UNIVERSITY OF MARYLAND EXTENSION
Solutions in your community

Factsheet FS-495
2013

Maryland Corn: Historical Basis and Price Information

The local basis, defined as the cash price minus futures price, reflects important information about regional supply and demand for a commodity. Corn basis estimates can be used by farmers, grain marketing firms, processors and feed buyers to forecast regional prices, make production or storage decisions, or assess different grain purchasing alternatives. This fact sheet gives monthly average estimates of corn basis and cash prices for five regions in Maryland.

Methodology and Interpretation

Tables 1-5 display the 8-year average monthly corn basis for five regions in Maryland: Western Maryland, Central Maryland, Southern Maryland, Upper Eastern Shore, and Lower Eastern Shore. The regional average cash price bid is collected each Wednesday by the Maryland Department of Agriculture and published in the Maryland Grain and Livestock Report. The crop year for corn begins on September 1 and ends August 31. Weekly regional prices were collected for the marketing years 2004-05, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, and 2011-12. For each day a cash price is quoted, the array of futures prices for that day is merged with the cash price to construct a profile of basis values. The basis is computed by subtracting the futures price from the regional cash price for a specific contract month. Monthly average basis values are computed for each contract month and then averaged over the eight marketing years. The average and standard deviation (SD) of the basis for the eight years is presented in the tables.

The columns for Tables 1-5 represent the futures contract month while rows signify the calendar month of the marketing season. For example, in Table 1, the intersection of the October calendar row and the December futures column shows that the basis is 13 cents and would be read as follows: "In the calendar month of October, the cash price for corn in Western Maryland averages 13 cents above the December futures price." The nearby basis can be obtained from the left hand entry in each row.

A standard deviation is associated with each average basis estimate; it represents the variability from the average basis estimates. As a general rule, the actual basis is likely to fall within plus or minus one SD of the average basis 67% of the time. An optimistic basis is the average basis estimate plus the SD, while a pessimistic basis estimate is the average basis minus the SD. If the basis is normally distributed, 67% of the time, the actual basis will fall within the bounds of the optimistic and pessimistic basis values. Figures 1-5 show graphs of the optimistic, average, and pessimistic basis for the typical harvest months (September, October, and November). In the calendar month of October, the cash price for corn in Western Maryland averages 13 cents above the December futures price. The optimistic basis would be 41 cents (13 + 28) and the pessimistic

basis would be -15 cents (13 – 28) as shown in Figure 1.

Using the Basis Tables: Some Examples

In this section, various examples are presented that show how the basis tables can be used.

1. Harvest-Time Storage Decisions

For deciding whether to store grain after harvest it is important to recognize the market signals that encourage storage. The first thing to examine is the current harvest time basis. Is the current basis stronger or weaker than normal? A general rule, which can improve storage profitability, is to store grain after harvest whenever the harvest-time basis is below the pessimistic basis level and sell grain if the basis is above the optimistic basis value. A producer harvesting corn in October would want to compare the current December basis with the average December basis in October. For the Lower Eastern Shore, the average December basis in October is 13 cents with a standard deviation of 15 (see Table 5). A basis less than -2 cents (13 - 15) is a good indicator to store. In contrast, a basis higher than 28 cents (13 + 15) is a good indicator to sell grain at harvest in lieu of storing. If the current basis falls between the optimistic basis and the pessimistic basis, as it does 67% of the time, then there is not any marketing signal to store or to sell.

The second piece of important information for analyzing a post-harvest storage decision is comparing the current futures spread with historical futures spread. The futures spread represents what the futures market is willing to pay to have grain stored from a nearby contract month to a distant contract month and is computed from the price spread between consecutive contracts (i.e., distant futures price minus nearby futures price). For example, suppose that in October, the December and March futures corn prices are $3.45 and $3.65 cents per bushel, respectively. Given these prices, the market is willing to pay 20 cents to store grain from December to March. This difference in futures contracts is most relevant for delivery locations near the Chicago futures exchange, but it can be useful for determining storage returns for Maryland.

