University of Nebraska Lincoln EXTENSION

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Pinto and Great Northern Bean Prices: Historical Trends and Seasonal Patterns

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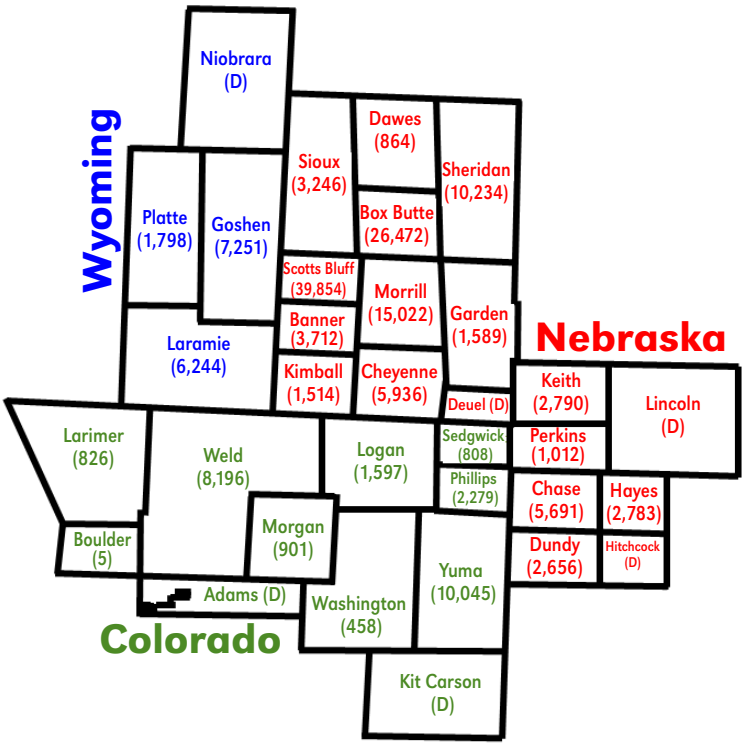
Cover photo by David Ostdiek

Dry edible beans are an important crop in the Nebraska Panhandle and scattered regions in Colorado, Idaho, Michigan, Montana, North Dakota, and Wyoming. Lacking widespread cultivation and national prominence as a cash crop, edible bean prices receive little national attention. There is no futures market and only limited price outlook information exists for dry edible beans in any region. The need arises for basic price analysis, such as long-term bean price trends, the amount of variability in bean prices, and the predictability and the degree of seasonal price patterns. Price information for these regional markets is critical for growers to plan for future production, to evaluate contract offers, to analyze storage options, and to decide the time of sales.

The goal of this extension circular is to provide a basic price analysis for pinto and great northern beans, and to show what has happened to the prices of these market classes over time. Price analysis will focus on the northern Colorado, western Nebraska, eastern Wyoming (CO/NE/WY) market where pinto and great northern market classes dominate *(Figure 1)*. CO/NE/WY great northerns will be compared to the North Dakota/Minnesota (ND/MN) market. Pinto bean prices will be compared with the Idaho/Washington (ID/WA), and North Dakota/Minnesota (ND/MN) market. Data for 10 crop years, 2004/05 through 2013/14, was used in the analysis. The crop year is defined as beginning in the harvest month for new crops (September) and ending before the next year's new crop appears (August).

The prices reported in this publication are grower prices recorded by the United States Department of Agriculture Agricultural Marketing Service (USDA AMS), report GL_GR 851. The prices are the average reported sales for the week. However, the quality grade, number of sales, and the volume sales are not recorded; thus, weighted average prices and quality grades comparisons are not available. In some cases, if there were no sales or too few sales to adequately establish a market price, no price is reported for that time period. The weekly prices are averaged to obtain monthly prices for each market. Monthly prices for CO/NE/WY for pinto and great northern beans are shown in *Tables 1* and *2*.



(D) = Withheld to avoid disclosing data for individual operations.

Figure 1. Map of dry bean acres harvested by county in northern Colorado, western Nebraska, and eastern Wyoming according to 2012 Census of Agriculture.

