Seasonal Price Patterns for Arkansas Soybeans

C. Robert Stark, Jr.
Professor/Extension
Economist

Kelly J. Bryant
Professor/Dean/Center
Director

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Seasonality is frequently mentioned as a major aspect of price variation for many agricultural commodities. Market analysts refer to seasonal price patterns as they present market outlooks and advice for producer marketing strategies. Manternach (2009) has defined seasonality as "the tendency for the highest prices of any given year to happen at certain times of the year and the lowest prices of any given year to happen at certain times of the year." These tendencies occur because most major U.S. agricultural grain commodities are harvested during rather narrow time periods and then stored for use throughout the year. The seasonal production patterns generate seasonal price variations which further impact the commodity storage decisions.
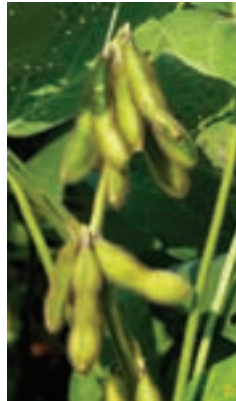
Recent years in Arkansas have seen considerable construction of on-farm grain storage facilities. Increased on-farm storage provides opportunities for producers to delay marketing activity and at least partially avoid low price periods of the seasonal cycle. The purpose of this fact sheet is to present the most recent seasonal price pattern for Arkansas soybeans.

Economic Theory and Background

Traditional market theory has long held that grain prices should follow a seasonal pattern related to the interaction of production season and market supply level. Price would be lowest during harvest months, increase in strength through subsequent months as excess supply declines, decrease immediately following the planting period in response to supply indications and have another upward spike prior to new crop harvest beginning as market supply reaches its lowest annual level. U.S. grain prices in recent years have been unusual. New highs have been set for many row crops. Daily price movements seem to have greater magnitude.

Jordan et al. (1986) examined five- and ten-year indices for soybeans in Arkansas using data from the 1975 to 1985 crops. Their ten-year index reached a high in May and a low in December, while their five-year index reached a high in November and a low in July. Doane's Agricultural Report recently calculated five- and ten-year indices for soybeans using a national price from 1999 to 2009. They found the soybean index to be very stable over the ten-year period with a low in October, a high in June and a shape that is intuitive.

Approach

Recent five-year and ten-year seasonal price indices for soybeans in Arkansas are calculated for the

TABLE 1. SOYBEAN PRICE INDICES FOR ARKANSAS FARMERS, CROP YEARS 1999/00-2008/09

YEAR	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1999-00	0.99	0.97	0.94	0.94	1.00	1.06	1.04	1.06	1.09	1.03	0.94	0.93
2000-01	1.01	0.98	1.01	1.07	1.02	0.97	0.94	0.90	0.94	0.99	1.09	1.06
2001-02	0.98	0.90	0.91	0.93	0.93	0.93	0.96	0.98	1.02	1.07	1.20	1.19
2002-03	0.98	0.94	0.99	0.99	0.99	1.00	0.99	1.03	1.08	1.06	1.00	0.97
2003-04	0.74	0.86	0.89	1.20	0.97	1.02	1.16	1.16	1.11	1.03	1.16	0.70
2004-05	0.93	0.88	0.91	0.93	0.92	0.93	1.06	1.04	1.07	1.15	1.15	1.04
2005-06	0.97	0.95	1.01	1.05	1.02	1.02	1.01	0.99	1.02	1.01	1.01	0.94
2006-07	0.77	0.85	0.95	0.95	0.98	1.06	1.03	1.00	1.05	1.12	1.13	1.11
2007-08	0.75	0.78	0.86	0.93	1.00	1.11	1.07	1.04	1.05	1.20	1.20	1.01
2008-09	1.13	0.86	0.85	0.87	1.00	0.94	0.92	1.02	1.16	1.22	1.00	1.04
10 Yr Av	92.42	89.49	93.29	98.60	98.34	100.27	101.80	102.41	105.88	108.82	108.77	99.90
Std Dev	13.05	6.48	5.79	9.85	3.55	6.32	6.93	6.64	5.78	8.12	9.42	13.08
Coef Var	14%	7%	6%	10%	4%	6%	7%	6%	5%	7%	9%	13%
5 Yr Av	90.90	86.02	91.62	94.58	98.52	101.17	101.75	101.95	106.99	114.04	109.80	102.67
Std Dev	15.70	6.06	6.51	6.77	4.00	7.99	5.94	2.31	5.17	8.32	8.80	6.05
Coef Var	17%	7%	7%	7%	4%	8%	6%	2%	5%	7%	8%	6%