To help farmers make harvest-time storage decisions, this current futures spread of 20 cents can be compared to the historical futures spread found in the basis tables. The historical futures spread can be obtained by taking the nearby basis and subtracting a distant basis. Using Lower Eastern Shore (Table 5), as an example, in the calendar month of October the historical futures spread between December and March is calculated as follows:

December basis in October – March basis in October = 13 – 0 = 13 cents

Thus, in October the historical futures spread (average price difference between the March futures contract and the December futures contract) is 13 cents per bushel for 3 months or 4+ cents per month. Comparing it to the current futures spread of 20 cents or 6+ cents per month indicates that it might be a good idea to store. On any given day one can obtain the current futures spread by looking at the difference between consecutive futures contract prices. When the current futures spread is higher than historical futures spread, this indicates it is a good year to store. Lower than normal current futures spread (compared to the historical futures spread) indicate that it is not good to store.

2. Optimal Selling Month of Stored Grain

The basis tables can be used to calculate the average return to grain storage. By placing corn in storage after harvest and simultaneously selling a distant futures contract, a producer earns a return whenever the contracted basis increased over the season. Thus, instead of storage returns being dependent on cash price appreciation, a hedged storage position earns profits if a contract month basis increases over the season. Using the Lower Eastern Shore, as an example, suppose a producer wants to store corn from October to February. The futures side of this hedging decision is to sell the March contract in

October and, when the cash grain is sold in February, buy back the March futures contract. The return to storage accounts for the short futures position and long cash position. On average, this return is as follows:

March basis in February – March basis in October = 34 – 0 = 34 cents

Thus, on average, storing from October to February earns 34 cents per bushel when hedging with a March futures contract.

The tables can also be used to calculate the optimal month to sell stored grain. If a product is harvested in October and has a storage cost of 6 cents per month, average storage profit is equal to the average storage return (i.e., basis appreciation) for each month less storage cost. This is illustrated below using the Lower Eastern Shore May corn basis. Average return is computed from the amount of appreciation in the May basis from October (i.e., harvest) until grain is sold. For example, the average return in January is 32 cents per bushel, which reflects the difference between the May basis in January (24 cents) and the May basis in October (-8 cents).

Lower Eastern Shore Corn Storage Profit with 6 Cents/Month Storage Cost, May Futures Contract, and Storing Corn in October

Selling Month	**Average Return** (¢/bushel)	**Storage Costs** (¢/bushel)	**Average Profit** (¢/bushel)
November	12	6	6
December	24	12	12
January	32	18	14
February	32	24	8
March	39	30	9
April	39	36	3

The producer's optimal selling month is January, since that month has the highest average profit. This only illustrates what the best strategy would be on average. For any given year, it may be best to sell grain at a different time during the season.

The monthly storage costs were calculated as follows. It was assumed that the harvest time corn price was $4.00/bushel and that the farmer had an outstanding loan with an interest rate of 9%. The opportunity cost of not reducing the principle of the loan with a payment is 3 cents/month ($4.00 * .09/12). It was then assumed that the physical cost of drying and storage was 3 cents/month, giving 6 cents/month storage cost for corn. Farmers should develop their own storage costs for this analysis.

Many farmers use their storage facilities for at least a short time each year to assist them in managing the flow of grain at harvest. These farmers consider drying costs to be a harvest cost.

Price Information

Figure 6 and Table 6 show the change in average Maryland corn prices between September 2004 and August 2012. Prices increased from a low of $1.99/bushel in October 2004 to a high of $8.54/bushel in August 2012. Typically grain markets are characterized as having sharp peaks with long valleys.

Table 6 shows average monthly increases in cash prices from October through selected storage months. As illustrated above, storage costs vary with the price of grain. However, at least three of these eight years were profitable for storage. Also, storage returns were highest when the grain was sold earlier in the storage season rather than holding to later. However, storing grain without some type of forward pricing is speculation. There is no guarantee that the next eight years will be profitable for storing corn.

