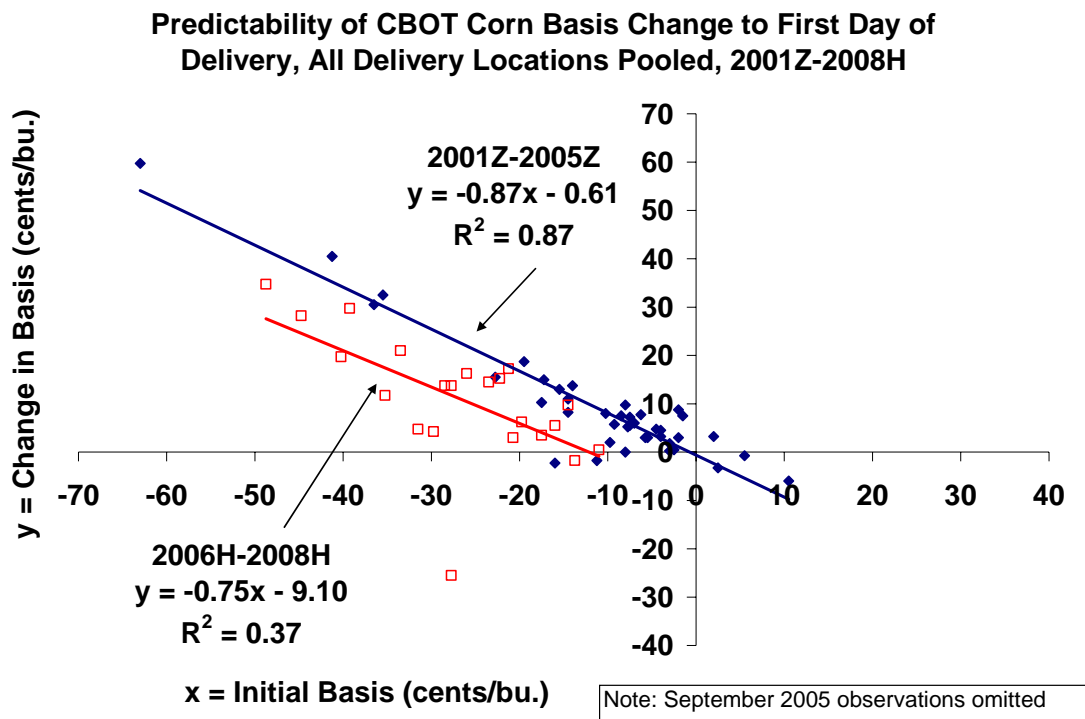
The reliability of basis signals can be quantified by measuring the level of basis at some point before the delivery period and comparing this "initial" basis to the change in basis from that point forward through the delivery period. Perfect delivery location predictability is illustrated in the chart below.

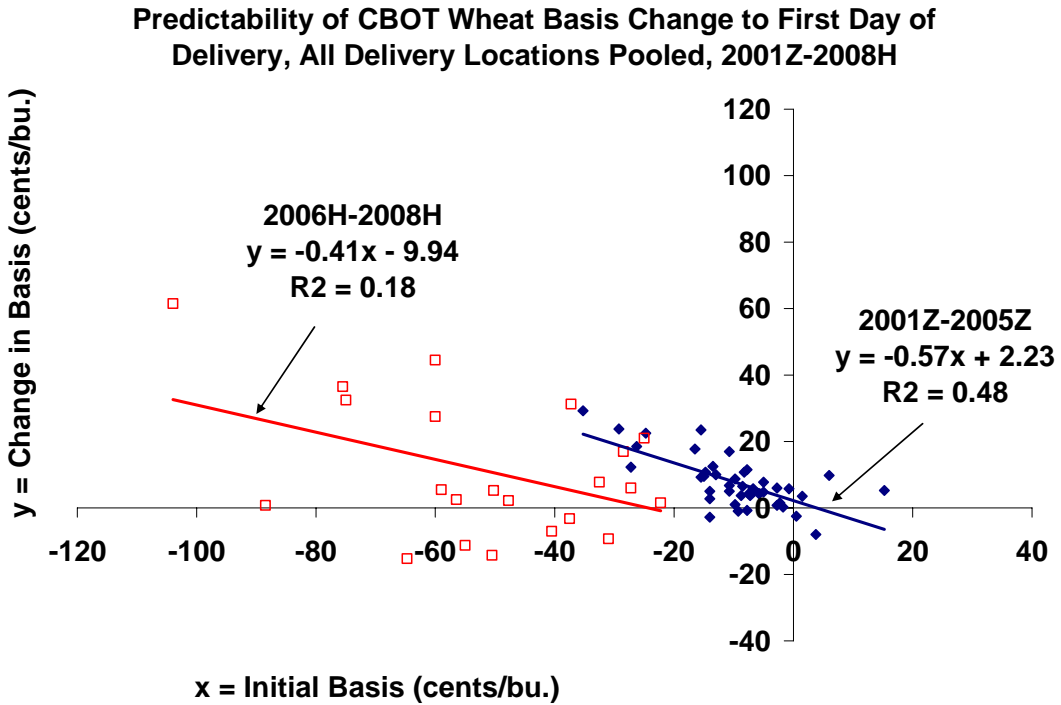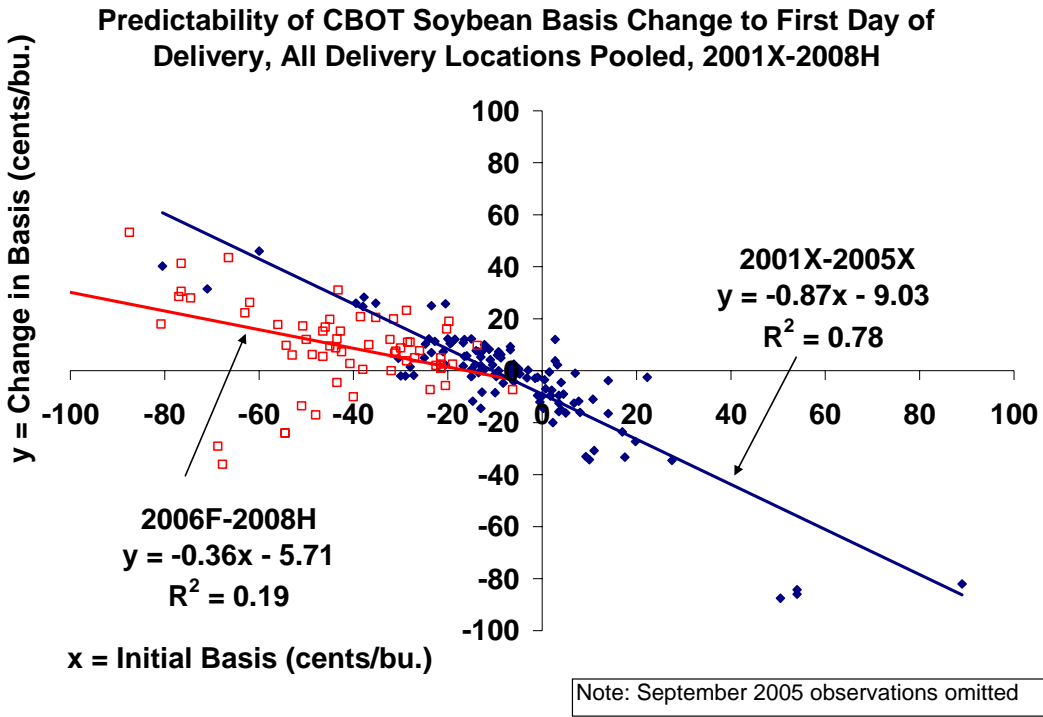**Perfect Delivery Location Basis Predictability**
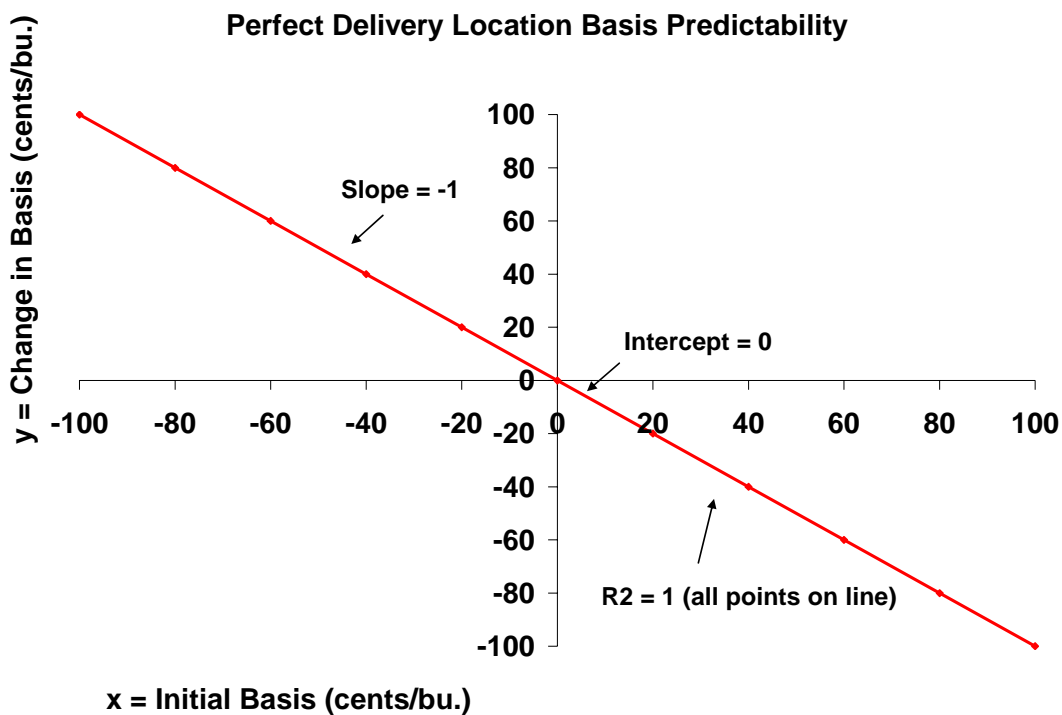
Note that when delivery location basis is perfectly predictable, the relationship between initial basis and the change in basis has a slope of -1 and runs through the origin. In other words, if basis is -50 cents/bushel two months before expiration, the change in the basis over the subsequent two months should be +50 cents/bushel. Additionally, all

points lie directly on the line, which indicates that hedges over the interval are perfectly effective in eliminating price risk.

The next three charts show the predictability of delivery location basis for CBOT corn, soybeans, and wheat before and after 2006. The horizontal axis in each chart measures the level of the delivery location basis on the day after the preceding contract expires. The vertical axis measures the change in the delivery location basis from the day after the preceding contract expires to the first day of delivery. Note that observations for all delivery locations and expiration months for a given commodity are pooled together in the analysis and that observations for new crop December and November contracts in corn and soybeans start on the first trading day of October.

Predictability of CBOT Corn Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H

2001Z-2005Z
y = -0.87x - 0.61
R^2 = 0.87

2006H-2008H
y = -0.75x - 9.10
R^2 = 0.37

y = Change in Basis (cents/bu.)

x = Initial Basis (cents/bu.)

Note: September 2005 observations omitted

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Predictability of CBOT Soybean Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001X-2008H

2001X-2005X
y = -0.87x - 9.03
R² = 0.78

2006F-2008H
y = -0.36x - 5.71
R² = 0.19

y = Change in Basis (cents/bu.)

x = Initial Basis (cents/bu.)

Note: September 2005 observations omitted

Predictability of CBOT Wheat Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H

2006H-2008H
y = -0.41x - 9.94
R2 = 0.18

2001Z-2005Z
y = -0.57x + 2.23
R2 = 0.48

y = Change in Basis (cents/bu.)

x = Initial Basis (cents/bu.)

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The charts indicate a sharp decline in basis predictability for all three markets since 2006. In corn, the upper right regression line indicates the futures market performs reasonably well in terms of basis predictability before 2006, as the slope and intercept are near -1 and 0, respectively, and hedging effectiveness (R^2) is a respectable 78%. The lower left regression line shows the precipitous drop in basis predictability over the last two years in corn. While the decline in the slope is not large, the intercept increases considerably, and hedging effectiveness drops to 37%. Basis predictability results for soybeans are even more dramatic. The lower left regression line indicates delivery location basis since 2006 changes by far less than the initial basis (slope = -0.36) and hedging effectiveness drops to only 19%. Results for wheat are different from corn and soybeans, in that basis predictability was unimpressive before 2006. Nonetheless, predictability since 2006 followed the pattern of corn and soybeans and deteriorated substantially relative to the earlier period.

The bottom line from the predictability analysis is that delivery location basis in corn, soybeans, and wheat generally is weaker and far less predictable post-2006 compared to pre-2006. This has far reaching implications for hedging use of these futures markets if the situation is not corrected.

An obviously important question is what caused the convergence problems observed over the last couple of years. A relevant observation in this regard is that the nature of convergence problems was inconsistent through time and across markets. For example, convergence in wheat was weakest during 2006 but recovered somewhat in late 2007 and early 2008, while convergence in soybeans was weakest in the second half of 2007 and early 2008. This makes it difficult to identify a single cause and difficult

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to accept a one-solution remedy. Solutions to convergence issues suggested to date have tended to be one-dimensional and focus on:

1. Encouraging longs to liquidate before first notice date by changing delivery rules to force takers to load out (demand certificates) or by increasing maximum storage charges to make owning delivery instruments less attractive. The assumption being that forcing longs out before delivery would drive down the nearby contract and improve convergence.

2. Changing terms of the futures contact to a cash index rather than a certificate market, thereby forcing convergence to the cash index.

3. "Managing" the influence of passive longs and perhaps other groups by limiting hedge exemptions, thereby forcing those groups to trade with spec margins and spec limits. This solution follows from the assumption that these traders have artificially and permanently forced futures prices above fundamental value of the commodities in the cash market.

4. Expanding delivery capacity in order to accommodate more arbitrage of cash and futures prices during the delivery period and thereby force convergence.

Without a consensus as to the cause or causes of poor convergence performance, it may not be advisable to make substantial changes in contract specifications at the present time. Unintended consequences could be worse than the poorly designed remedy, particularly if market conditions change in the near future. Tweaking some contract specifications like storage rates and delivery capacity and

monitoring performance makes sense, but may not be palatable to market participants who would like an immediate fix.

As a final point, it is important to note that convergence problems at delivery locations are not necessarily identical to non-delivery basis performance issues. Basis in some non-delivery markets may be influenced by lack of convergence, but that is not uniformly the case. Corn basis at interior processing markets, for example, is less influenced by the Illinois River basis than cash markets tributary to the River. Basis at non-delivery locations is influenced by transportation costs, storage and ownership costs, supply of and demand for storage in the local market, and merchandising risk (margin risk). All of these factors have likely contributed to weaker basis at many non-delivery markets.

Thank you for considering this statement Mr. Chairman.

Appendix Tables and Figures

Table 1. Grade and Location Adjustments to Cash Price Data

Commodity (Grade)	Location Premium				
	Chicago	Illinois River North of Peoria	Illinois River South of Peoria	St. Louis	Toledo
Corn (#2 yellow: par)	Par	+2.5¢	NA	NA	NA
Soybeans (#1 yellow: +6¢)	Par	+2.5¢	+3.5¢	+6¢	
Wheat (#2 soft red: par)	Par	NA	NA	NA	Par

Note: NA denotes not applicable or data not available in the case of St. Louis wheat.

Table 2. Letter Codes for Futures Contract Expiration Months

Calendar Month	Code
January	F
February	G
March	H
April	J
May	K
June	M
July	N
August	Q
September	U
October	V
November	X
December	Z

Table 3. Average Basis on the First and Last Day of Delivery for CBOT Corn, Soybean, and Wheat Futures Contracts, 2001Z/X – 2008H

Commodity/ Delivery Location	2001Z/X-2005Z/X	2006H/F-2008H	Difference
First Day of Delivery		cents/bu.	
Corn			
Chicago	0.1	-13.6	-13.6
Illinois River North of Peoria	-4.2	-18.0	-13.8
Soybeans			
Chicago	-6.0	-31.5	-25.5
Illinois River North of Peoria	-14.3	-40.4	-26.1
Illinois River South of Peoria	-15.1	-39.5	-24.4
St. Louis	-4.2	-25.0	-20.8
Wheat			
Chicago	0.2	-41.4	-41.6
Toledo	-4.2	-39.1	-34.9
Last Day of Delivery			
Corn			
Chicago	-0.1	-12.8	-12.7
Illinois River North of Peoria	-5.8	-20.1	-14.3
Soybeans			
Chicago	-11.4	-33.2	-21.8
Illinois River North of Peoria	-17.4	-47.3	-29.9
Illinois River South of Peoria	-17.5	-44.3	-26.8
St. Louis	-8.4	-28.2	-19.8
Wheat			
Chicago	-4.1	-35.4	-31.3
Toledo	-4.1	-36.9	-32.8

Note: September 2005 corn and soybean contracts excluded from 2001-2005 averages.
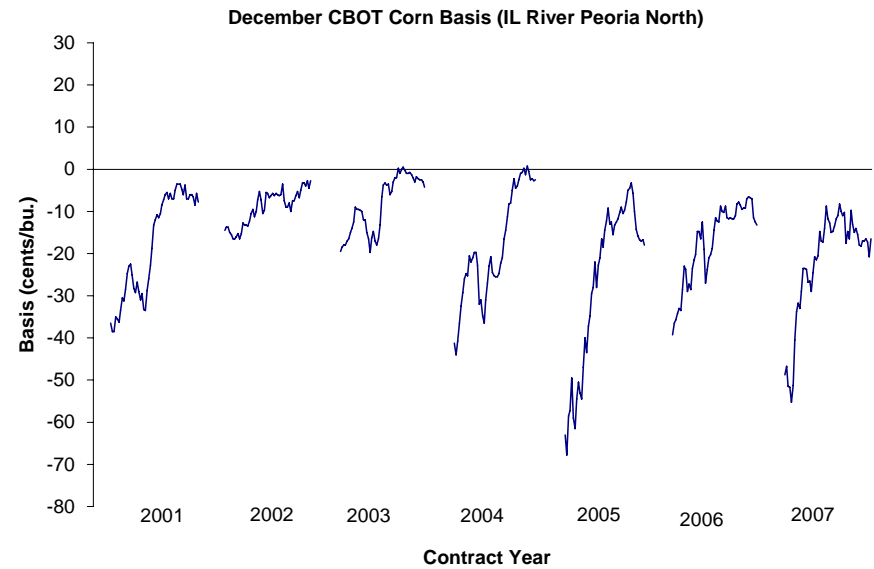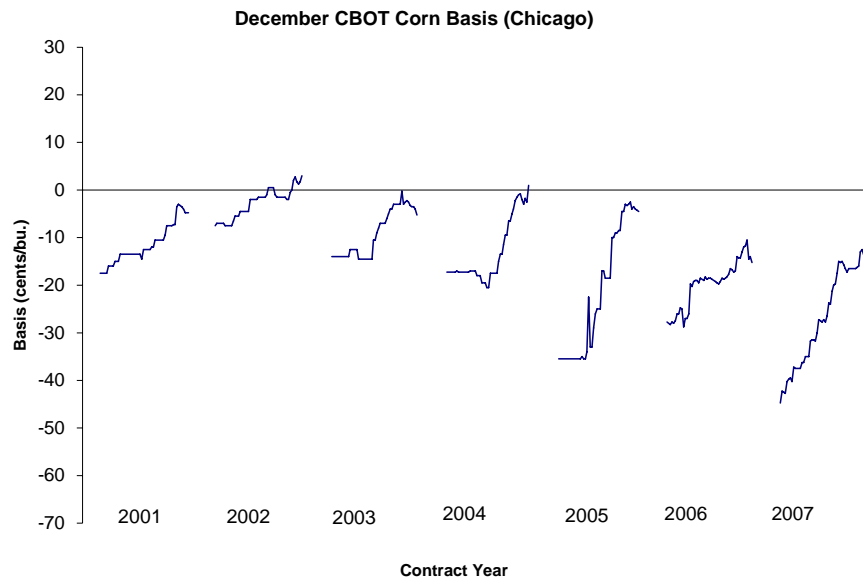
December CBOT Corn Basis (Chicago)

