

# Maryland Soybeans: Historical Basis and Price Information

Fact Sheet 496

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The local basis, defined as the cash price minus futures price, reflects important information about regional supply and demand for a commodity. Soybean 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 soybean basis and cash prices for five regions in Maryland.

## Methodology and Interpretation

Tables 1-5 display the 8-year average monthly soybean 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 soybeans 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 November futures column shows that the basis is -67 cents and would be read as follows: "In the calendar month of October, the cash price for soybeans in Western Maryland averages 67 cents below the November futures price." The nearby basis can be obtained from the left hand entry in every row.

A standard deviation (SD) 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 (calendar months of September, October, and November). In the calendar month of October, the cash price for soybeans in Western Maryland averages 78 cents below the January futures price. The optimistic basis would be -62 cents ( $-78 + 16$ ) and the pessimistic basis would be -94 cents ( $-78 - 16$ ) 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 soybeans in October would want to compare the current November basis with the average November basis in October. For the Lower Eastern Shore, the average November basis in October is -31 cents with a standard deviation of 13 (see Table 5). A basis less than -44 cents ( $-31 - 13$ ) is a good indicator to store. In contrast, a basis higher than -18 cents ( $-31 + 13$ ) 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 November and March futures soybean prices are \$8.50 and \$8.90 per bushel, respectively. Given these prices, the market is willing to pay 40 cents to store grain from November 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 40 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 November and March is calculated as follows:

November basis in October – March basis in October = -31 – -50 = 19 cents

Thus, in October the historical futures spread (average price difference between the March futures contract and the November futures contract) is 19 cents per bushel for 4 months or 4+ cents per month. Comparing it to the current futures spread of 40 cents or 10 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; while 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 soybeans 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 soybeans 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 = -13 – -50 = 37 cents

Thus, on average, storing from October to February earns 37 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 harvests in October and has a storage cost of 9 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 soybean 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 25 cents per bushel, which reflects the difference between the May basis in January (-29 cents) and the May basis in October (-54 cents).

**Lower Eastern Shore Soybean Storage Profit with 9 Cents/Month Storage Cost, May Futures Contract, and Storing Soybeans in October**

<b>Selling Month</b>	<b>Average Return (¢/bushel)</b>	<b>Storage Costs (¢/bushel)</b>	<b>Average Profit (¢/bushel)</b>
November	5	9	-4
December	12	18	-6
January	25	27	-2
February	31	36	-5
March	47	45	2
April	38	54	-16

The producer's optimal selling month is March, 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 soybeans price was \$8.00/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 6 cents/month ( $\$8.00 * .09/12$ ). All other costs associated with storage total \$.03/month making the total monthly storage costs for soybeans \$.09. 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**

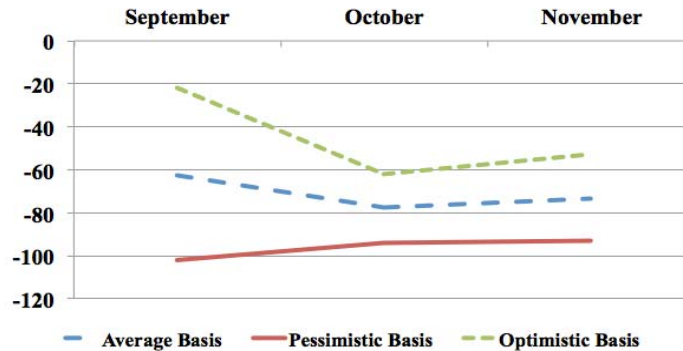
Figure 6 and Table 6 show the change in average Maryland soybeans prices between September 2004 and August 2012. Prices increased from a low of \$4.94/bushel in October 2004 to a high of \$16.47/bushel in August 2012. Typically grain markets are characterized as having sharp peaks with long valleys.

Table 6 shows average monthly increases in cash prices from November through selected storage months. As illustrated above, storage costs vary with the price of grain. However, in general, 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 soybeans.