CO/NE/WY Market Class Comparison

Grower Prices

A plot of actual monthly grower prices over the 10-year period is shown in *Figure 2*. For extended periods, pinto and great northern prices are nearly equal. But in other time periods, substantial and sustained price gaps develop between the two bean market classes, alternating high prices between pintos and great northerns.

The first step in price analysis is to calculate some simple statistics to help identify differences in the prices of these market classes. The average price, standard deviation, and the minimum and maximum prices for each year and month are calculated for the 10 crop years and displayed in *Tables 1* and *2*. Standard deviation is a measure of variation around the average for each month. By adding and subtracting the standard deviation to the average value, a range of expected prices is created. This range represents the variation in prices. Normally, in two out of three years a monthly price would be expected to be within the calculated range. For example, the average price for great northerns in September is $30.61 per hundredweight, and the standard deviation is $11.61 *(Table 2)*. Therefore, in two out of three years, one would expect great northern prices in September to be between $19.45 and $41.78 per cwt.

Figure 3 illustrates the average, standard deviation, and maximum and minimum of pintos and great northerns in CO/NE/WY through boxplots. Pinto bean statistics are represented in the left boxplot for each month in blue, and great northerns are the right boxplot in red. The gray shaded boxes represent the expected price variation for each month, based on the previous 10 marketing years. The vertical lines extending from the top and bottom of each box represent the range of prices that actually occurred during those years. The "X" represents the average price for each month.

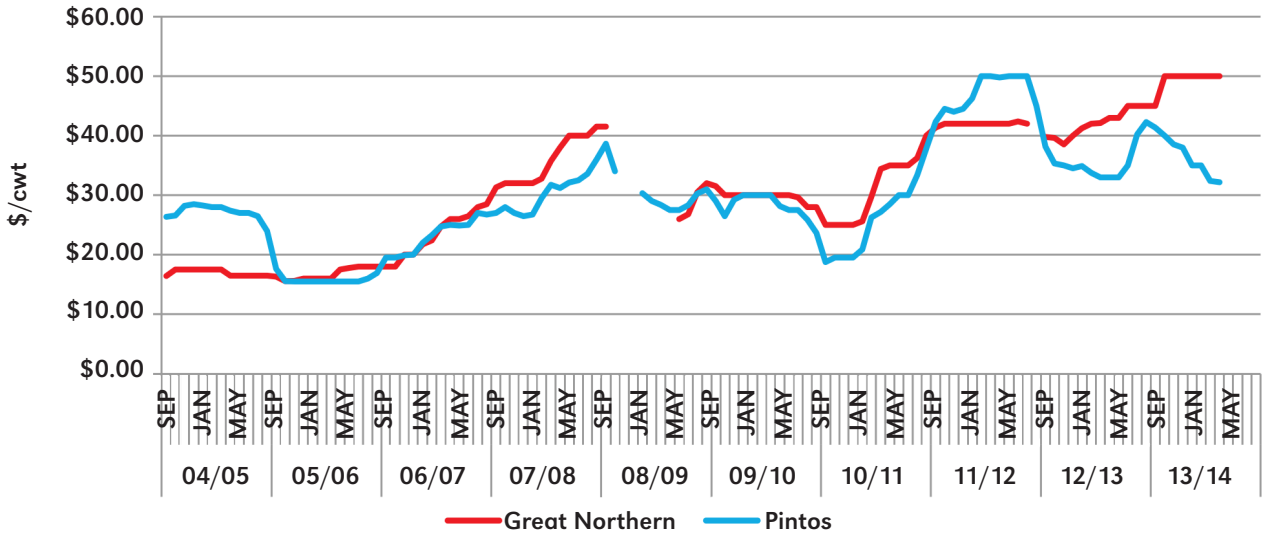


Figure 2. Actual monthly price for CO/NE/WY pinto and great northern beans 2004/05 - 2013/14.

Table 1. CO/NE/WY pinto bean prices 2004/05 - 2013/14.