December CBOT Corn Basis (IL River Peoria North)
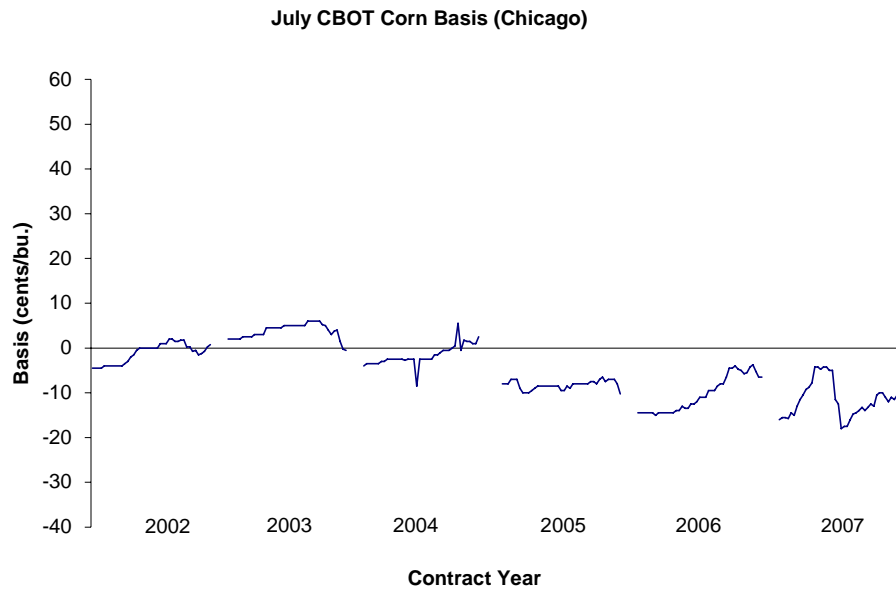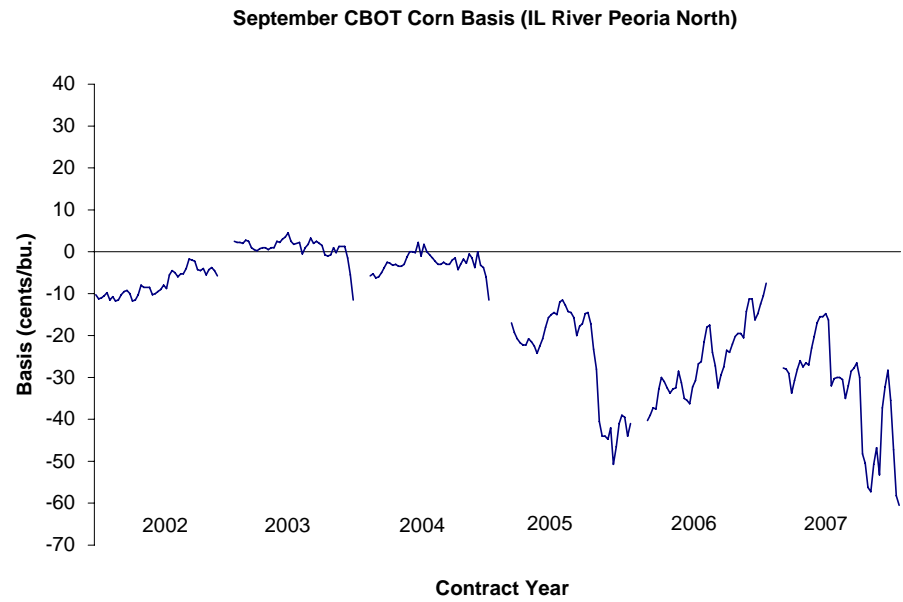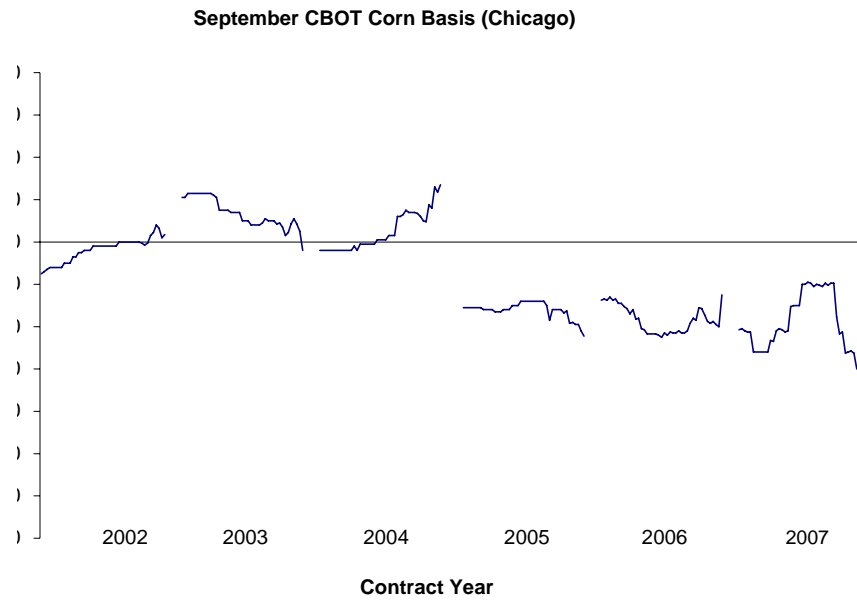
Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is October 1st. The last observation for each contract year is the expiration day for the given contract, again around the 15th of the month. A location differential of $0.025/bu. is subtracted from cash prices for Illinois River North of Peoria. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/) . Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 1. Delivery Location Basis for CBOT Corn Futures Contracts, 2001Z - 2007Z
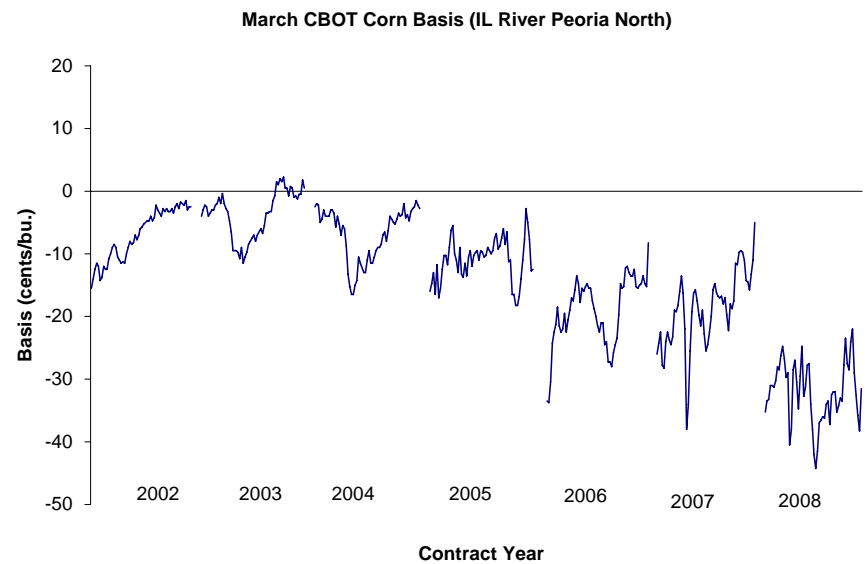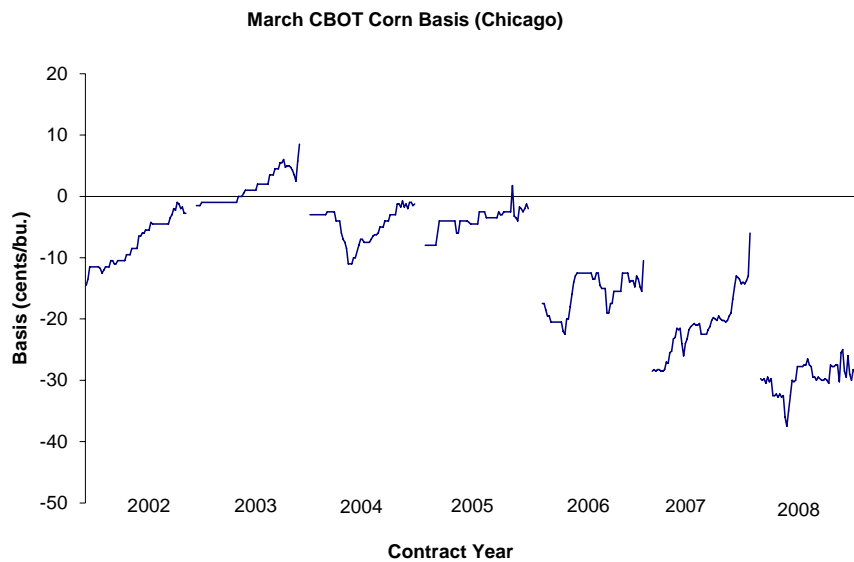
March CBOT Corn Basis (Chicago)
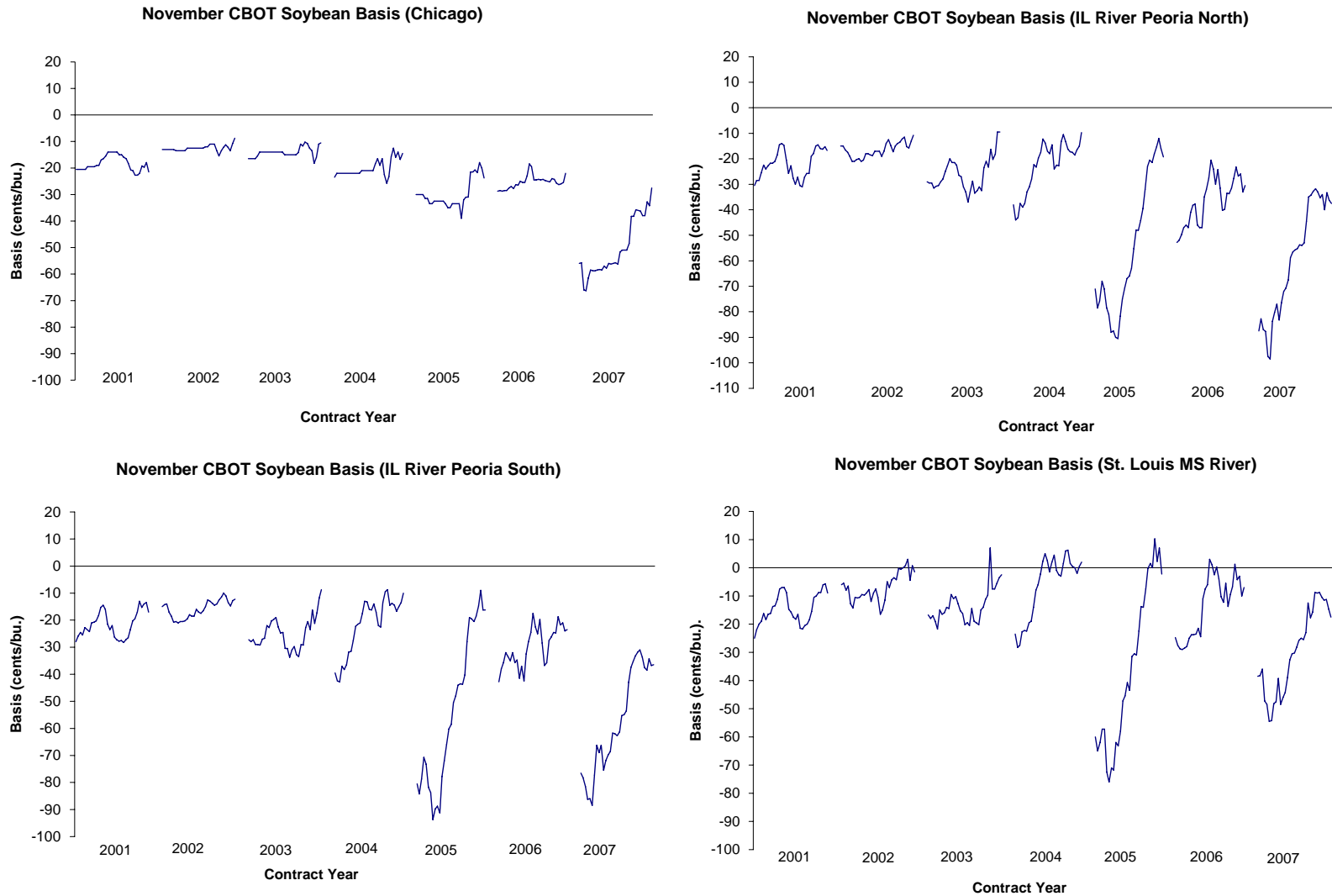
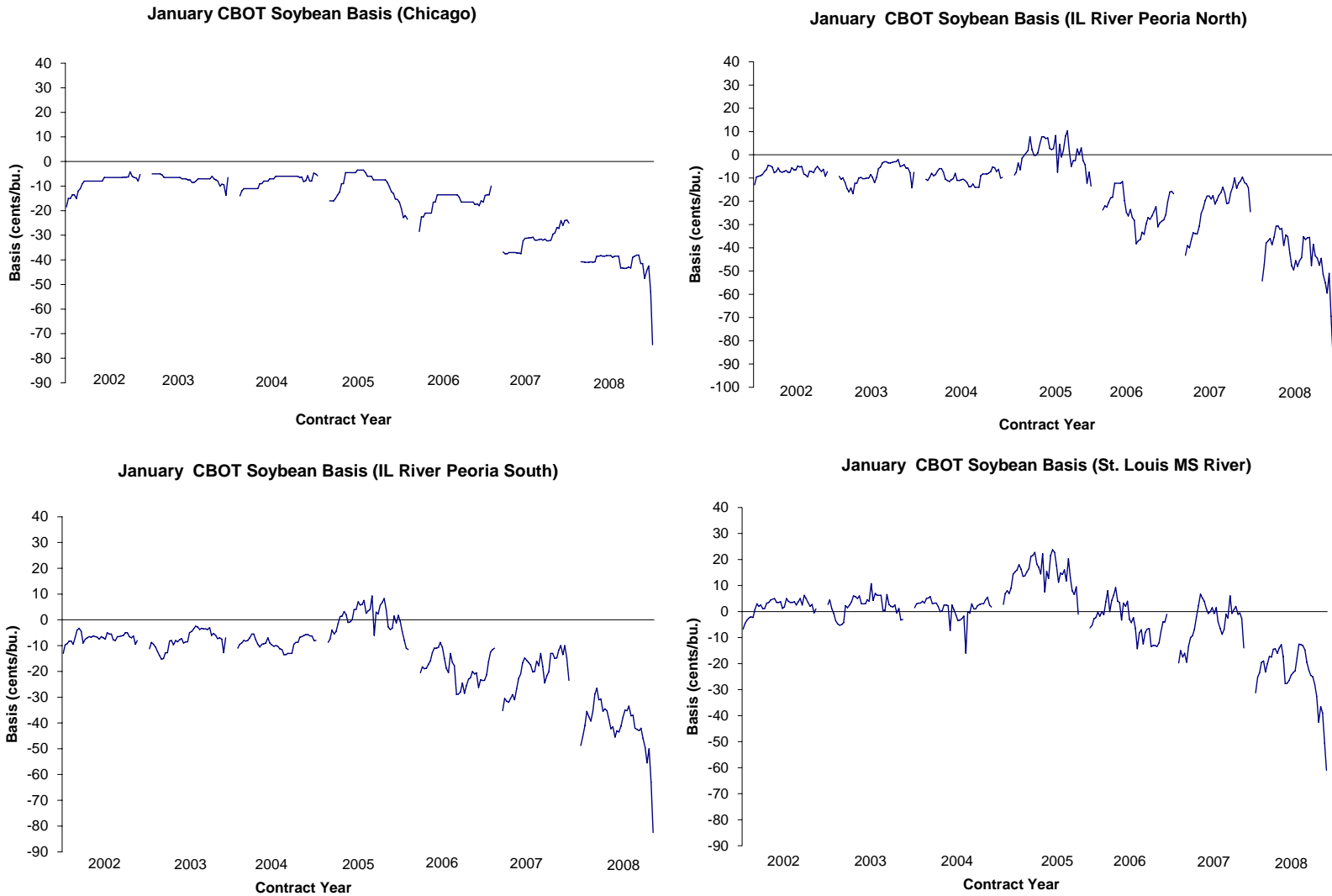**March CBOT Corn Basis (IL River Peoria North)**