**Table 1. Average Western Maryland Soybean Basis, 2004 –2011.**

Calendar Month	2004-2011 Average Soybean Basis - Western Maryland (cents/bushel)						
	November Futures	January Futures	March Futures	May Futures	July Futures	August Futures	September Futures
September avg	-52	-62	-71	-75	-81	-72	n/a
SD	36	40	43	46	48	47	n/a
October avg	-67	-78	-86	-90	-96	-93	n/a
SD	15	16	18	19	21	21	n/a
November avg		-73	-82	-88	-94	-90	-83
SD		20	21	20	19	15	16
December avg		-67	-77	-85	-93	-87	-74
SD		20	21	23	24	23	33
January avg			-69	-79	-88	-81	-67
SD			21	23	25	21	24
February avg			-62	-72	-80	-75	-60
SD			21	22	22	19	19
March avg				-68	-77	-72	-56
SD				18	19	18	21
April avg				-70	-79	-73	-57
SD				29	25	18	17
May avg					-73	-65	-48
SD					33	25	27
June avg					-73	-62	-48
SD					44	32	32
July avg						-56	-40
SD						36	49
August avg							-48
SD							42

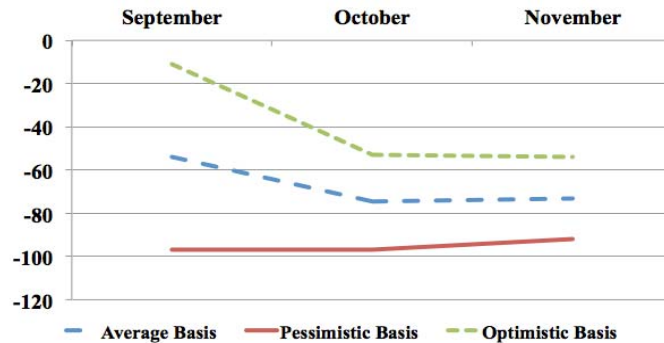
**Figure 1. Harvest Basis for Soybeans (January futures, cents/ bushel) in Western Maryland, 2004 – 2011.**



**Table 2. Average Central Maryland Soybean Basis, 2004 – 2011.**

Calendar Month	2004-2011 Average Soybean Basis - Central Maryland (cents/bushel)						
	November Futures	January Futures	March Futures	May Futures	July Futures	August Futures	September Futures
September avg	-43	-54	-62	-67	-73	-64	n/a
SD	39	43	46	48	49	50	n/a
October avg	-64	-75	-82	-87	-93	-90	n/a
SD	20	22	24	25	25	27	n/a
November avg		-73	-82	-88	-94	-89	-82
SD		19	22	22	22	20	25
December avg		-60	-70	-78	-86	-79	-67
SD		16	19	21	24	28	40
January avg			-60	-70	-78	-72	-58
SD			17	19	21	19	25
February avg			-53	-63	-71	-66	-51
SD			15	16	18	17	23
March avg				-51	-59	-54	-39
SD				10	12	15	28
April avg				-48	-57	-51	-35
SD				12	11	14	30
May avg					-51	-43	-26
SD					12	19	40
June avg					-46	-35	-21
SD					21	24	43
July avg						-33	-17
SD						19	46
August avg							-25
SD							38

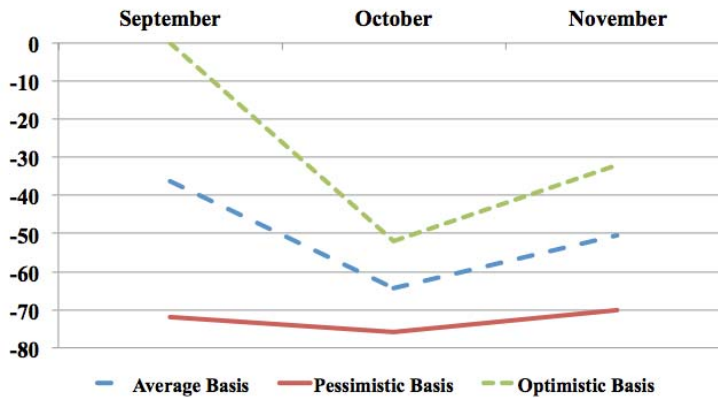
**Figure 2. Harvest Basis for Soybeans (January futures, cents/bushel) in Central Maryland, 2004-2011.**