Marketing Year	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	AVG	MIN	MAX
2004/05	26.38	26.56	28.20	28.50	28.25	28.00	28.00	27.38	27.00	27.00	26.50	24.00	27.15	24.00	28.50
2005/06	17.63	15.56	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	16.00	16.90	15.84	15.50	17.63
2006/07	19.50	19.50	19.88	20.00	22.00	23.25	24.75	25.00	24.90	25.00	27.00	26.75	23.13	19.50	27.00
2007/08	27.00	28.00	27.00	26.50	26.75	29.50	31.75	31.20	32.13	32.50	33.60	36.00	30.16	26.50	36.00
2008/09	38.63	34.00			30.33	29.00	28.40	27.50	27.50	28.30	30.25	31.00	30.49	27.50	38.63
2009/10	29.00	26.50	29.25	30.00	30.00	30.00	30.00	28.13	27.50	27.50	25.88	23.63	28.12	23.63	30.00
2010/11	18.75	19.50	19.50	19.50	20.88	26.25	27.20	28.50	30.00	30.00	33.38	37.80	25.94	18.75	37.80
2011/12	42.33	44.50	44.00	44.50	46.25	50.00	50.00	49.75	50.00	50.00	50.00	45.00	47.19	42.33	50.00
2012/13	38.13	35.30	35.00	34.50	34.88	33.75	33.00	33.00	33.00	35.00	40.20	42.25	35.67	33.00	42.25
2013/14	41.33	40.00	38.50	38.00	35.00	35.00	32.38	32.20					36.55	32.20	41.33
Average	29.87	28.94	28.54	28.56	28.98	30.03	30.10	29.82	29.73	30.09	31.42	31.48	30.02		
Standard Dev.	9.62	9.43	9.42	9.43	8.65	8.91	8.63	8.56	9.16	9.25	9.65	9.43	8.48		
MIN	17.63	15.56	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	16.00	16.90	15.84		
MAX	42.33	44.50	44.00	44.50	46.25	50.00	50.00	49.75	50.00	50.00	50.00	45.00	47.19		

Table 2. CO/NE/WY great northern bean prices 2004/05 - 2013/14.

Marketing Year	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	AVG	MIN	MAX
2004/05	16.42	17.50	17.50	17.50	17.50	17.50	17.50	16.50	16.50	16.50	16.50	16.50	16.99	16.42	17.50
2005/06	16.31	15.56	15.60	16.00	16.00	16.00	16.00	17.50	17.80	18.00	18.00	18.00	16.73	15.56	18.00
2006/07	18.00	18.00	20.00	20.00	21.75	22.38	24.75	26.00	26.00	26.50	28.00	28.50	23.32	18.00	28.50
2007/08	31.33	32.00	32.00	32.00	32.00	32.75	35.75	38.00	40.00	40.00	40.00	41.50	35.61	31.33	41.50
2008/09	41.50								26.00	26.80	30.50	32.00	31.36	26.00	41.50
2009/10	31.50	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	29.60	28.00	28.00	29.76	28.00	31.50
2010/11	25.00	25.00	25.00	25.00	25.63	29.75	34.40	35.00	35.00	35.00	36.25	40.00	30.92	25.00	40.00
2011/12	41.33	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.00	42.38	42.00		41.97	41.33	42.38
2012/13	39.75	39.60	38.50	40.00	41.25	42.00	42.13	43.00	43.00	45.00	45.00	45.00	42.02	38.50	45.00
2013/14	45.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00					49.38	45.00	50.00
Average	30.61	29.96	30.07	30.28	30.68	31.38	32.50	33.11	30.70	31.09	31.58	31.19	31.81		
Standard Dev.	11.16	12.11	11.77	11.86	11.78	11.67	11.55	11.56	9.98	10.26	10.12	10.57	10.83		
MIN	16.31	15.56	15.60	16.00	16.00	16.00	16.00	16.50	16.50	16.50	16.50	16.50	16.73		
MAX	45.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	43.00	45.00	45.00	45.00	49.38		