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. A location differential of $0.025/bu. is subtracted from cash prices for Illinois River North of Peoria. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/) . Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 2. Delivery Location Basis for CBOT Corn Futures Contracts, 2002H - 2008H
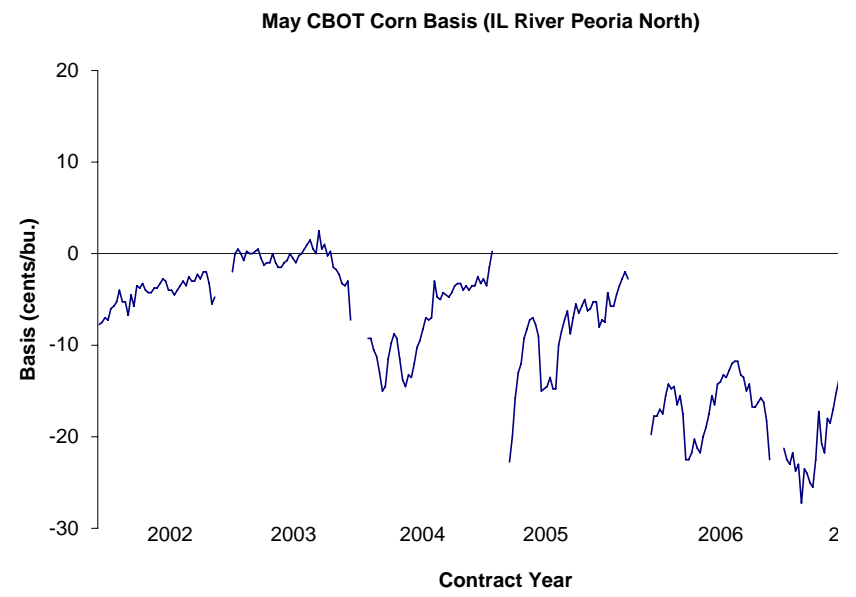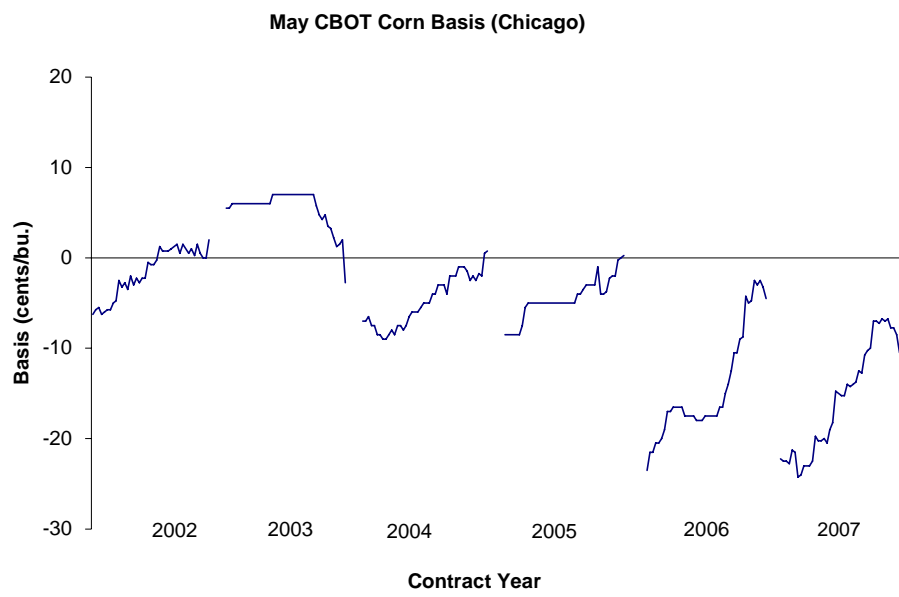
May CBOT Corn Basis (Chicago)
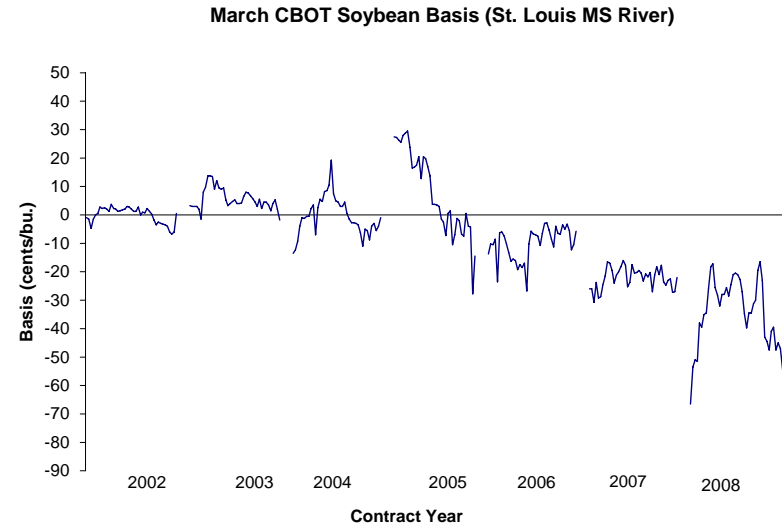
May CBOT Corn Basis (IL River Peoria North)
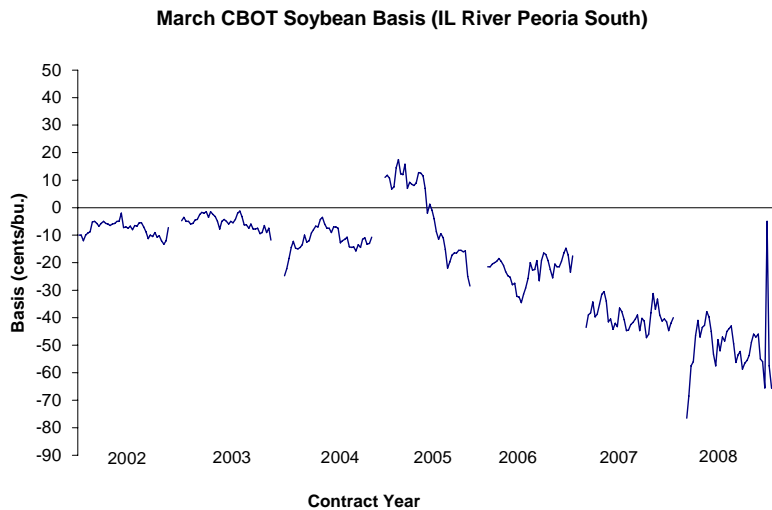

Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is the day after the preceding contract expires, around the 15th of the month. The last observation for each contract year is the expiration day for the given contract, again around the 15th of the month. A location differential of $0.025/bu. is subtracted from cash prices for Illinois River North of Peoria. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 3. Delivery Location Basis for CBOT Corn Futures Contracts, 2002K - 2007K
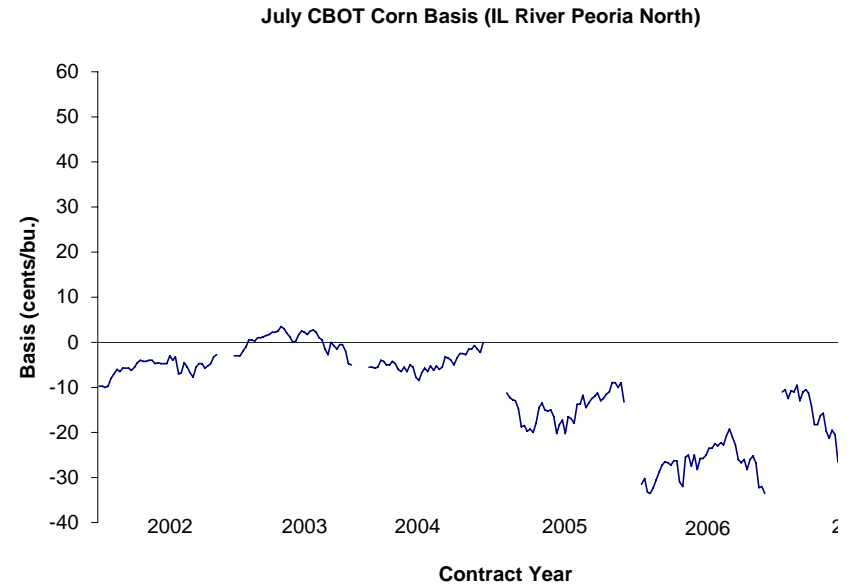
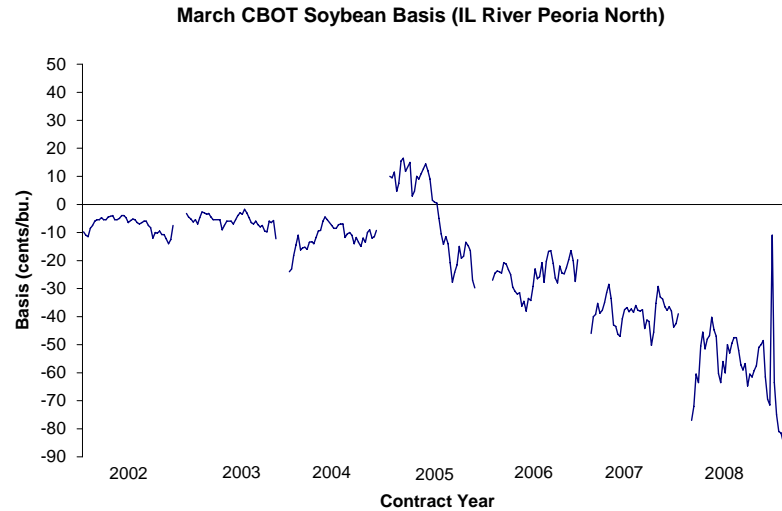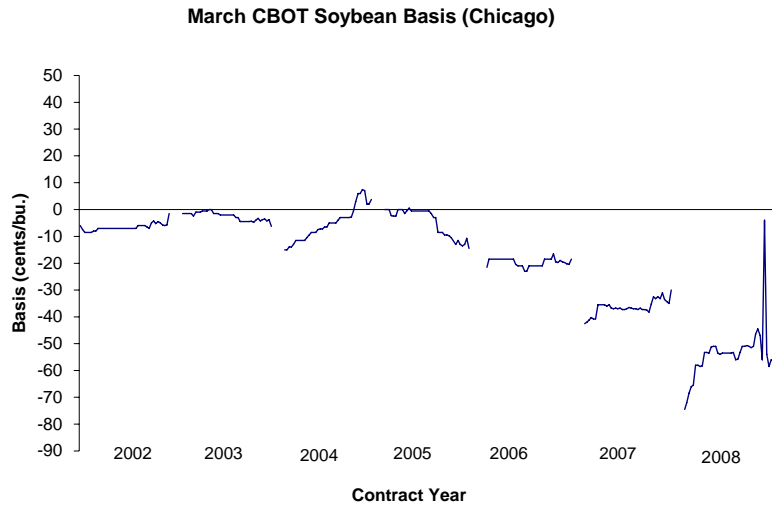**July CBOT Corn Basis (Chicago)**

July CBOT Corn Basis (IL River Peoria North)

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. A location differential of $0.025/bu. is subtracted from cash prices for Illinois River North of Peoria. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 4. Delivery Location Basis for CBOT Corn Futures Contracts, 2002N - 2007N

September CBOT Corn Basis (Chicago)
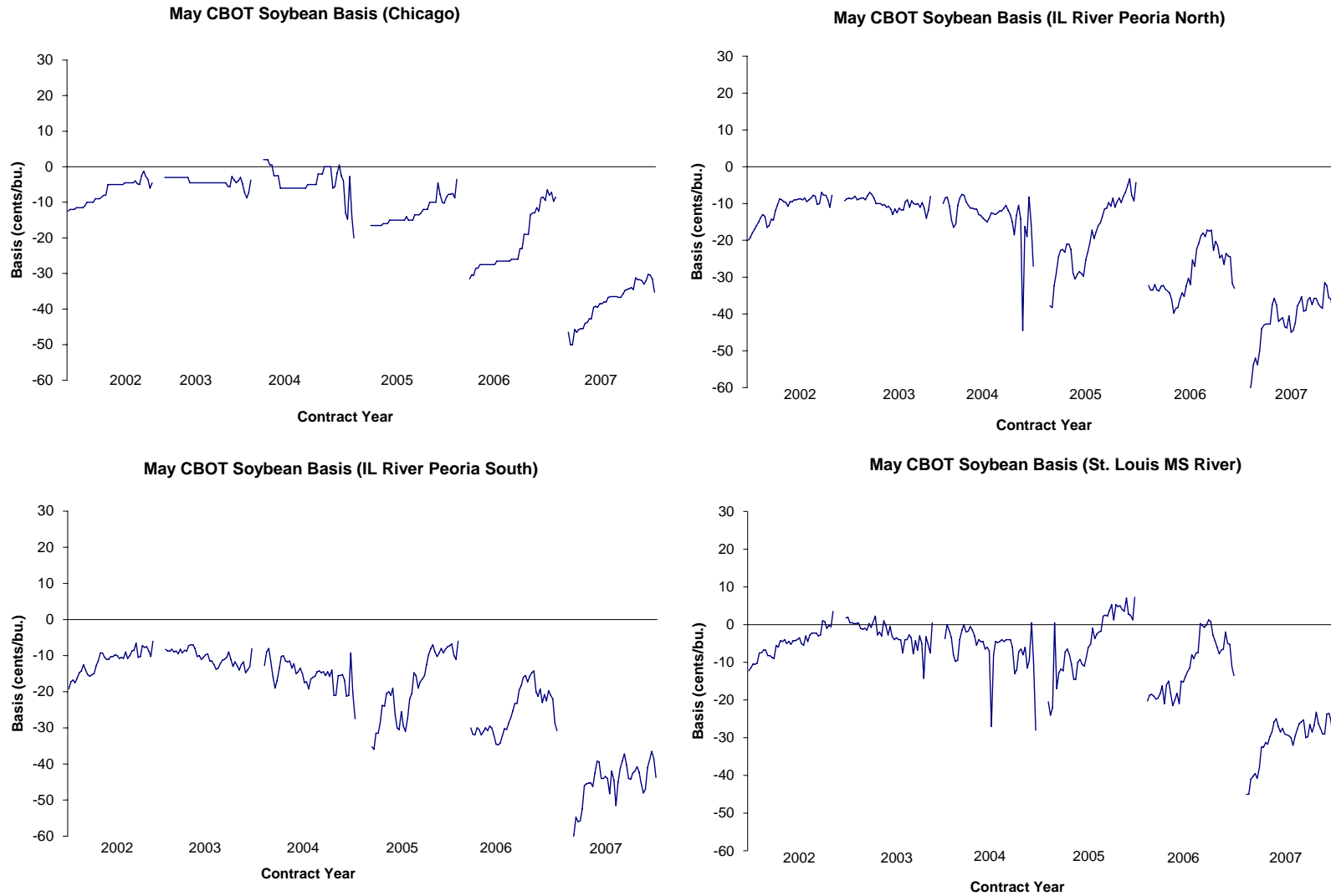
September CBOT Corn Basis (IL River Peoria North)

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. A location differential of $0.025/bu. is subtracted from cash prices for Illinois River North of Peoria. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 5. Delivery Location Basis for CBOT Corn Futures Contracts, 2002U - 2007U

November CBOT Soybean Basis (Chicago)

November CBOT Soybean Basis (IL River Peoria North)

November CBOT Soybean Basis (IL River Peoria South)

November CBOT Soybean Basis (St. Louis MS River)

Notes: Basis is plotted daily and computed as cash minus futures. The first observation for each contract year is October 1st. The last observation for each contract year is the expiration day for the given contract, around the 15th of the month. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 6. Delivery Location Basis for CBOT Soybean Futures Contracts, 2001X - 2007X

January CBOT Soybean Basis (Chicago)

January CBOT Soybean Basis (IL River Peoria North)

January CBOT Soybean Basis (IL River Peoria South)

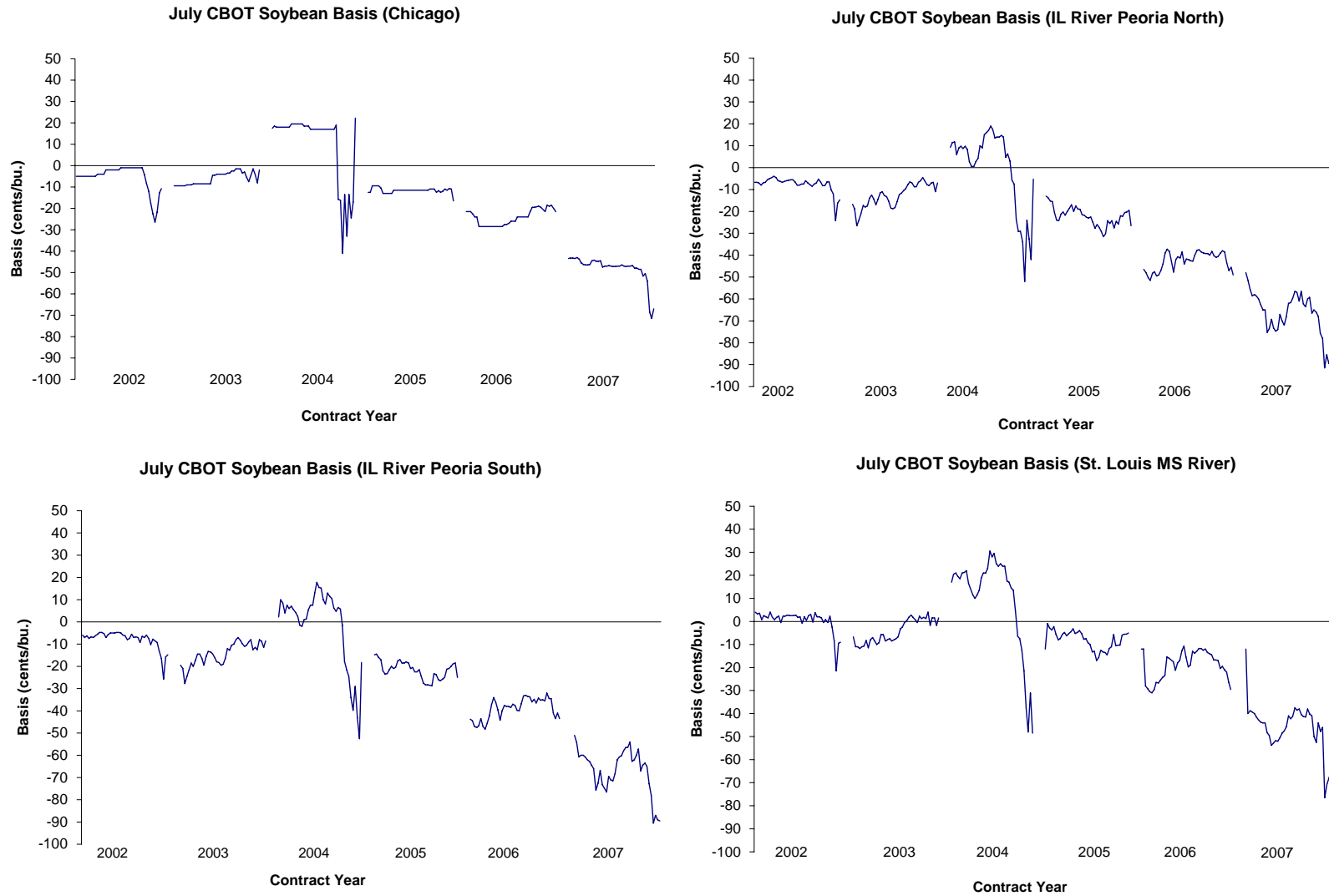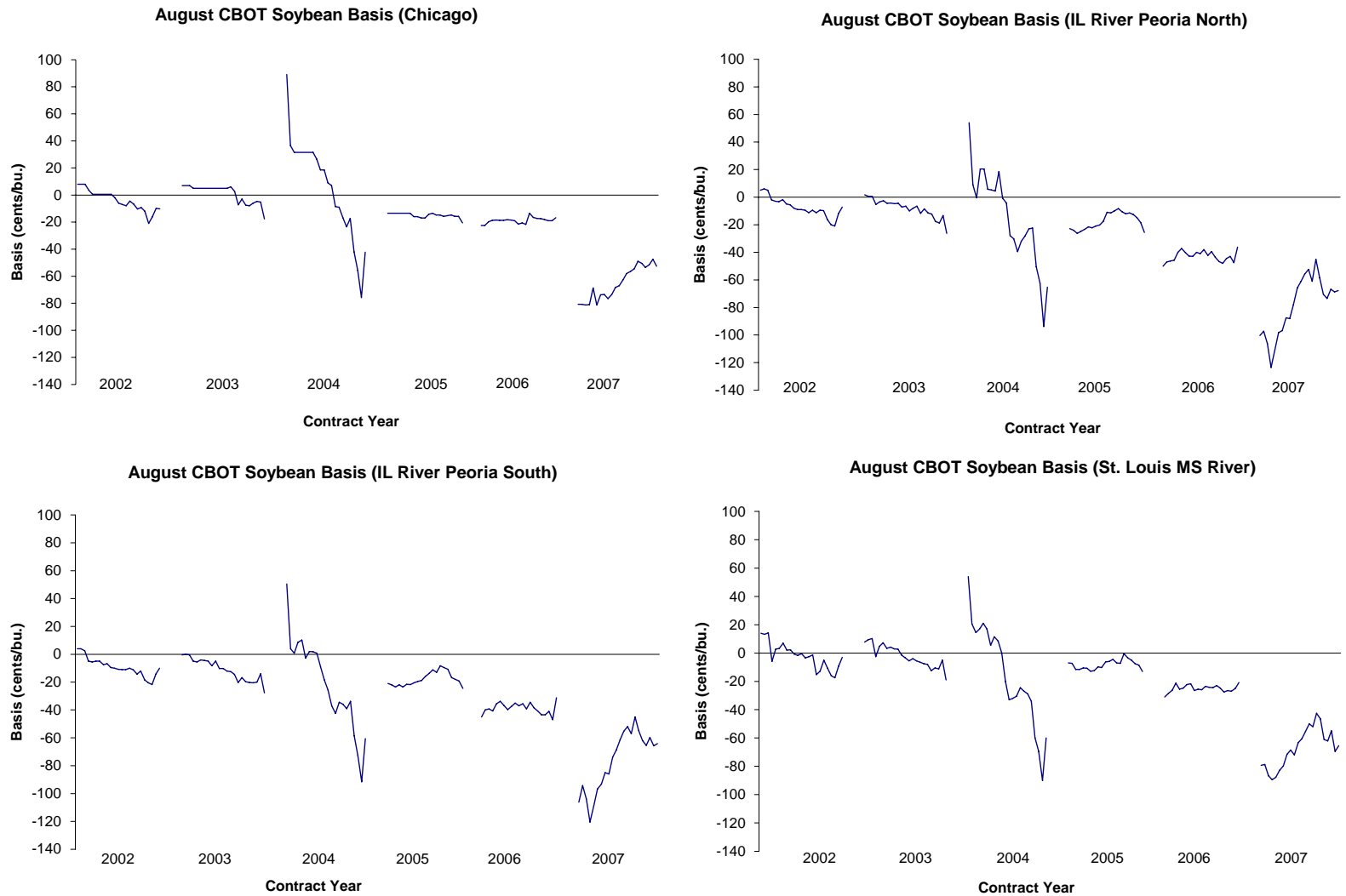**January CBOT Soybean Basis (St. Louis MS River)**