**Table 3. Average Southern Maryland Soybean Basis, 2004 – 2011.**

Calendar Month		2004-2011 Average Soybean Basis - Southern Maryland (cents/bushel)						
		November Futures	January Futures	March Futures	May Futures	July Futures	August Futures	September Futures
September	avg	-26	-36	-45	-49	-55	-46	n/a
	SD	34	36	38	39	41	50	n/a
October	avg	-54	-64	-72	-77	-83	-79	n/a
	SD	11	12	14	16	17	18	n/a
November	avg		-51	-60	-65	-71	-67	-60
	SD		19	20	19	18	16	20
December	avg		-49	-59	-67	-75	-69	-56
	SD		21	22	23	26	29	42
January	avg			-43	-53	-62	-55	-41
	SD			14	16	17	12	20
February	avg			-39	-49	-58	-52	-38
	SD			13	16	18	16	24
March	avg				-36	-44	-39	-24
	SD				22	22	25	38
April	avg				-45	-54	-48	-32
	SD				12	12	14	27
May	avg					-40	-32	-14
	SD					11	21	43
June	avg					-33	-22	-8
	SD					17	24	45
July	avg						-28	-12
	SD						16	39
August	avg							-14
	SD							36

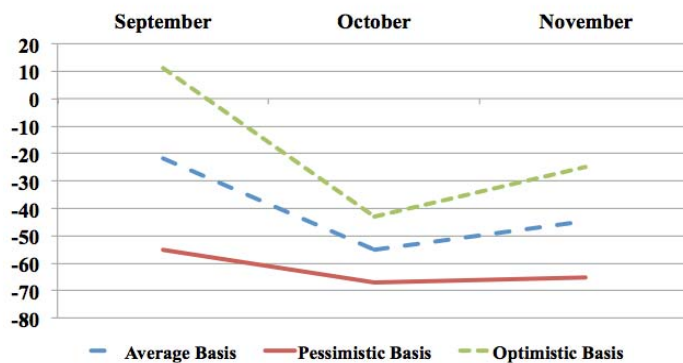
**Figure 3. Harvest Basis for Soybeans (January futures, cents/bushel) in Southern Maryland, 2004-2011.**



**Table 4. Average Maryland's Upper Eastern Shore Soybean Basis, 2004 – 2011.**

Calendar Month	2004-2011 Average Soybean Basis - Maryland's Upper Eastern Shore (cents/bushel)						
	November Futures	January Futures	March Futures	May Futures	July Futures	August Futures	September Futures
September avg	-11	-22	-30	-34	-41	-32	n/a
SD	31	33	35	37	39	46	n/a
October avg	-45	-55	-63	-68	-73	-70	n/a
SD	14	12	13	13	14	14	n/a
November avg		-45	-54	-60	-66	-61	-54
SD		20	21	19	19	17	21
December avg		-42	-52	-60	-68	-61	-49
SD		18	19	20	23	28	41
January avg			-32	-42	-51	-44	-30
SD			13	14	15	11	20
February avg			-26	-36	-45	-40	-25
SD			14	17	19	17	24
March avg				-23	-32	-27	-12
SD				21	21	25	38
April avg				-32	-40	-35	-18
SD				14	13	14	26
May avg					-28	-21	-3
SD					9	20	42
June avg					-20	-9	5
SD					18	24	46
July avg						-18	-2
SD						16	40
August avg							-3
SD							38