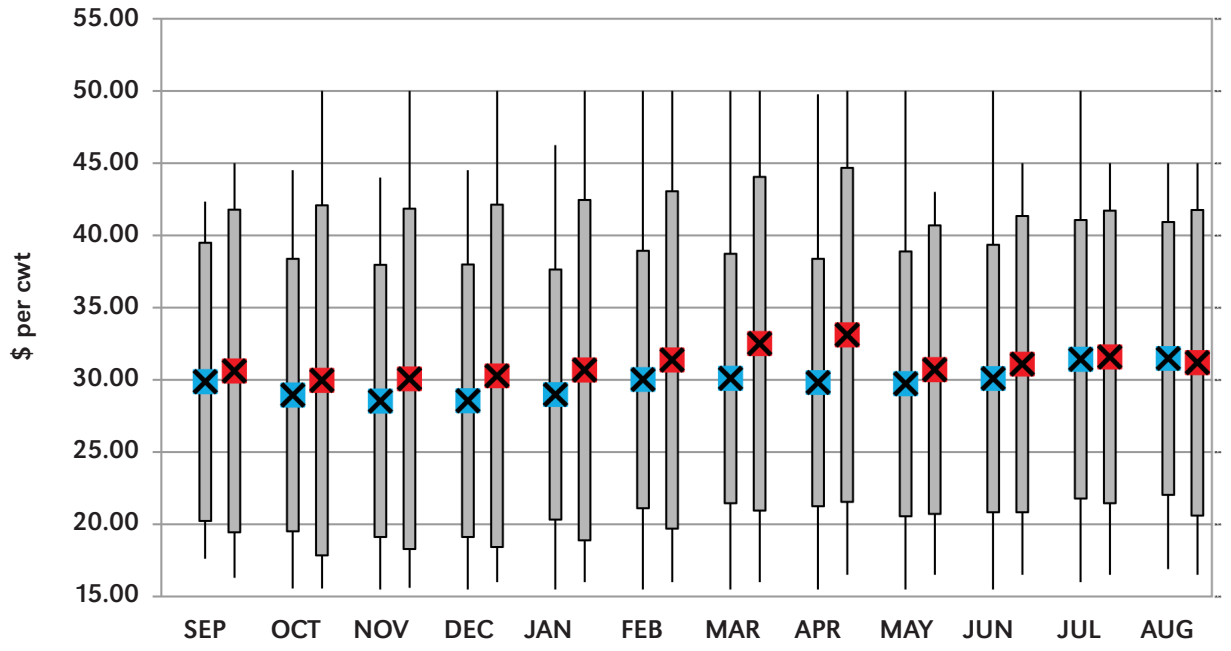


Figure 3. Seasonal price patterns for CO/NE/WY pinto and great northern beans 2004/05 - 2013/14.

Pinto beans have a gradual decline in average price from the start of the marketing year in September through harvest, remaining below $30 per cwt. Average price lows are experienced after the bulk of the area bean harvest in October. Prices then climb to their seasonal high through the growing season, peaking in August at $31.48 per cwt. Prices are most unpredictable in September, at the beginning of harvest, and in July.

Pinto bean prices have a narrow spread between the highest and lowest monthly average price at $2.94. They show more upside potential as actual high prices in the 10-year period are further from the average monthly price than the actual low prices. On average, low prices are -$13.95 per cwt while price spikes are +$17.40 per cwt from the monthly average. *Figure 3* highlights the fact that pinto bean prices are typically more predictable due to smaller standard deviations than great northerns. Average monthly pinto bean prices are lower than great northerns except for August.

Great northern prices reach their annual lows and greatest price variability after the bulk of harvest in October. Following harvest, average prices then increase to a peak price in April at over $33 per cwt. After this peak, prices decline and remain below $32 per cwt for the rest of the marketing year. There is a $3.15 spread between the highest and lowest monthly average prices. Great northern beans have more downside potential because actual low prices in the 10-year period are further from the average monthly price than the actual high prices. On average, low prices are -$19.98 per cwt while price spikes are +$16.65 from the average.