Table 1. Average Western Maryland Corn Basis, 2004 - 2011.

Calendar Month		2004-2011 Average Corn Basis - Western Maryland (cents/bushel)				
		December Futures	March Futures	May Futures	July Futures	September Futures
September	avg	27	14	5	-1	8
	SD	*33*	*33*	*33*	*34*	*54*
October	avg	13	0	-8	-14	-8
	SD	*28*	*26*	*26*	*26*	*38*
November	avg	16	2	-6	-13	-5
	SD	*30*	*31*	*32*	*33*	*48*
December	avg		4	-5	-12	-3
	SD		*27*	*27*	*28*	*44*
January	avg		10	1	-7	4
	SD		*21*	*22*	*23*	*42*
February	avg		15	5	-3	9
	SD		*20*	*23*	*24*	*45*
March	avg			14	6	16
	SD			*18*	*22*	*46*
April	avg			22	14	23
	SD			*16*	*21*	*48*
May	avg				20	25
	SD				*28*	*52*
June	avg				34	36
	SD				*36*	*46*
July	avg					44
	SD					*46*
August	avg					43
	SD					*41*

Figure 1. Harvest Basis for Corn (December futures, cents/ bushel) in Western Maryland, 2004 - 2011

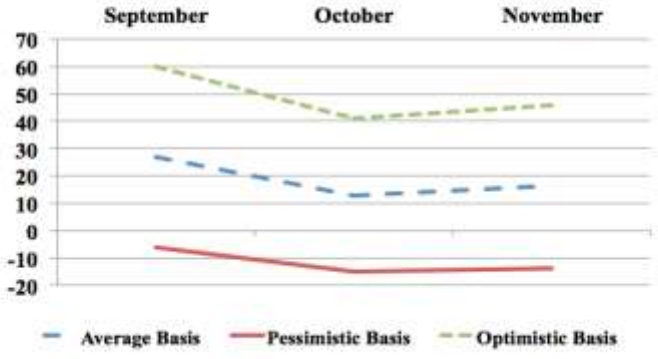


Table 2. Average Central Maryland Corn Basis, 2004 – 2011.

Calendar Month		2004-2011 Average Corn Basis - Central Maryland (cents/bushel)				
		December Futures	March Futures	May Futures	July Futures	September Futures
September	avg	7	-7	-15	-22	-13
	SD	*23*	*24*	*26*	*27*	*47*
October	avg	-4	-17	-25	-31	-25
	SD	*16*	*16*	*17*	*20*	*36*
November	avg	0	-14	-23	-29	-22
	SD	*16*	*18*	*18*	*20*	*39*
December	avg		-2	-12	-19	-10
	SD		*20*	*20*	*21*	*40*
January	avg		6	-3	-10	0
	SD		*23*	*25*	*26*	*45*
February	avg		9	-1	-9	3
	SD		*20*	*22*	*24*	*44*
March	avg			10	2	12
	SD			*19*	*23*	*46*
April	avg			14	6	15
	SD			*14*	*20*	*48*
May	avg				19	24
	SD				*26*	*52*
June	avg				19	20
	SD				*18*	*36*
July	avg					21
	SD					*23*
August	avg					26
	SD					*23*

Figure 2. Harvest Basis for Corn (December futures, cents/ bushel) in Central Maryland, 2004-2011.

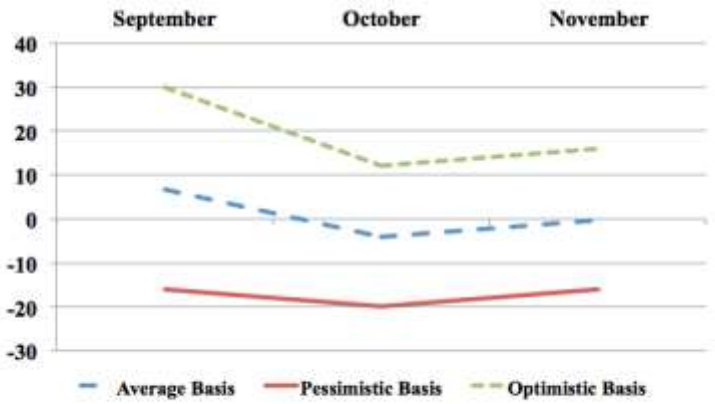


Table 3. Average Southern Maryland Corn Basis, 2004 - 2011.