TABLE 1A. SOYBEAN PRICES RECEIVED BY ARKANSAS FARMERS, CROP YEARS 1999/00-2008/09

YEAR	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
						- - - - Dollars Per Bushel - - - -						
1999-00	4.79	4.71	4.56	4.54	4.84	5.11	5.04	5.15	5.26	4.96	4.54	4.51
2000-01	4.73	4.60	4.75	5.02	4.77	4.54	4.41	4.23	4.42	4.62	5.08	4.98
2001-02	4.64	4.23	4.31	4.38	4.38	4.38	4.55	4.61	4.81	5.07	5.68	5.63
2002-03	5.65	5.42	5.72	5.72	5.75	5.77	5.74	6.00	6.24	6.15	5.79	5.60
2003-04	6.21	7.25	7.51	10.15	8.16	8.60	9.74	9.80	9.37	8.70	9.76	5.91
2004-05	5.52	5.20	5.39	5.51	5.45	5.49	6.26	6.15	6.35	6.84	6.79	6.13
2005-06	5.51	5.37	5.72	5.97	5.80	5.80	5.75	5.62	5.80	5.74	5.74	5.34
2006-07	5.38	5.91	6.66	6.68	6.84	7.42	7.24	7.02	7.33	7.82	7.89	7.76
2007-08	9.02	9.40	10.40	11.20	12.14	13.45	12.90	12.62	12.73	14.47	14.54	12.23
2008-09	11.15	8.45	8.41	8.55	9.91	9.26	9.07	10.11	11.43	12.08	9.91	10.25

1999-2009 marketing years (Table 1). The indices were developed from monthly cash market prices received by farmers as collected by the USDA-AR Extension Service office of the National Agricultural Statistics Service (Table 1A). These indices are compared to price indices calculated for Arkansas in 1986 (Jordan et al.), and to a national soybean price index calculated in 2009 (Manternach, 2009). Individual year indices for the 1999-2000 through 2008-2009 crops are then examined and compared to the five-year average. Seasonal price index differences through time and location are identified and discussed.

Data and Methods

Daily price information is collected by the Arkansas Crop and Livestock Reporting Service of Arkansas Agricultural Statistics. The individual market prices are reported in the Arkansas Daily Grain report published by the National Agricultural Statistics Service. This data is available on-line through the Livestock and Grain Market News Portal of the United States Department of Agriculture Agricultural Marketing Service. These daily prices for multiple locations in the state were used to calculate an average price by

month and year over five and ten crop year periods. Seasonal price indices measure monthly price movement about the average annual price. Average annual prices were assigned an index of 100 and the monthly indices were percentages of the annual averages. The USDA soybean crop marketing year runs from September 1 to August 31 and data from 1999 to 2009 were included. By using the crop marketing year as a base, annual price variations due to crop size (total yield) were removed. Monthly index values were calculated for each year, then averaged over the ten-year period as previously done by Jordan et al. (1986).

The standard deviation (Std Dev) measures the divergence of the monthly index from the average index, an indication of seasonal pattern consistency. The ten-year soybean seasonal index is presented in Figure 1. The outer lines indicate one standard deviation above and below seasonal index values, the range within which prices are expected to be in two out of three years.