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 7. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002F - 2008F

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March CBOT Soybean Basis (Chicago)

March CBOT Soybean Basis (IL River Peoria North)

March CBOT Soybean Basis (IL River Peoria South)

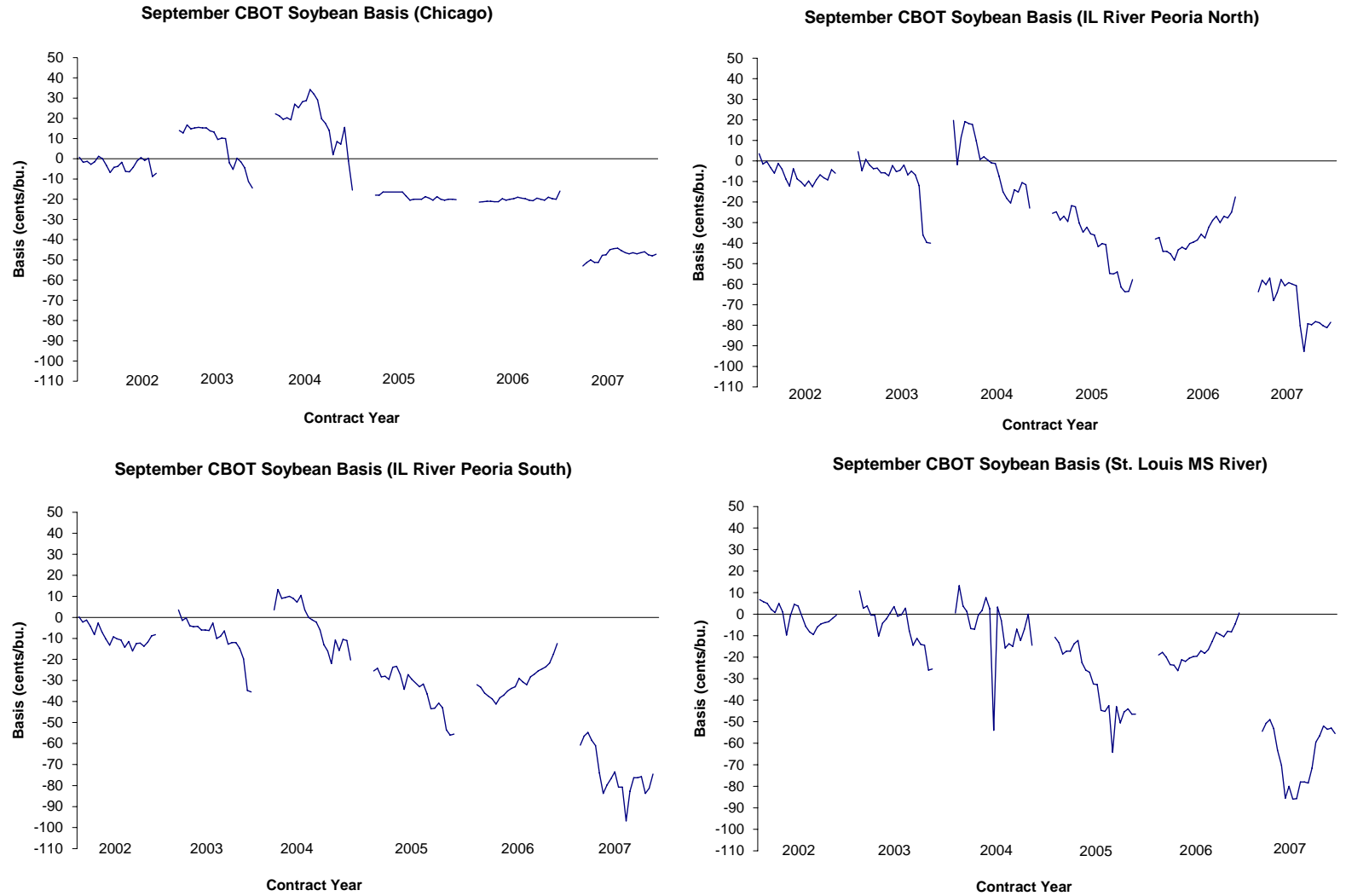**March CBOT Soybean Basis (St. Louis MS River)**

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 8. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002H- 2008H

May CBOT Soybean Basis (Chicago)

May CBOT Soybean Basis (IL River Peoria North)

May CBOT Soybean Basis (IL River Peoria South)

May CBOT Soybean Basis (St. Louis MS River)

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively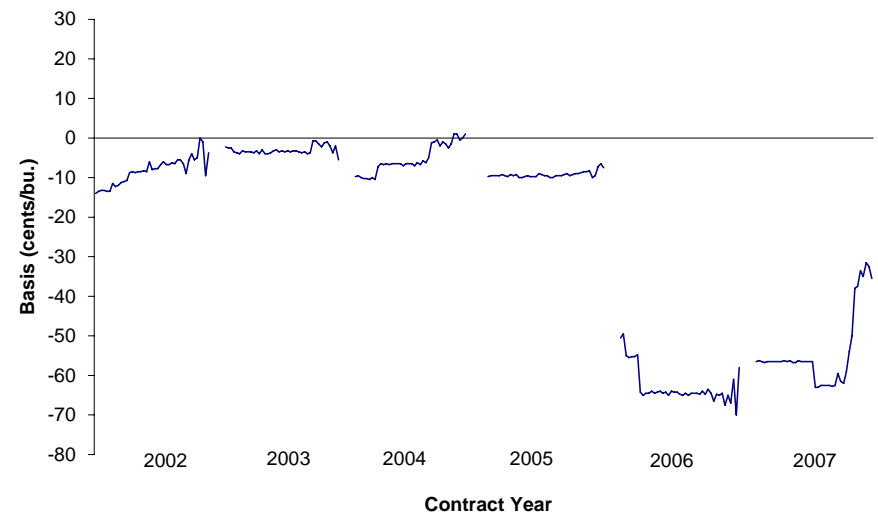. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 9. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002K - 2007K

July CBOT Soybean Basis (Chicago)

July CBOT Soybean Basis (IL River Peoria North)

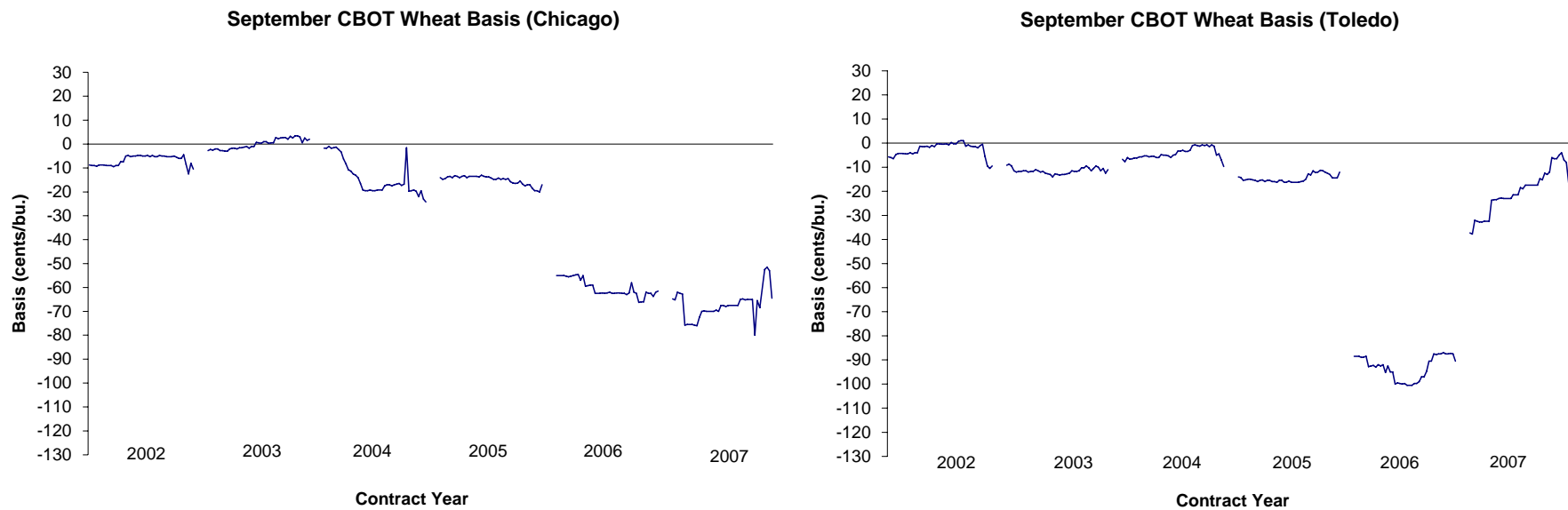**July CBOT Soybean Basis (IL River Peoria South)**
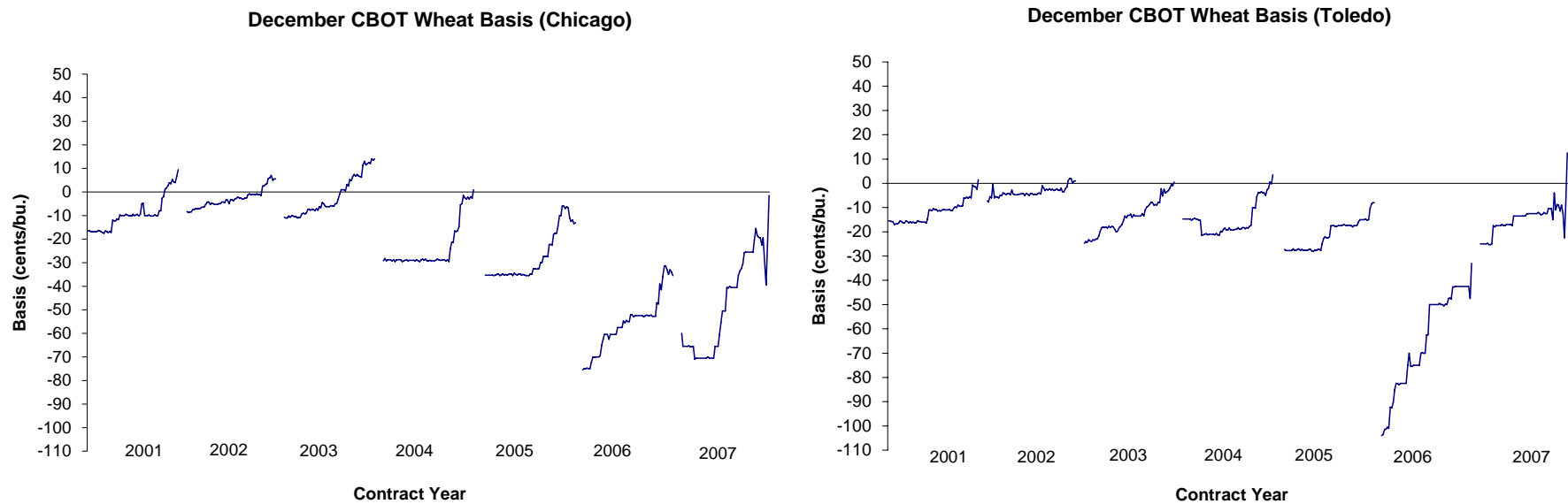
July CBOT Soybean Basis (St. Louis MS River)

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 10. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002N - 2007N

August CBOT Soybean Basis (Chicago)

August CBOT Soybean Basis (IL River Peoria North)

August CBOT Soybean Basis (IL River Peoria South)
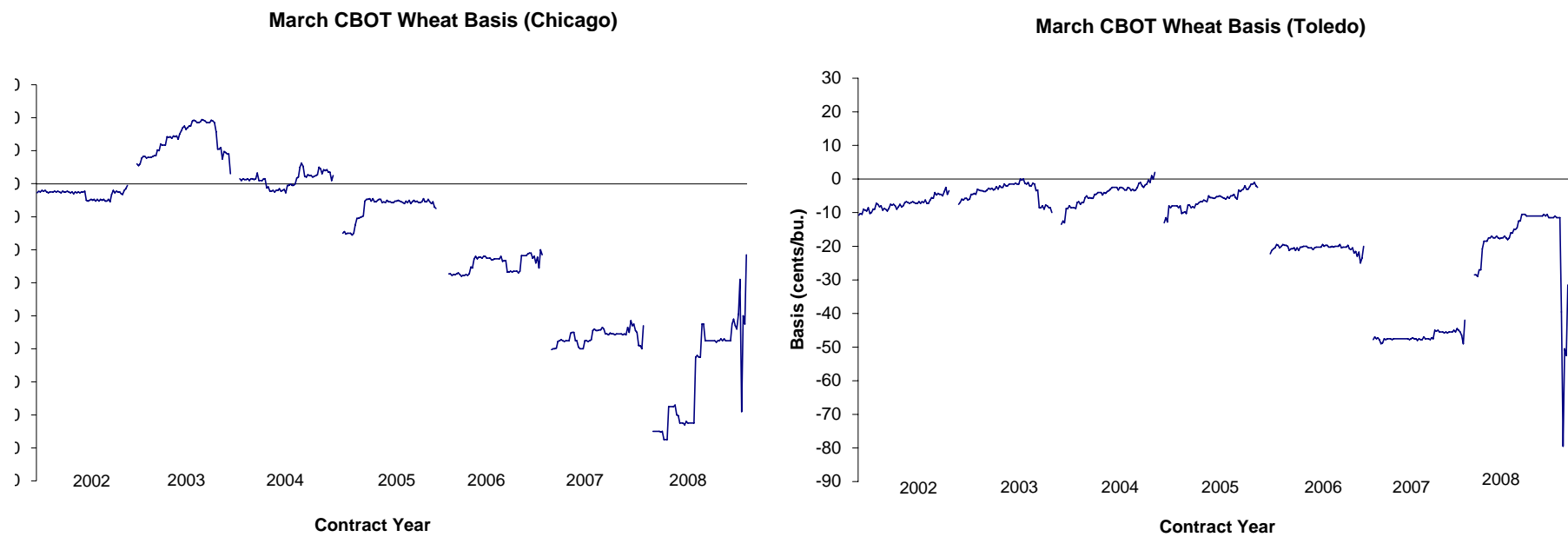
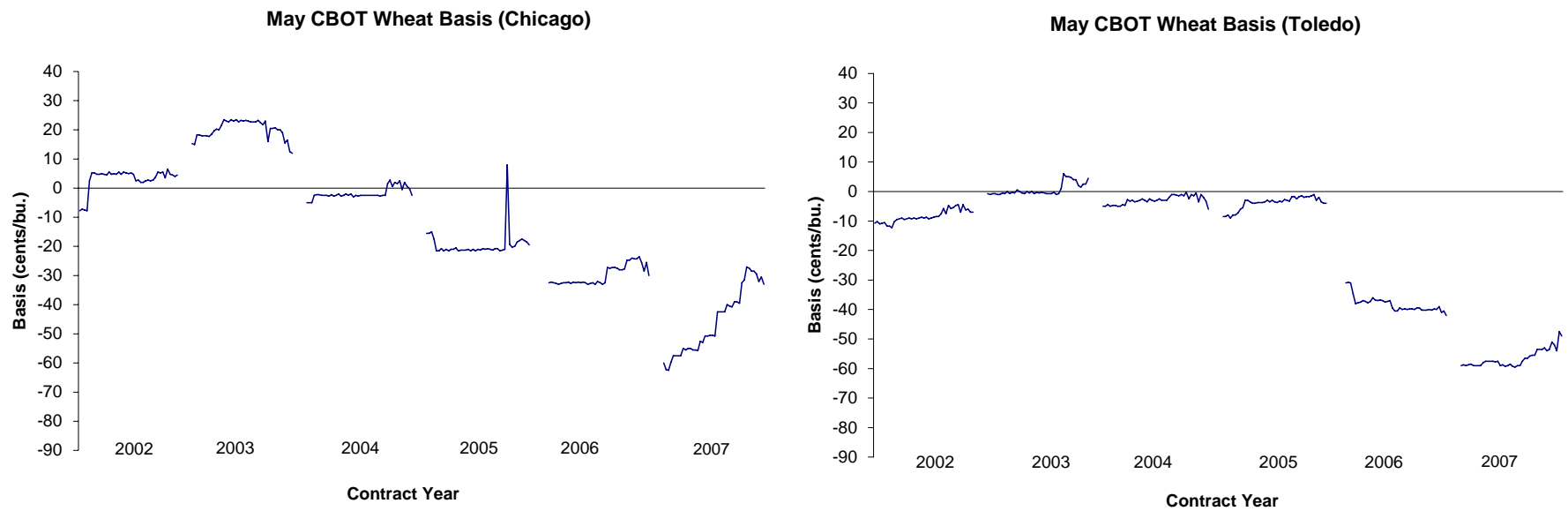**August CBOT Soybean Basis (St. Louis MS River)**

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 11. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002Q - 2007Q

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September CBOT Soybean Basis (Chicago)

September CBOT Soybean Basis (IL River Peoria North)

September CBOT Soybean Basis (IL River Peoria South)

September CBOT Soybean Basis (St. Louis MS River)

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. A grade differential of $0.06/bu. is subtracted from cash prices at all locations. Location differentials of $0.025/bu., $0.035/bu., and $0.06/bu is also subtracted from cash prices for Illinois River North of Peoria, Illinois River South of Peoria, and St. Louis, respectively. Cash price source: Agricultural Marketing Service (http://marketnews.usda.gov/portal/lg/). Futures price source: Commodity Systems Inc. (http://www.csidata.com/).