Calendar Month		2004-2011 Average Corn Basis - Southern Maryland (cents/bushel)				
		December Futures	March Futures	May Futures	July Futures	September Futures
September	avg	-11	-24	-33	-39	-30
	SD	*11*	*12*	*13*	*15*	*35*
October	avg	-16	-29	-37	-43	-38
	SD	*6*	*5*	*5*	*8*	*25*
November	avg	-3	-17	-25	-32	-25
	SD	*11*	*11*	*10*	*10*	*27*
December	avg		-7	-16	-23	-15
	SD		*9*	*9*	*10*	*25*
January	avg		2	-8	-15	-5
	SD		*10*	*10*	*8*	*22*
February	avg		1	-9	-17	-5
	SD		*12*	*12*	*10*	*22*
March	avg			-2	-10	0
	SD			*8*	*8*	*28*
April	avg			-2	-9	0
	SD			*10*	*12*	*39*
May	avg				0	5
	SD				*20*	*44*
June	avg				2	2
	SD				*17*	*35*
July	avg					3
	SD					*22*
August	avg					3
	SD					*20*

Figure 3. Harvest Basis for Corn (December futures, cents/ bushel) in Southern Maryland, 2004-2011.

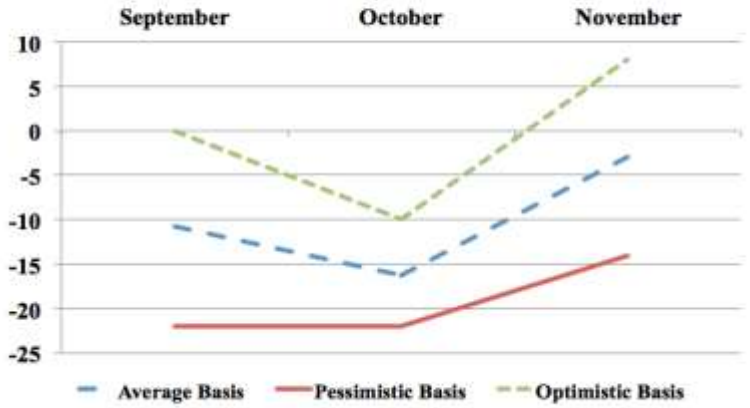


Table 4. Average Maryland's Upper Eastern Shore Corn Basis, 2004 - 2011.

Calendar Month		2004-2011 Average Corn Basis - Maryland's Upper Eastern Shore (cents/bushel)				
		December Futures	March Futures	May Futures	July Futures	September Futures
September	avg	6	-7	-15	-22	-13
	SD	*14*	*14*	*15*	*16*	*36*
October	avg	3	-10	-18	-23	-18
	SD	*14*	*13*	*13*	*14*	*32*
November	avg	15	1	-8	-14	-7
	SD	*18*	*19*	*18*	*19*	*36*
December	avg		11	2	-5	3
	SD		*10*	*10*	*11*	*30*
January	avg		22	13	5	15
	SD		*13*	*14*	*14*	*33*
February	avg		22	12	4	16
	SD		*10*	*12*	*14*	*36*
March	avg			19	11	22
	SD			*14*	*17*	*42*
April	avg			17	9	18
	SD			*16*	*21*	*49*
May	avg				16	21
	SD				*22*	*47*
June	avg				19	19
	SD				*19*	*38*
July	avg					21
	SD					*24*
August	avg					19
	SD					*22*