Figure 1. Seasonal Price Index Variability
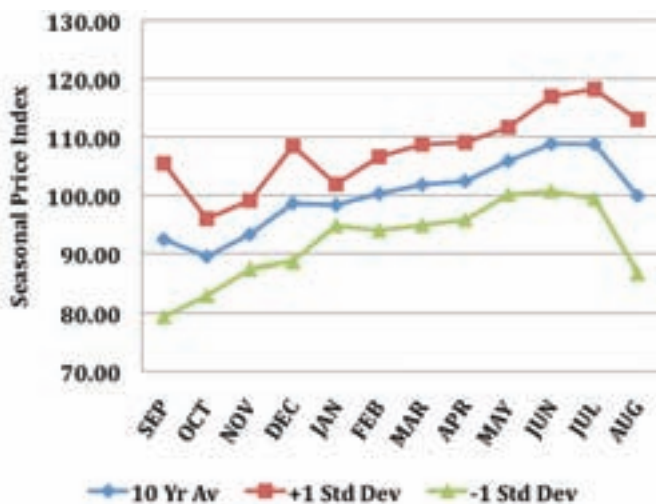
Another price variability measure is the coefficient of variation. The coefficient of variation is the standard deviation divided by the sample mean. Dividing by the sample mean normalizes the variability to a percentage of the mean to compare relative variability across the year for a given commodity and across commodities for a given month.

Both five-year and ten-year seasonal indices were calculated to show the base year dependence. Comparing the two indices (five-year and ten-year) can provide a check for changes occurring in the seasonal price patterns. If the timing of seasonal highs or lows has changed, then the pattern may be shifting.

Results

Monthly average soybean prices for Arkansas from September 1999 to August 2009 are displayed in Table 1A. Prices ranged from $4.23/bu. to $14.54/bu. during this time period. Prices exceeded $8.00/bushel at some period in three of the ten years.

The ten-year and five-year price indices are displayed in Figure 2. Arkansas soybean prices have followed a consistent seasonal price pattern in recent years with the low coming in October and the high in June and July. The five-year average price index is very similar to the ten-year average price index even though nominal prices were greater in the more recent years. Also, the pattern for Arkansas soybeans appeared to be similar to that of the national five-year and ten-year indices over the same time period as calculated by Manternach (2009).

Figure 2. Average Seasonal Price Indices, Soybeans
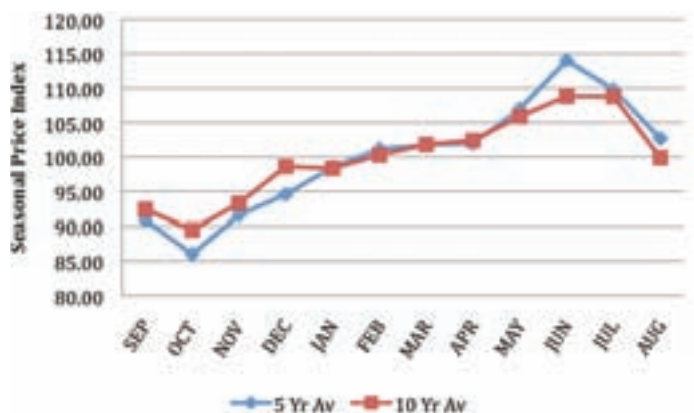
The ten-year average price index ranges from 90% to 110% while the five-year price index ranges from 85% to 115% (Table 2). This is different from what Jordan et al. (1986) found 14 years ago. Their ten-year indices ranged from 96% to 105% and their five-year indices ranged from 96% to 102%. Arkansas soybean prices from 1999 to 2009 have experienced much greater swings in price level during each 12-month period in recent years than they did from 1975 to 1985. There is apparently more money to be made or lost in marketing a soybean crop these days.

The coefficients of variation for the five-year and ten-year average price indices are displayed in Table 1. The greatest uncertainty in price levels relative to the recent ten-year average occurs in the summer months of July, August, September and December. Jordan et al. found their highest ten-year coefficients of variation in April, May, July and August. These results suggest that ten-year price variability may be shifting from a combination of the planting and harvest periods to exclusively in the late summer and fall periods.

Conclusions

Arkansas soybean prices appear to have followed a consistent and logical pattern around their annual average in recent years, in spite of increased variability and uncertainty in the overall U.S. grains markets. The range of soybean prices in a season is greater than it was in the 1970s and 80s. The months of August and September have especially experienced variability in soybean prices relative to the yearly average price. Knowledge of these price patterns and the risk levels of specific months can be useful to soybean producers and purchasers as they develop their annual marketing plans.

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DR. C. ROBERT STARK, JR., is professor - agricultural economics and Extension economist, Southeast Research and Extension Center, Monticello. **DR. KELLY J. BRYANT** is director of the Southeast Research and Extension Center, Monticello.