Figure 12. Delivery Location Basis for CBOT Soybean Futures Contracts, 2002U - 2007U

July CBOT Wheat Basis (Chicago)
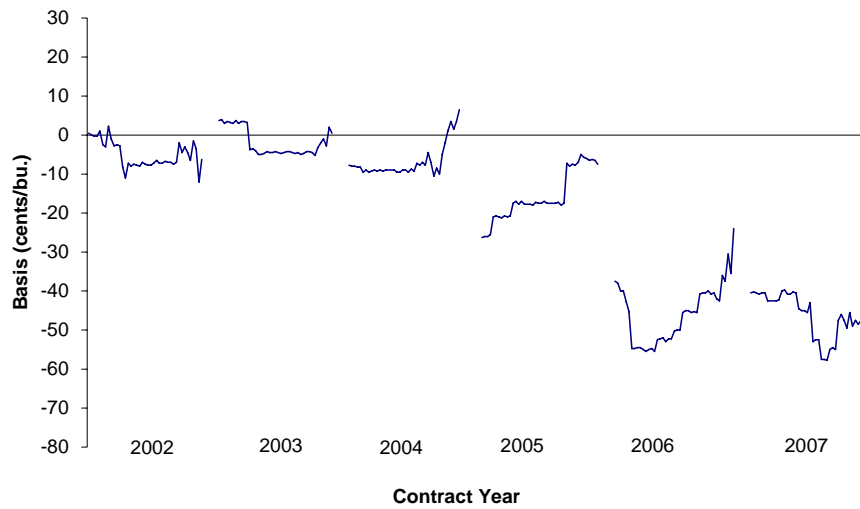
July CBOT Wheat Basis (Toledo)

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/).

Figure 13. Delivery Location Basis for CBOT Wheat Futures Contracts, 2002N - 2007N

September CBOT Wheat Basis (Chicago)

September CBOT Wheat Basis (Toledo)

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/).

Figure 14. Delivery Location Basis for CBOT Wheat Futures Contracts, 2002U - 2007U

December CBOT Wheat Basis (Chicago)

December CBOT Wheat Basis (Toledo)

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/).

Figure 15. Delivery Location Basis for CBOT Wheat Futures Contracts, 2001Z - 2007Z

March CBOT Wheat Basis (Chicago)

March CBOT Wheat Basis (Toledo)

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/).

Figure 17. Delivery Location Basis for CBOT Wheat Futures Contracts, 2002H - 2008H

May CBOT Wheat Basis (Chicago)

May CBOT Wheat Basis (Toledo)

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/).