Figure 4. Harvest Basis for Corn (December futures, cents/ bushel) in Maryland's Upper Eastern Shore, 2004-2011

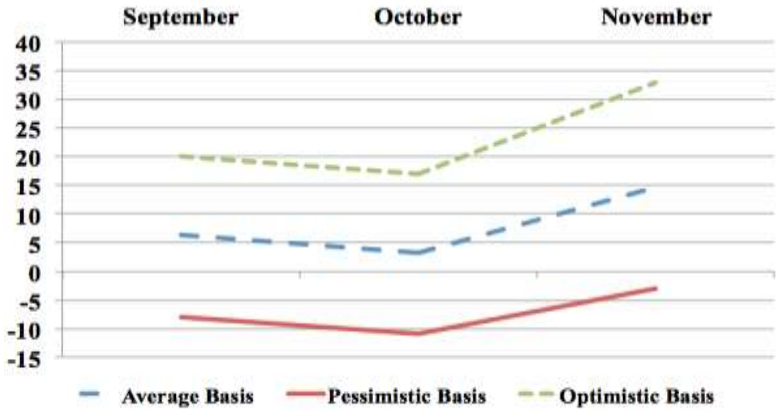


Table 5. Average Maryland's Lower Eastern Shore Corn Basis, 2004 - 2011.

Calendar Month	2004-2011 Average Corn Basis - Maryland's Lower Eastern Shore (cents/bushel)				
	December Futures	March Futures	May Futures	July Futures	September Futures
September avg	20	7	-2	-8	30
SD	*16*	*15*	*15*	*16*	*34*
October avg	13	0	-8	-13	-8
SD	*15*	*13*	*13*	*13*	*30*
November avg	26	12	4	-3	4
SD	*17*	*18*	*18*	*18*	*35*
December avg		25	16	8	17
SD		*12*	*11*	*11*	*28*
January avg		34	24	17	27
SD		*13*	*14*	*14*	*33*
February avg		34	24	16	28
SD		*12*	*14*	*15*	*38*
March avg			31	23	34
SD			*17*	*20*	*44*
April avg			31	23	33
SD			*17*	*21*	*50*
May avg				30	36
SD				*24*	*50*
June avg				35	35
SD				*21*	*39*
July avg					34
SD					*28*
August avg					35
SD					*25*

Figure 5. Harvest Basis for Corn (December futures, cents/ bushel) on Maryland's Lower Eastern Shore, 2004-2011.

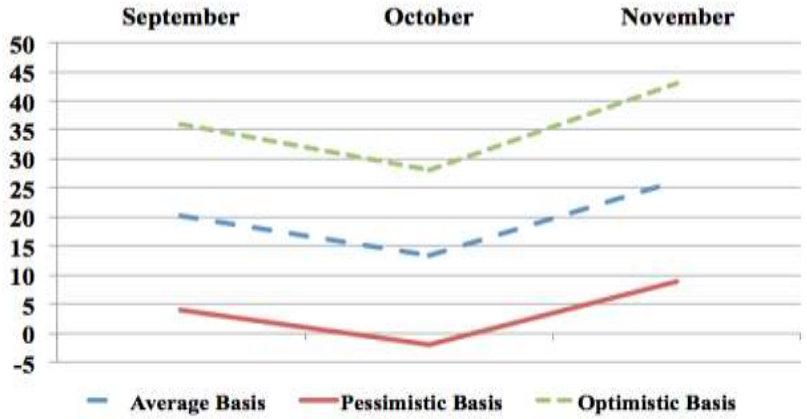
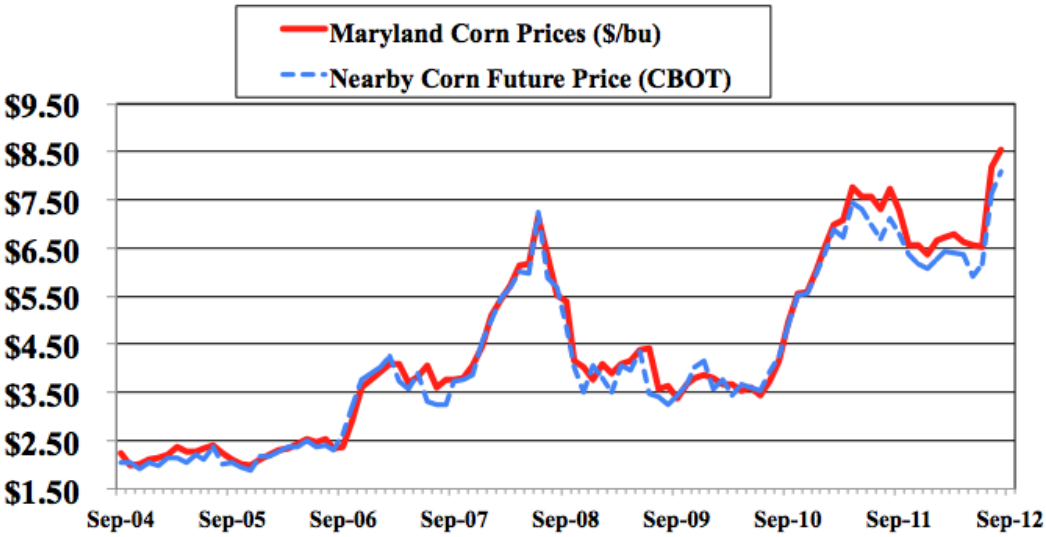