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

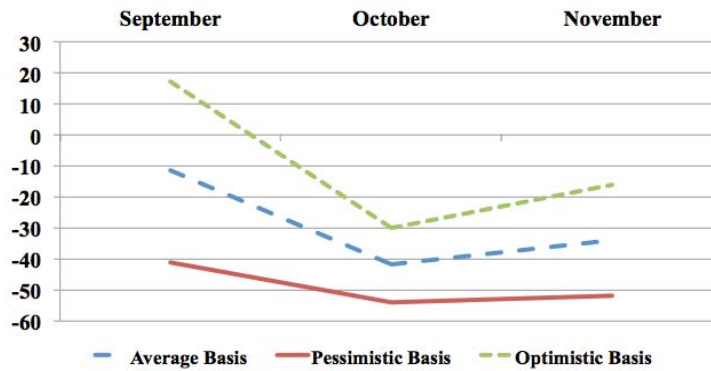




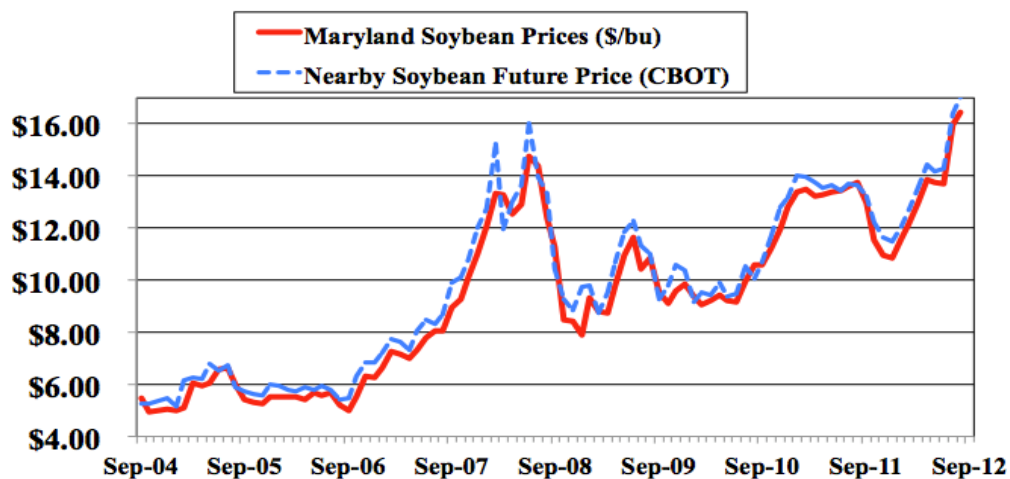
**Table 5. Average Maryland's Lower Eastern Shore Soybean Basis, 2004 – 2011.**

Calendar Month	2004-2011 Average Soybean Basis - Maryland's Lower Eastern Shore (cents/bushel)						
	November Futures	January Futures	March Futures	May Futures	July Futures	August Futures	September Futures
September avg	-1	-12	-20	-24	-31	-22	n/a
SD	27	29	31	33	35	42	n/a
October avg	-31	-42	-50	-54	-60	-57	n/a
SD	13	12	12	12	13	13	n/a
November avg		-34	-43	-49	-55	-50	-43
SD		18	18	16	16	15	20
December avg		-24	-34	-42	-50	-44	-31
SD		12	13	15	17	20	34
January avg			-19	-29	-38	-31	-17
SD			14	14	14	9	18
February avg			-13	-23	-31	-26	-11
SD			14	16	18	15	24
March avg				-7	-16	-11	5
SD				23	23	26	38
April avg				-16	-25	-19	-3
SD				13	12	14	28
May avg					-12	-5	13
SD					8	20	43
June avg					-9	2	16
SD					15	25	47
July avg						2	18
SD						18	41
August avg							13
SD							33

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



**Figure 6. Monthly Soybean 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 Soybean Prices with Monthly Increases in Prices during the Storage Season, 2004 – 2011 (\$/bushel).**

Calendar Month	Maryland Average Soybean Prices (\$/bu)								
	2004	2005	2006	2007	2008	2009	2010	2011	Average
September	5.48	5.44	5.00	8.94	11.26	9.53	10.56	12.94	8.65
October	4.94	5.32	5.53	9.27	8.45	9.12	11.24	11.55	8.18
November	4.97	5.27	6.29	10.13	8.44	9.57	11.95	10.97	8.45
December	5.05	5.52	6.25	10.99	7.90	9.87	12.79	10.84	8.65
January	5.00	5.53	6.63	12.05	9.34	9.38	13.39	11.58	9.11
February	5.11	5.54	7.24	13.32	8.81	9.04	13.50	12.17	9.34
March	6.07	5.53	7.16	13.30	8.75	9.22	13.21	12.98	9.53
April	5.95	5.42	6.98	12.55	9.78	9.40	13.30	13.84	9.65
May	6.07	5.66	7.32	12.89	10.98	9.22	13.37	13.77	9.91
June	6.58	5.60	7.81	14.74	11.63	9.18	13.44	13.70	10.34
July	6.64	5.68	8.06	14.38	10.43	9.97	13.58	15.99	10.59
August	6.00	5.23	8.07	12.36	10.85	10.58	13.74	16.47	10.41
	<i>Average monthly increases in price (\$/bu) from November to</i>								
January	0.02	0.13	0.17	0.96	0.45	-0.09	0.72	0.30	0.33
March	0.27	0.06	0.22	0.79	0.08	-0.09	0.32	0.50	0.27
May	0.18	0.06	0.17	0.46	0.42	-0.06	0.24	0.47	0.24

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