Figure 18. Delivery Location Basis for CBOT Wheat Futures Contracts, 2002K - 2007K
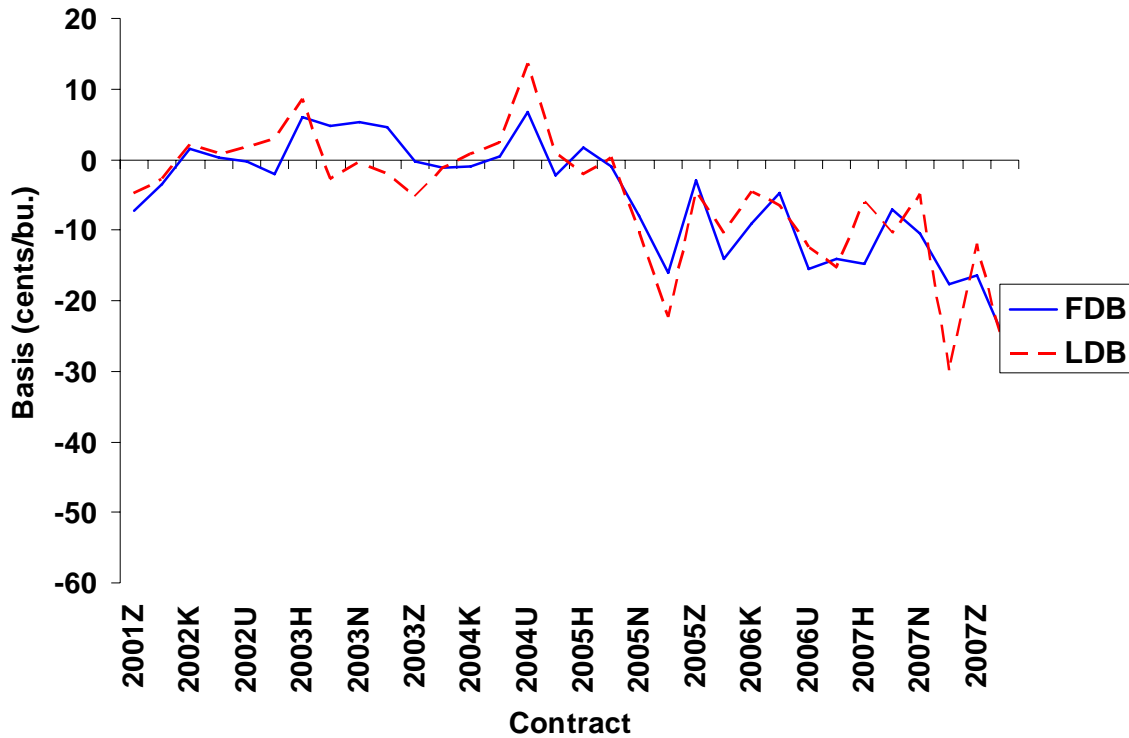
Figure 19. Delivery Location Basis on the First and Last Day of Expiration for CBOT Corn Futures Contracts, Chicago, 2001Z-2008H
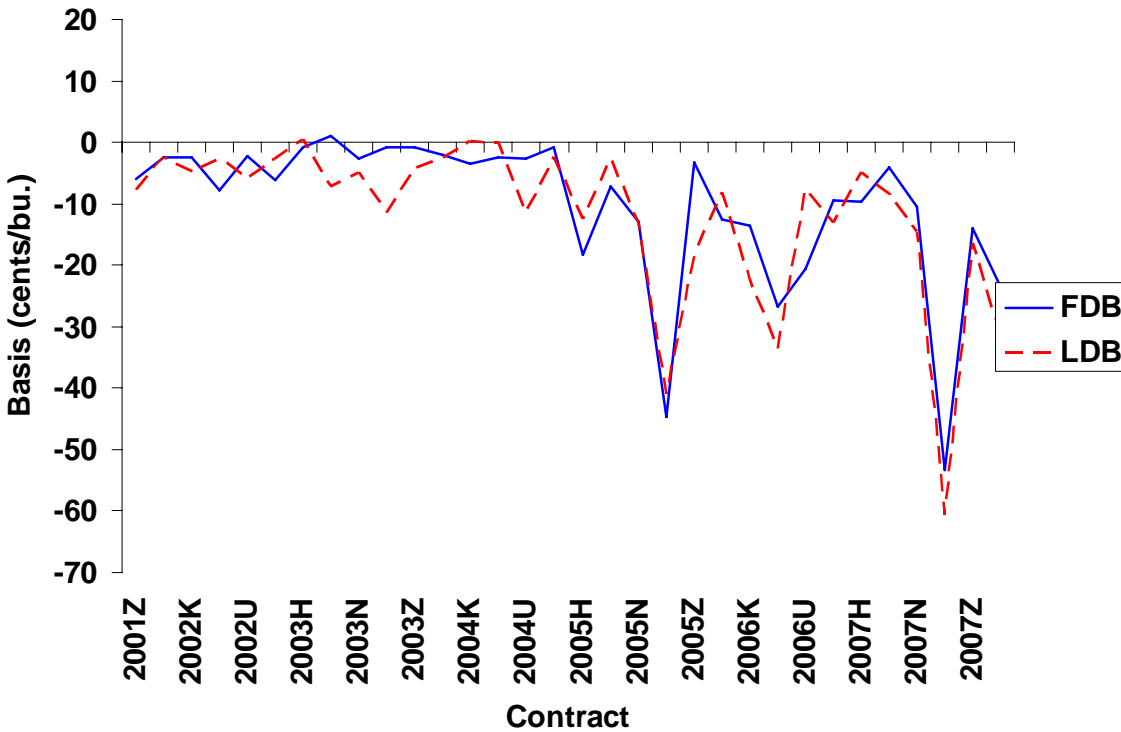
Figure 20. Delivery Location Basis on the First and Last Day of Expiration for CBOT Corn Futures Contracts, Illinois River North of Peoria, 2001Z-2008H
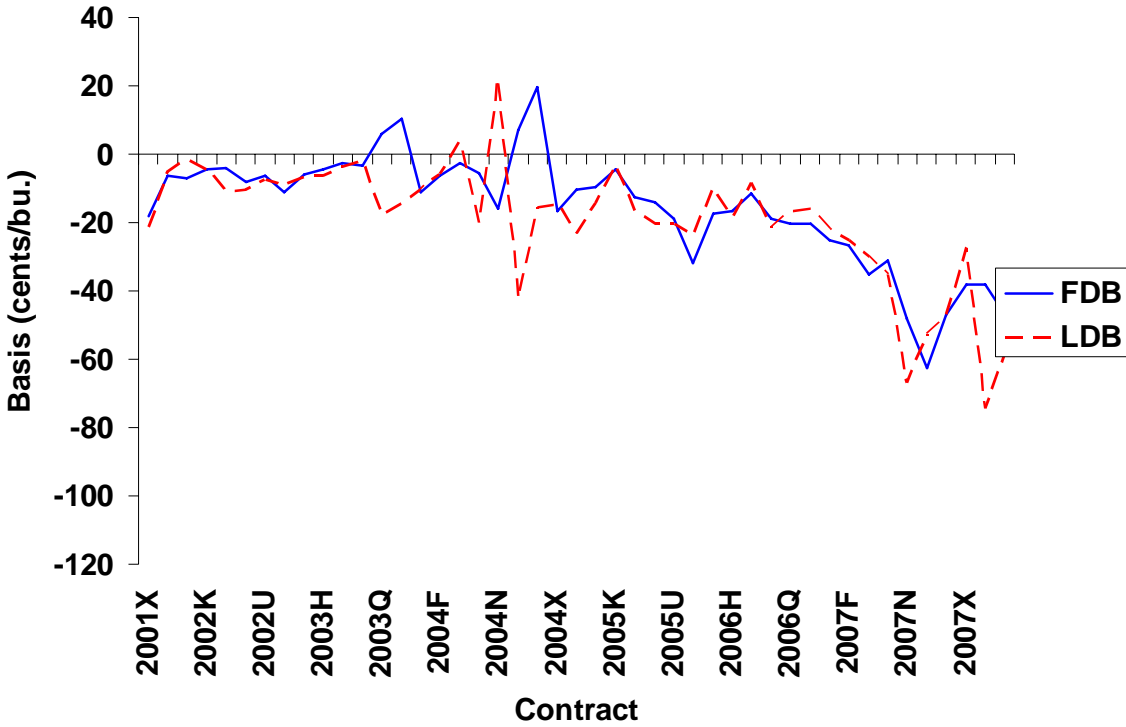
Figure 21. Delivery Location Basis on the First and Last Day of Expiration for CBOT Soybean Futures Contracts, Chicago, 2001X-2008H
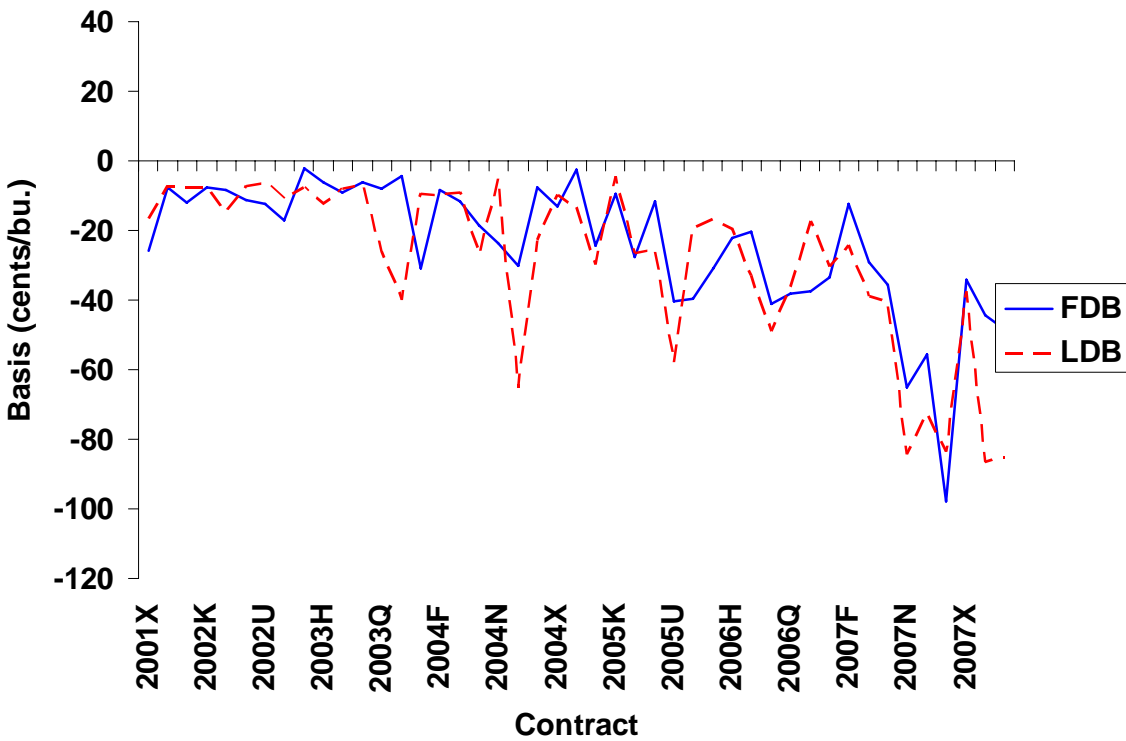
Figure 22. Delivery Location Basis on the First and Last Day of Expiration for CBOT Soybean Futures Contracts, Illinois River North of Peoria, 2001X-2008H
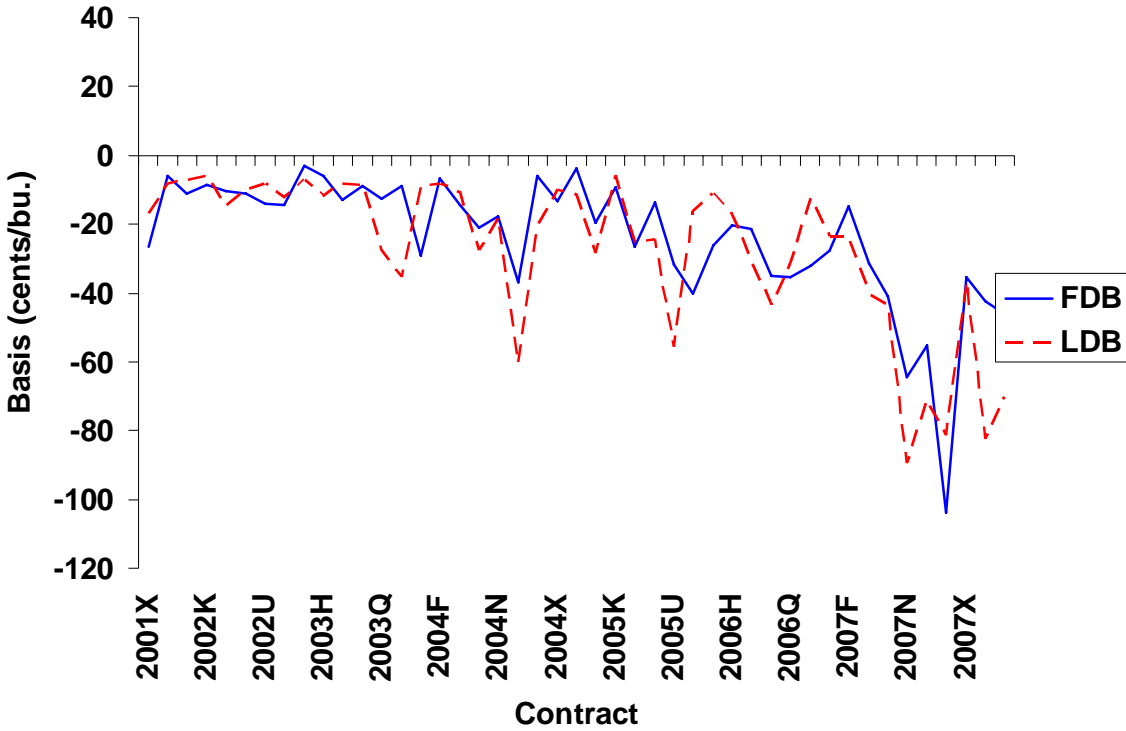
Figure 23. Delivery Location Basis on the First and Last Day of Expiration for CBOT Soybean Futures Contracts, Illinois River South of Peoria, 2001X-2008H
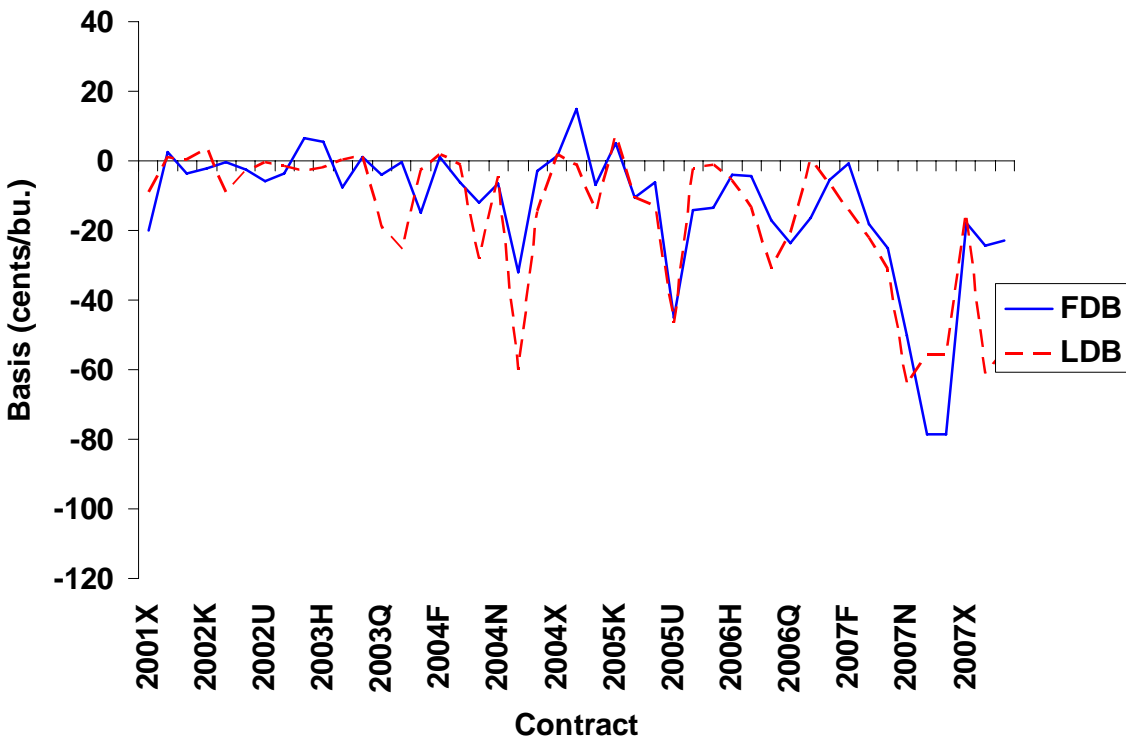
Figure 24. Delivery Location Basis on the First and Last Day of Expiration for CBOT Soybean Futures Contracts, St. Louis, 2001X-2008H
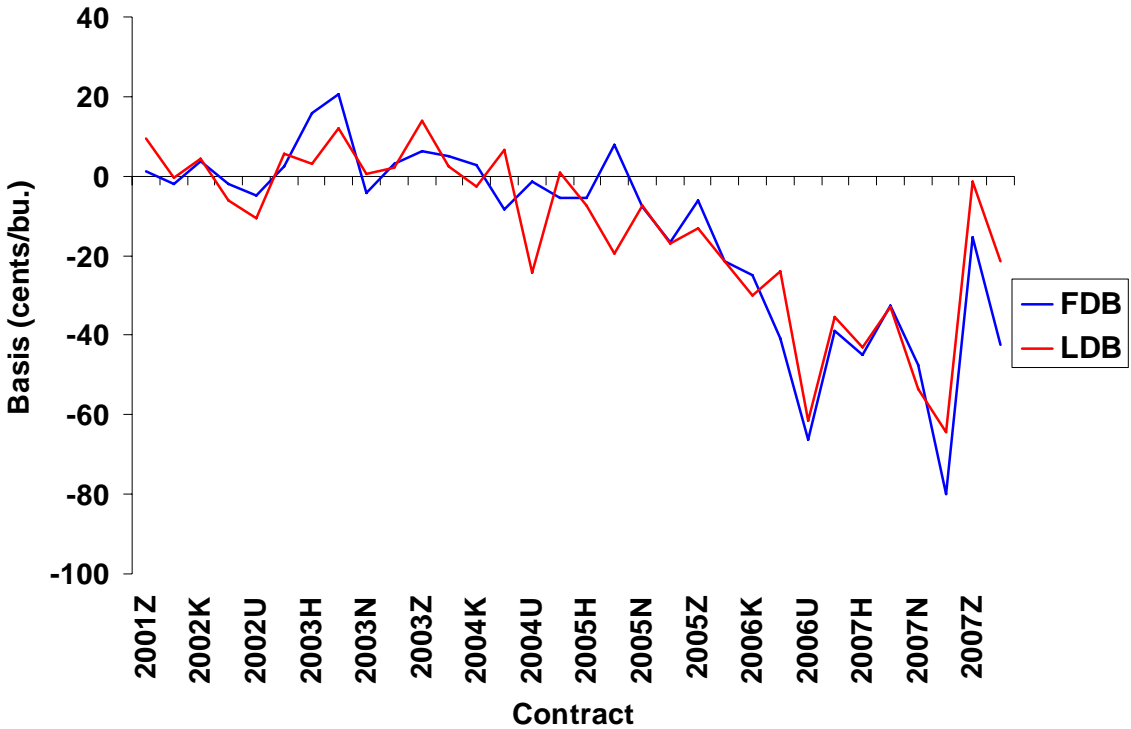
Figure 25. Delivery Location Basis on the First and Last Day of Expiration for CBOT Wheat Futures Contracts, Chicago, 2001Z-2008H
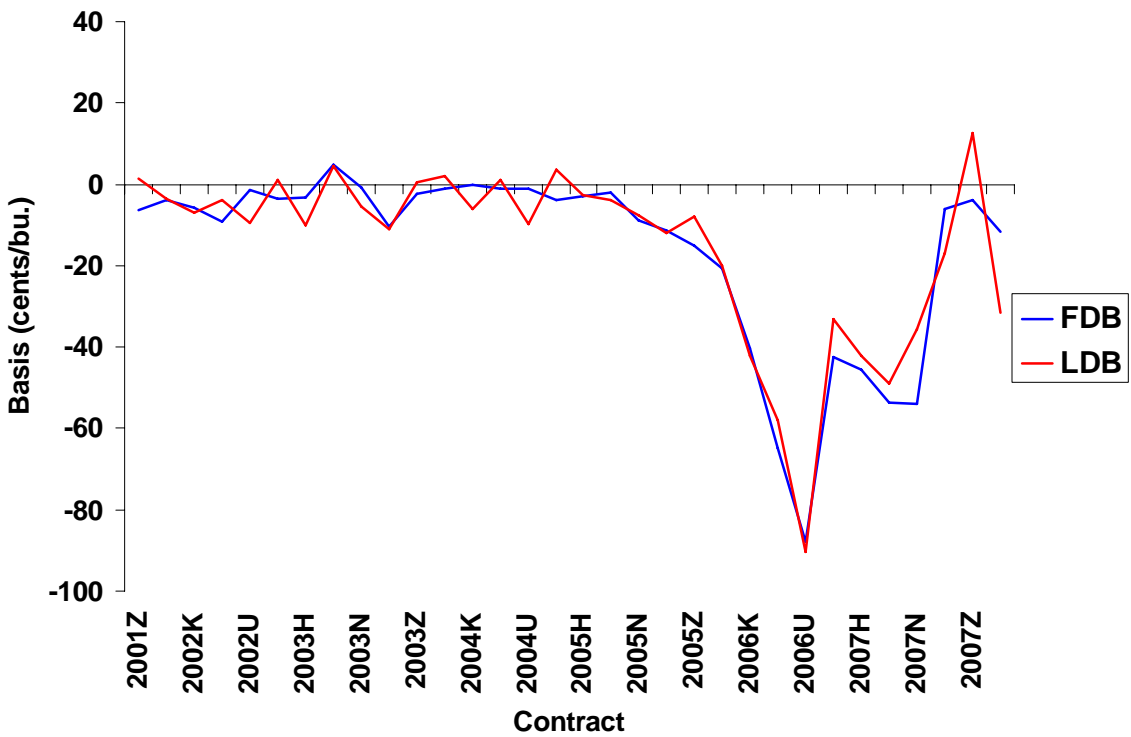
Figure 26. Delivery Location Basis on the First and Last Day of Expiration for CBOT Wheat Futures Contracts, Toledo, 2001Z-2008H