Figure 6. Monthly Corn Prices ($/bushel) Averaged Across Five Maryland Markets, 2004 – 2011.



Source: Maryland Grain and Livestock Report. Prices computed as the simple average among Western MD, Southern MD, Central MD, Upper Eastern Shore, and Lower Eastern Shore markets.

Table 6. Maryland Average Corn Prices with Monthly Increases in Prices during the Storage Season, 2004 – 2011 ($/bushel).

Calendar Month	Maryland Average Corn Prices ($/bu)								
	2004	2005	2006	2007	2008	2009	2010	2011	Average
September	2.25	2.10	2.38	3.77	5.39	3.39	4.98	7.26	3.94
October	1.99	2.02	2.91	3.79	4.16	3.66	5.54	6.56	3.83
November	2.01	1.99	3.61	4.07	4.01	3.79	5.59	6.57	3.95
December	2.10	2.11	3.76	4.45	3.78	3.86	6.04	6.37	4.06
January	2.15	2.22	3.92	5.11	4.08	3.81	6.48	6.65	4.30
February	2.20	2.30	4.10	5.43	3.90	3.67	6.99	6.73	4.41
March	2.36	2.34	4.08	5.70	4.10	3.67	7.07	6.78	4.51
April	2.26	2.45	3.71	6.14	4.14	3.53	7.76	6.64	4.58
May	2.27	2.53	3.83	6.18	4.39	3.62	7.57	6.56	4.62
June	2.35	2.46	4.06	7.14	4.42	3.43	7.56	6.53	4.74
July	2.41	2.53	3.62	6.35	3.59	3.75	7.32	8.20	4.72
August	2.25	2.34	3.77	5.53	3.63	4.15	7.73	8.54	4.74
Average monthly increases in price ($/bu) from October to									
January	0.06	0.07	0.34	0.44	-0.03	0.05	0.31	0.03	0.16
March	0.07	0.06	0.23	0.38	-0.01	0.00	0.31	0.04	0.14
May	0.04	0.07	0.13	0.34	0.03	-0.01	0.29	0.00	0.11

James C. Hanson and Kevin McNew

This publication, Maryland Corn: Historical Basis and Price Information (FS-495), is a series of publications of the University of Maryland Extension and Department of Agricultural Resource Economics. The information presented has met UME peer review standards, including internal and external technical review. For more information on related publications and programs, visit: http://arec.umd.edu/. Please visit http://extension.umd.edu/ to find out more about Extension programs in Maryland.