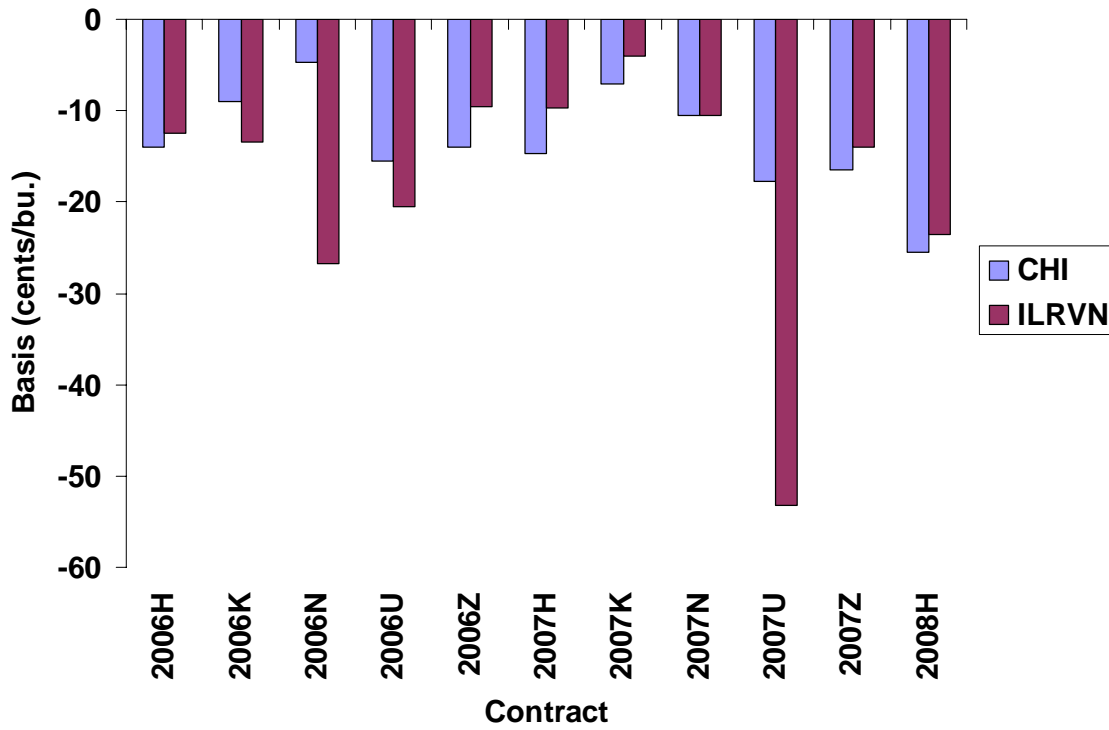
Figure 27. Basis on First Day of Delivery by Location, CBOT Corn Futures Contracts, 2006H-2008H
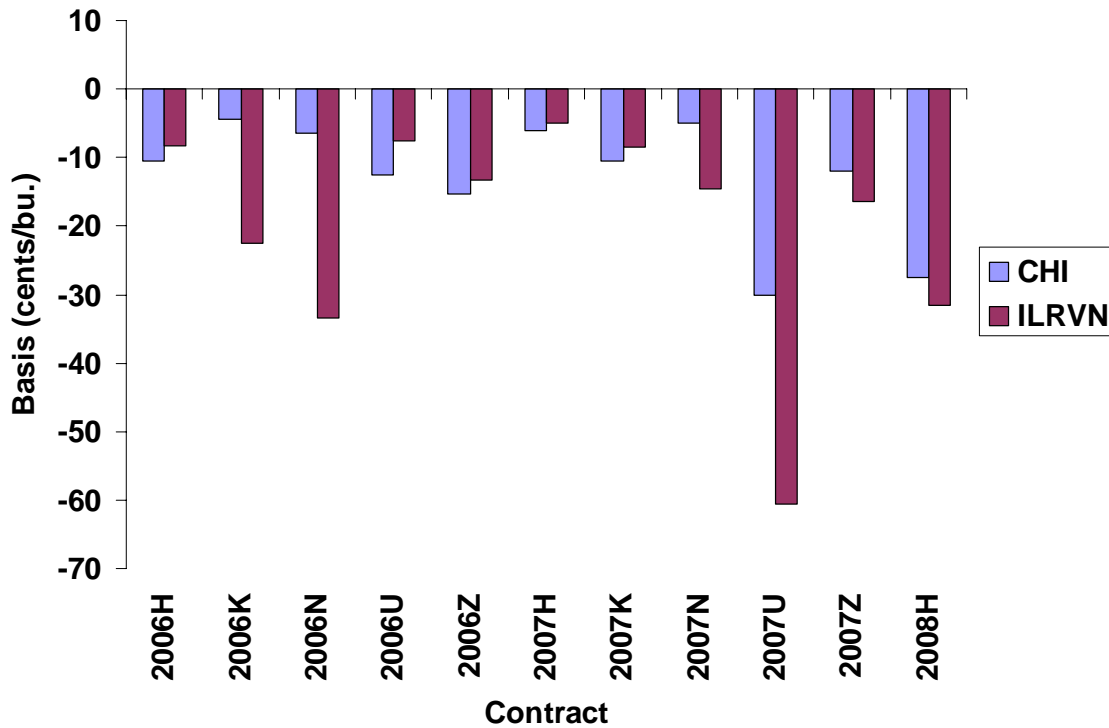
Figure 28. Basis on Last Day of Delivery by Location, CBOT Corn Futures Contracts, 2006H-2008H
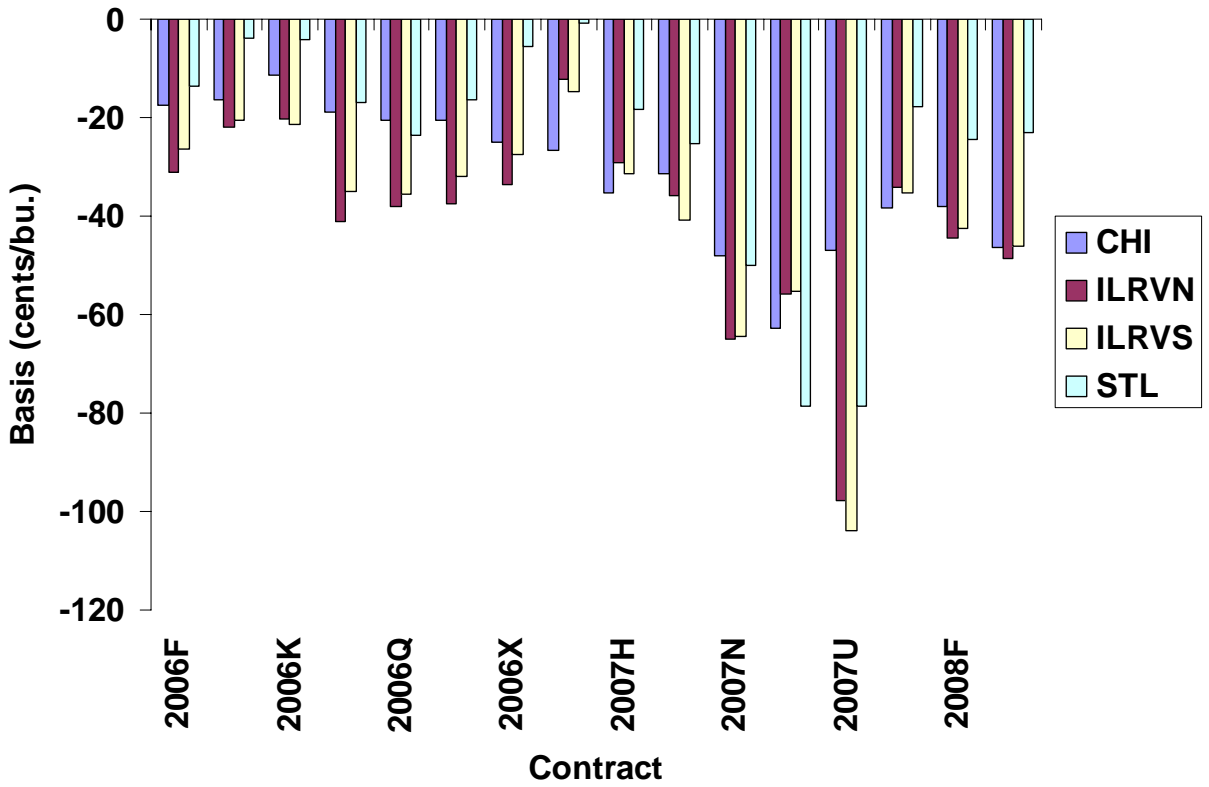
Figure 29. Basis on First Day of Delivery by Location, CBOT Soybean Futures Contracts, 2006F-2008H
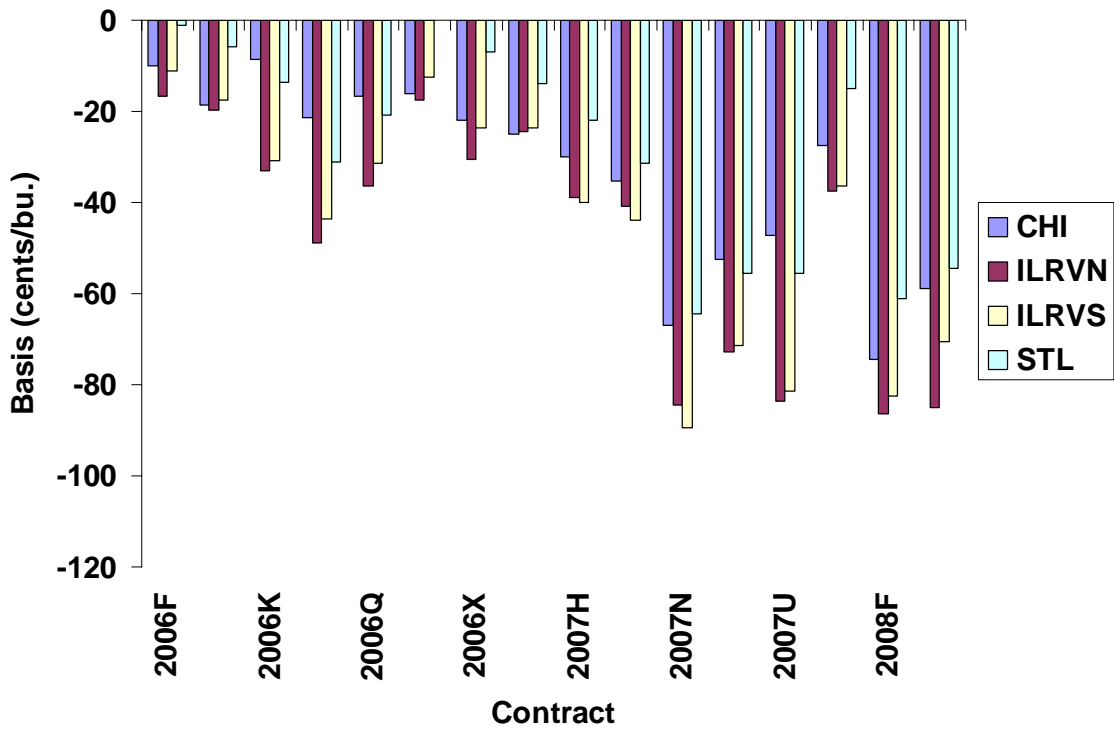
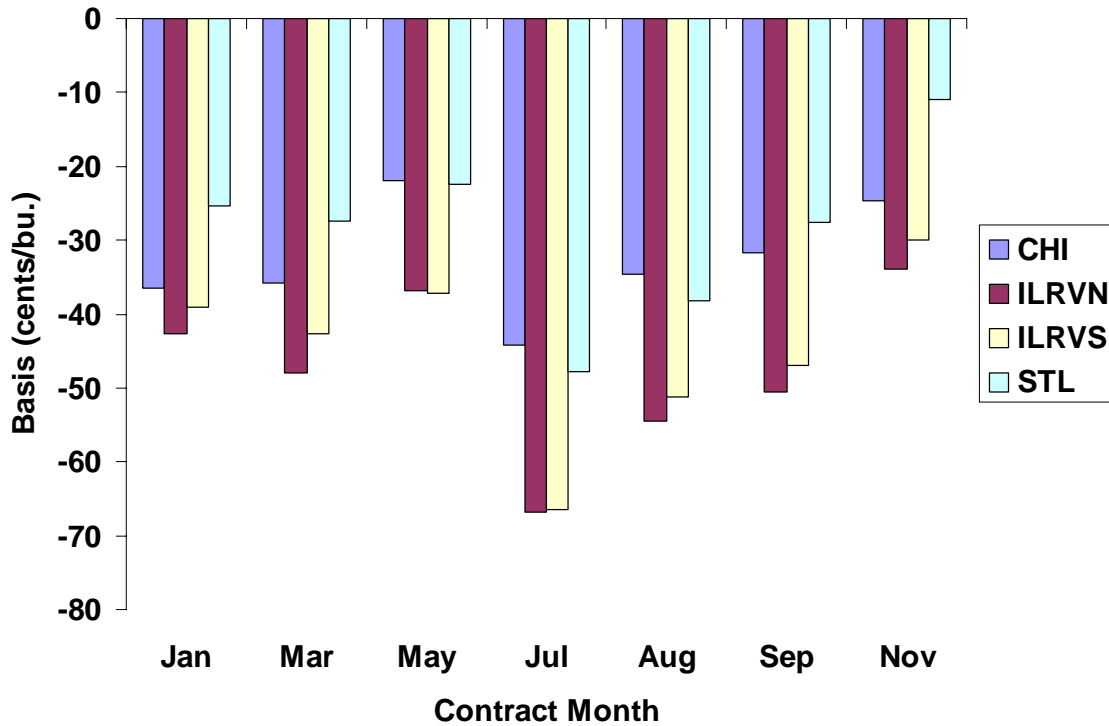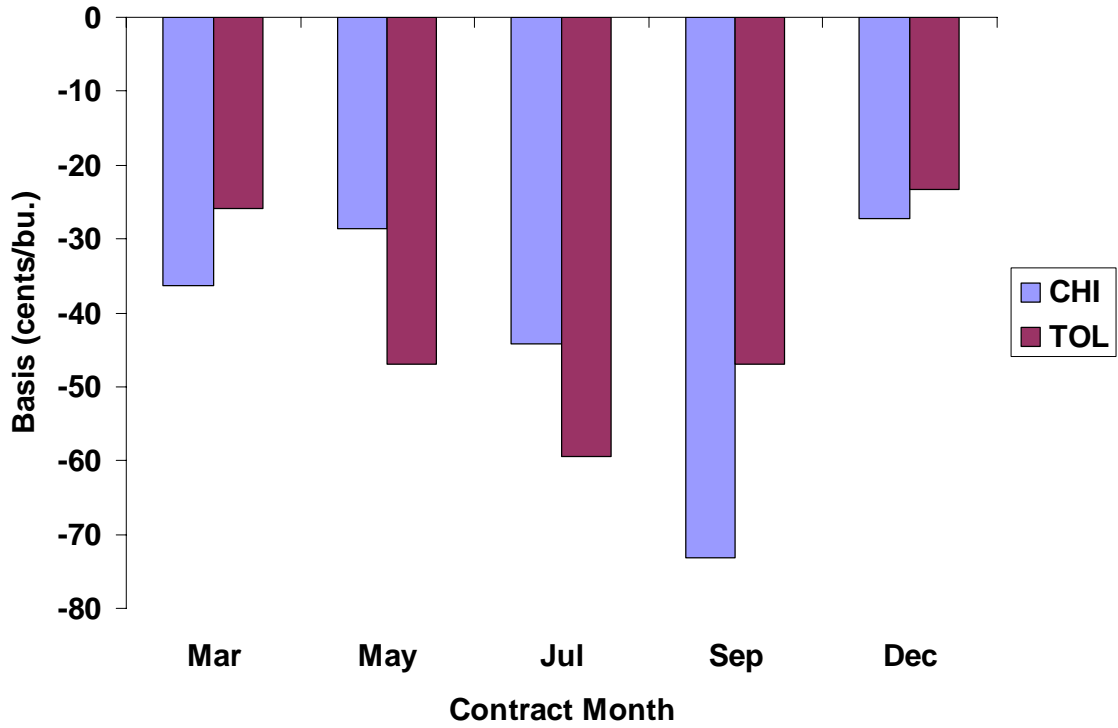**Figure 30. Basis on Last Day of Delivery by Location, CBOT Soybean Futures Contracts, 2006F-2008H**
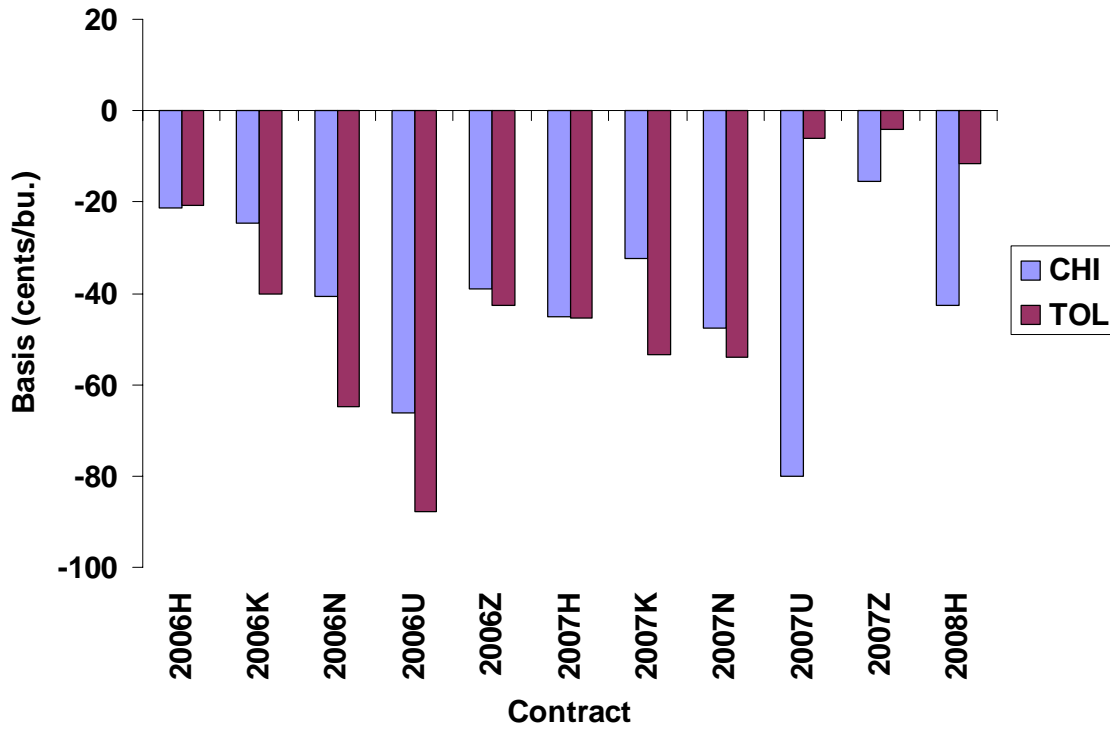
Figure 31. Basis on First Day of Delivery by Location, CBOT Wheat Futures Contracts, 2006H-2008H
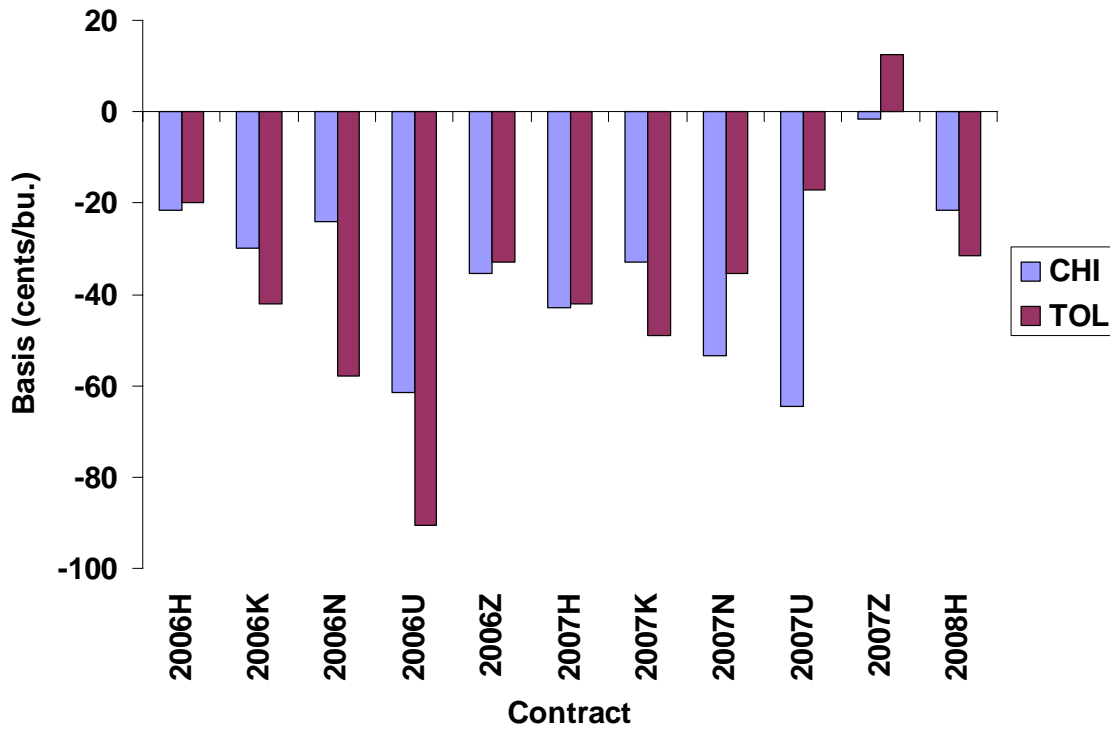
Figure 32. Basis on Last Day of Delivery by Location, CBOT Wheat Futures Contracts, 2006H-2008H
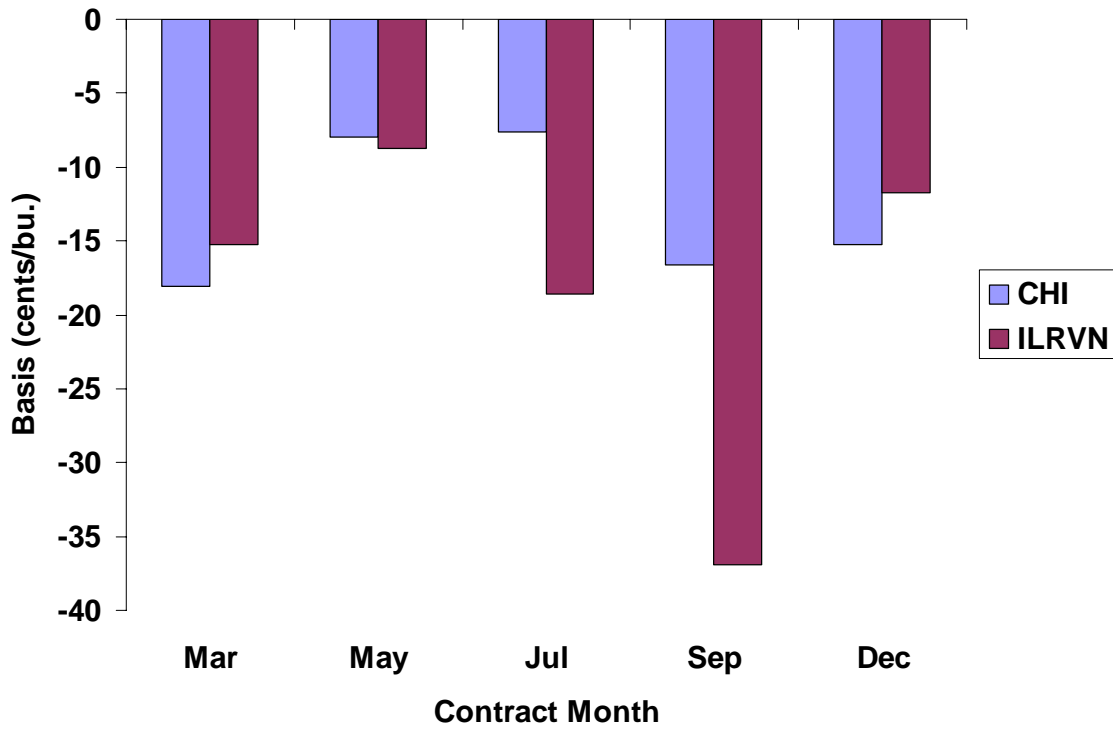
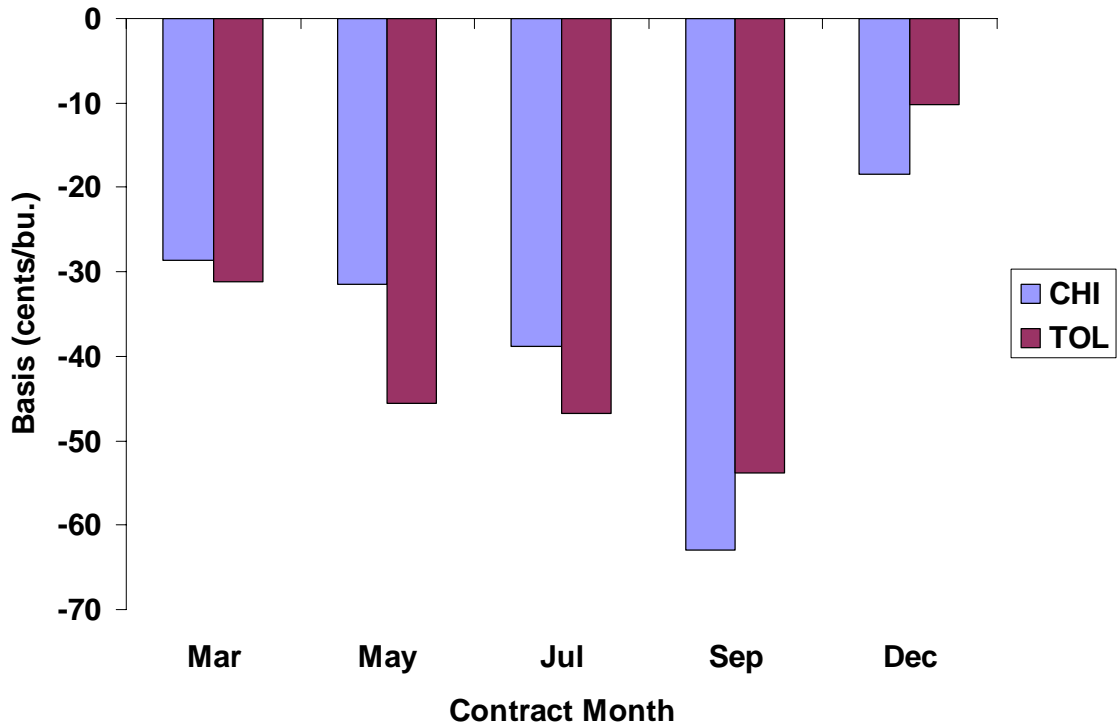**Figure 33. Average Basis on First Day of Delivery by Expiration Month, CBOT Corn Futures Contracts, 2006H-2008H**
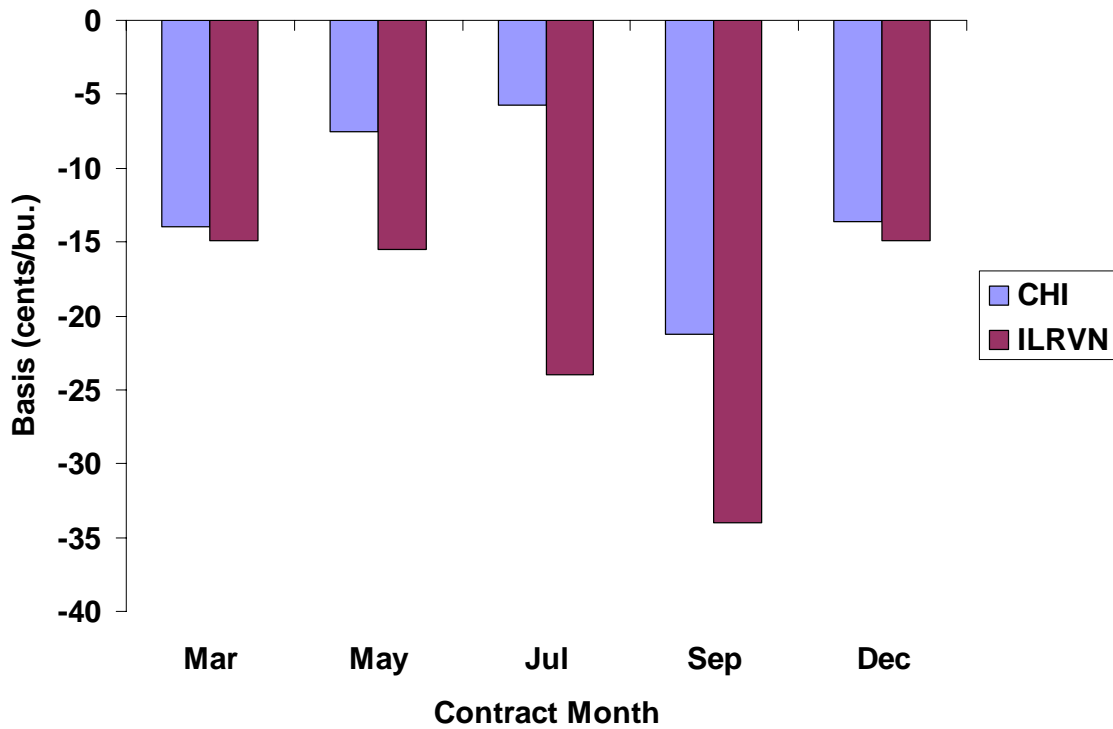
Figure 34. Average Basis on Last Day of Delivery by Expiration Month, CBOT Corn Futures Contracts, 2006H-2008H
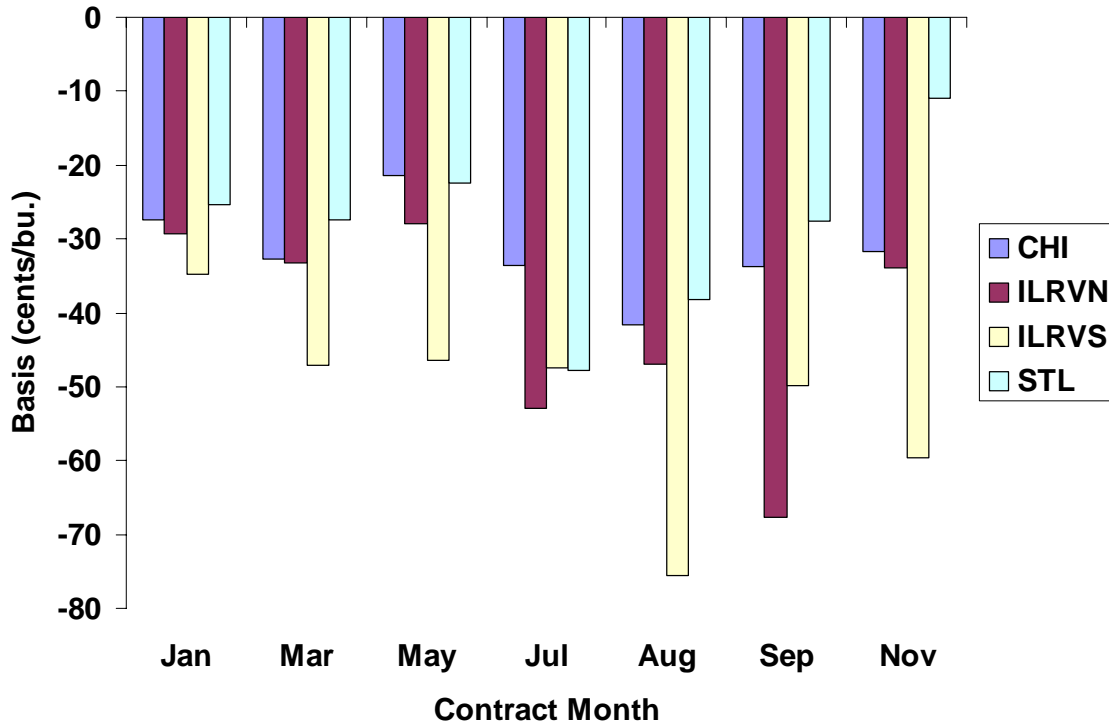
Figure 35. Average Basis on First Day of Delivery by Expiration Month, CBOT Soybean Futures Contracts, 2006F-2008H

Figure 36. Average Basis on Last Day of Delivery by Expiration Month, CBOT Soybean Futures Contracts, 2006F-2008H

Figure 37. Average Basis on First Day of Delivery by Expiration Month, CBOT Wheat Futures Contracts, 2006H-2008H

Figure 38. Average Basis on Last Day of Delivery by Expiration Month, CBOT Wheat Futures Contracts, 2006H-2008H
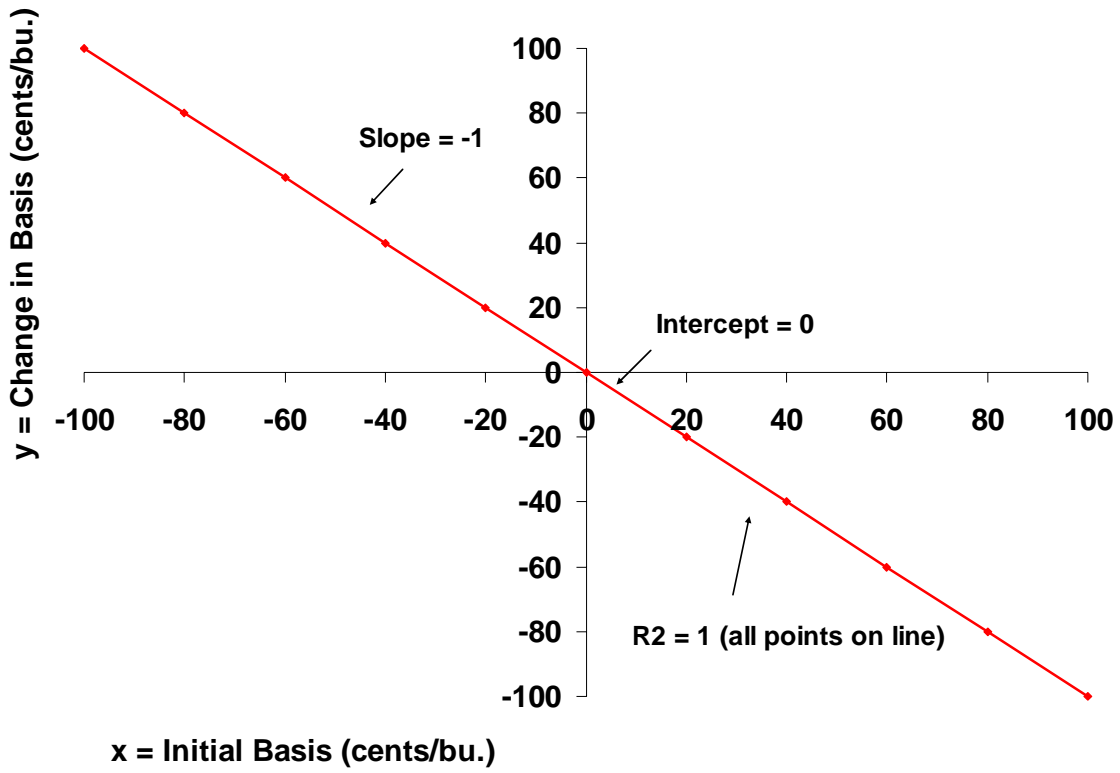
Figure 39. Perfect Delivery Location Basis Predictability
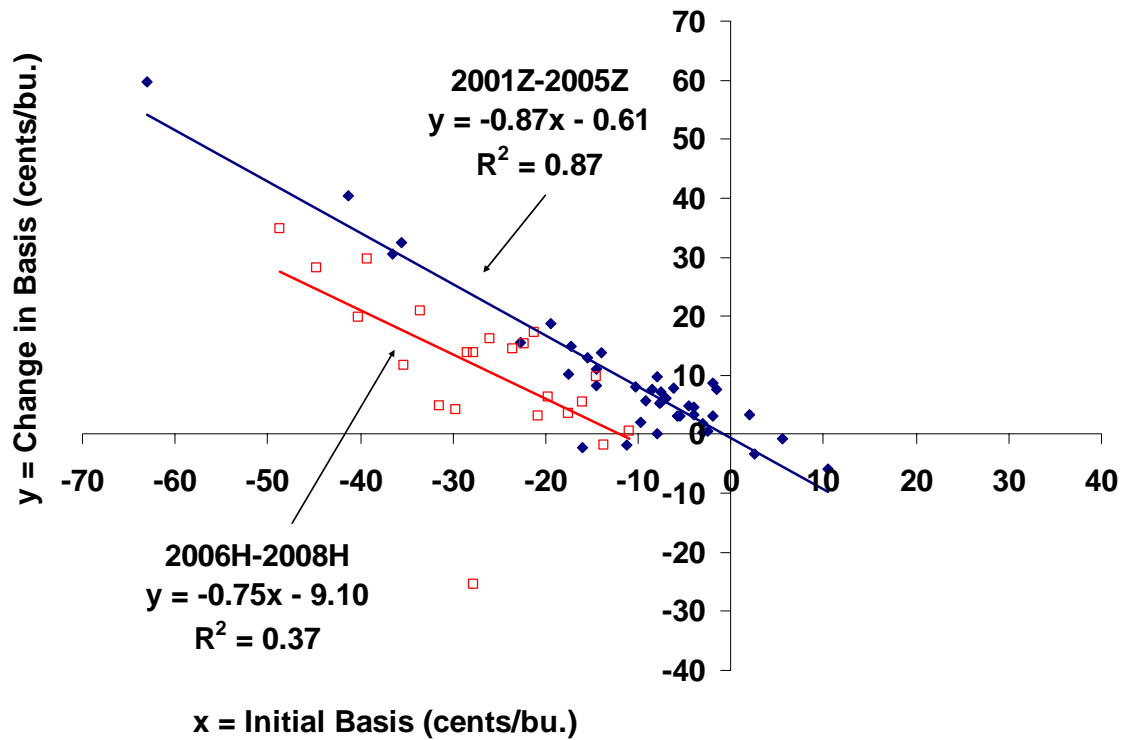
Figure 40. Predictability of CBOT Corn Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H (2005U Omitted)
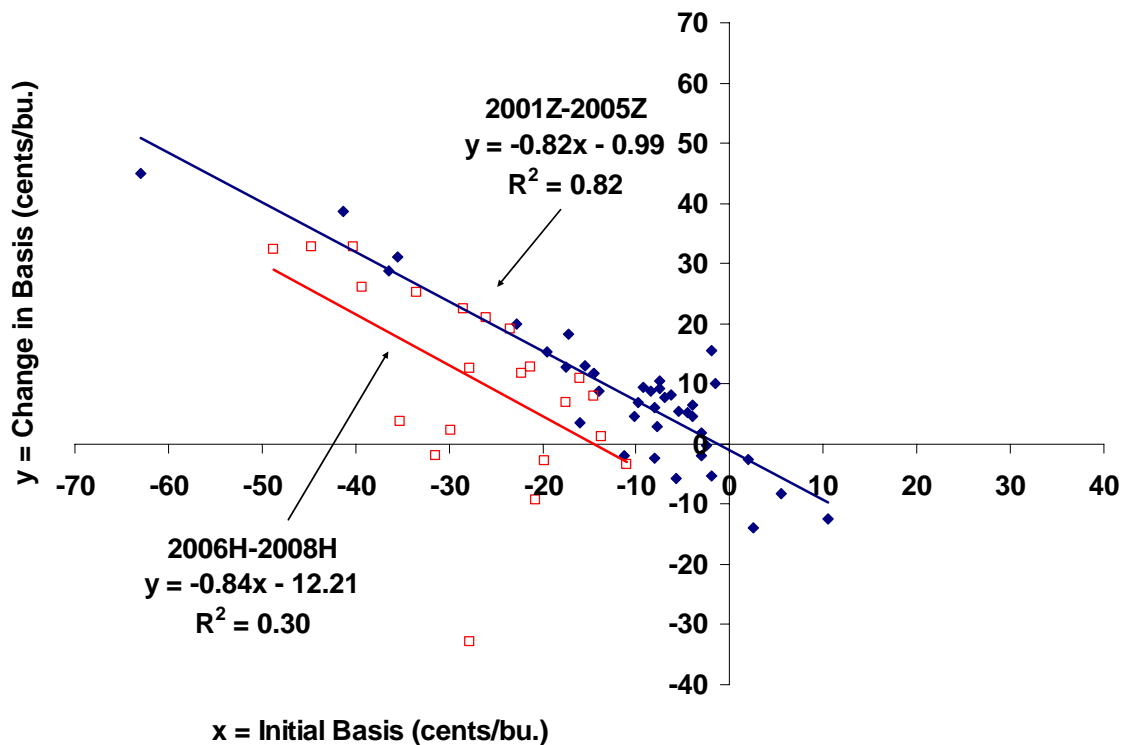

Figure 41. Predictability of CBOT Corn Basis Change to Last Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H (2005U Omitted)
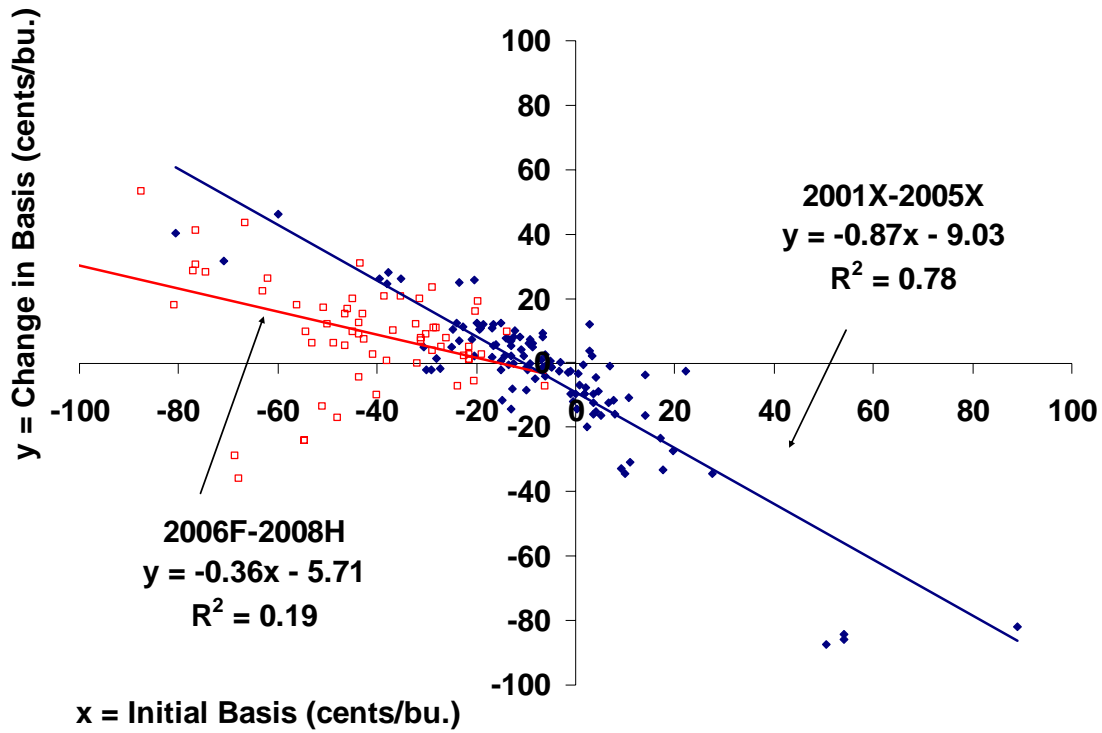
Figure 42. Predictability of CBOT Soybeans Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001X-2008H (2005U Omitted)
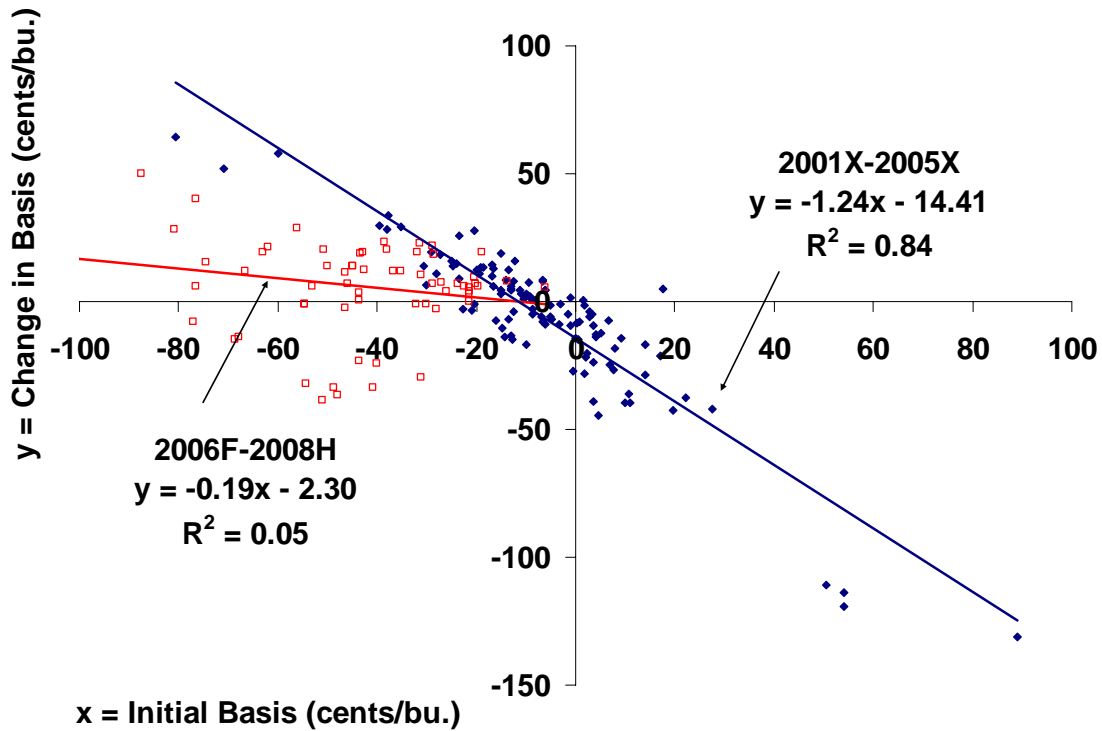

Figure 43. Predictability of CBOT Soybeans Basis Change to Last Day of Delivery, All Delivery Locations Pooled, 2001X-2008H (2005U Omitted)
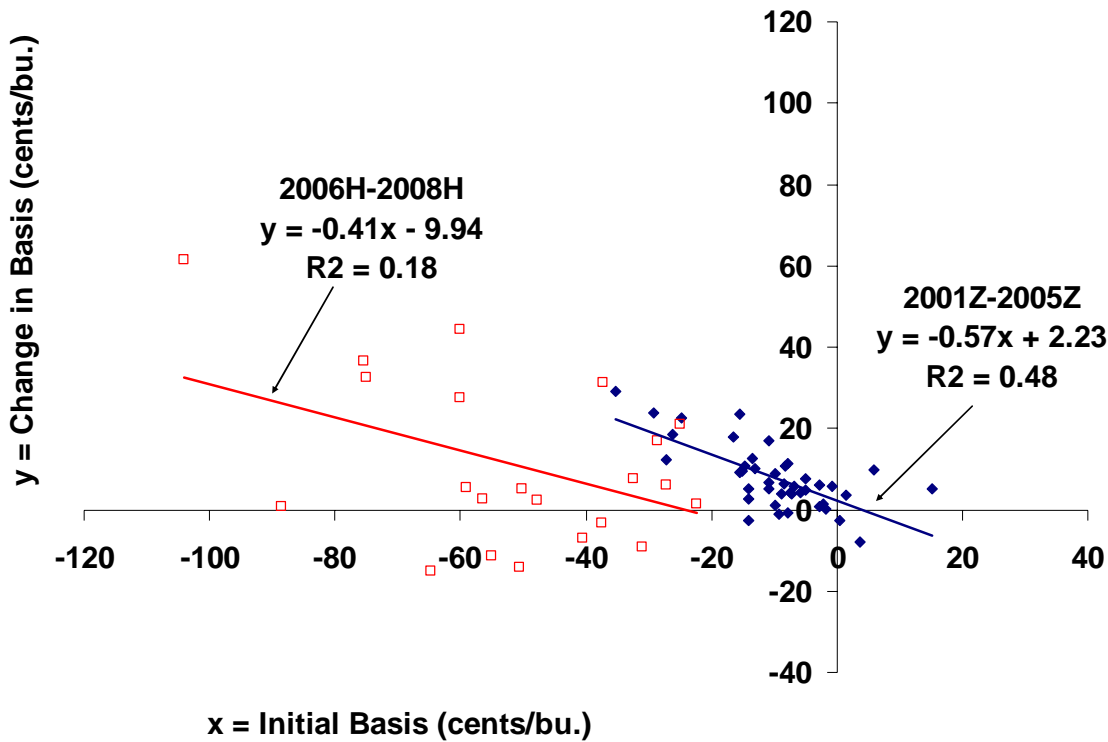
Figure 44. Predictability of CBOT Wheat Basis Change to First Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H
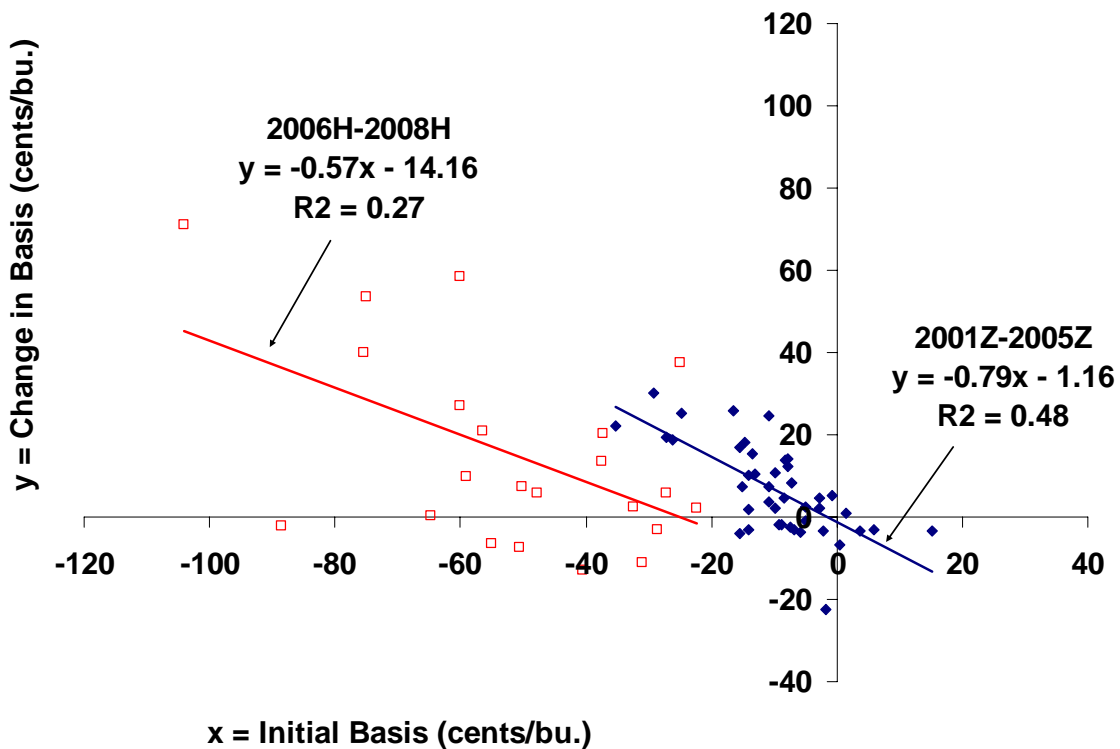

Figure 45. Predictability of CBOT Wheat Basis Change to Last Day of Delivery, All Delivery Locations Pooled, 2001Z-2008H