When reviewing price patterns, it is crucial to understand the logistics of marketing a commodity. Dry edible bean harvest in CO/NE/WY begins around the second week of September. There is potential for weather-related damage throughout harvest, particularly that caused by wind, freezing temperatures, and hail. These weather-related events result in lower prices due to decreased quality, especially for late-maturing beans. Lower-quality, late-harvest beans may contribute to price declines exhibited in price patterns from October through December.

Another factor is the typical selling habits of producers. The majority of selling is expected to occur during harvest if prices are profitable. In some cases, producers may need to delay sales for tax purposes until January. When the majority of selling is complete, elevator operators try to encourage producers to sell beans they are holding by increasing prices through the spring and summer months. This is reflected in the higher average price received for pinto and great northern beans in that time period.

Price Indices

Price indices provide an additional perspective on seasonal price patterns. Price indices show monthly prices as a percentage of the annual average price.

$$\textit{Price Index} = \frac{\textit{Monthly Average Price}}{\textit{Crop Year Average Price}}$$

In this manner, seasonal price patterns can be compared for different crops, the same crop in different markets, or different market classes of the same crop even though their average price level may be considerably different.

Table 3. CO/NE/WY pinto bean price index 2004/05 - 2013/14.

Marketing Year	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
2004/05	0.97	0.98	1.04	1.05	1.04	1.03	1.03	1.01	0.99	0.99	0.98	0.88
2005/06	1.11	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	1.01	1.07
2006/07	0.84	0.84	0.86	0.86	0.95	1.01	1.07	1.08	1.08	1.08	1.17	1.16
2007/08	0.90	0.93	0.90	0.88	0.89	0.98	1.05	1.03	1.07	1.08	1.11	1.19
2008/09	1.27	1.12			0.99	0.95	0.93	0.90	0.90	0.93	0.99	1.02
2009/10	1.03	0.94	1.04	1.07	1.07	1.07	1.07	1.00	0.98	0.98	0.92	0.84
2010/11	0.72	0.75	0.75	0.75	0.80	1.01	1.05	1.10	1.16	1.16	1.29	1.46
2011/12	0.90	0.94	0.93	0.94	0.98	1.06	1.06	1.05	1.06	1.06	1.06	0.95
2012/13	1.07	0.99	0.98	0.97	0.98	0.95	0.93	0.93	0.93	0.98	1.13	1.18
2013/14	1.13	1.09	1.05	1.04	0.96	0.96	0.89	0.88				
Average	0.99	0.96	0.95	0.95	0.96	1.00	1.01	1.00	1.02	1.03	1.07	1.08
Standard Dev.	0.16	0.11	0.10	0.10	0.07	0.04	0.07	0.07	0.08	0.07	0.11	0.19

Table 4. CO/NE/WY great northern bean price index 2004/05 - 2013/14.

Marketing Year	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
2004/05	0.97	1.03	1.03	1.03	1.03	1.03	1.03	0.97	0.97	0.97	0.97	0.97
2005/06	0.97	0.93	0.93	0.96	0.96	0.96	0.96	1.05	1.06	1.08	1.08	1.08
2006/07	0.77	0.77	0.86	0.86	0.93	0.96	1.06	1.11	1.11	1.14	1.20	1.22
2007/08	0.88	0.90	0.90	0.90	0.90	0.92	1.00	1.07	1.12	1.12	1.12	1.17
2008/09	1.32								0.83	0.85	0.97	1.02
2009/10	1.06	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	0.99	0.94	0.94
2010/11	0.81	0.81	0.81	0.81	0.83	0.96	1.11	1.13	1.13	1.13	1.17	1.29
2011/12	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.01	1.00	
2012/13	0.95	0.94	0.92	0.95	0.98	1.00	1.00	1.02	1.02	1.07	1.07	1.07
2013/14	0.91	1.01	1.01	1.01	1.01	1.01	1.01	1.01				
Average	0.96	0.93	0.94	0.95	0.96	0.98	1.02	1.04	1.03	1.04	1.06	1.10
Standard Dev.	0.15	0.09	0.08	0.08	0.06	0.04	0.04	0.05	0.10	0.09	0.09	0.12

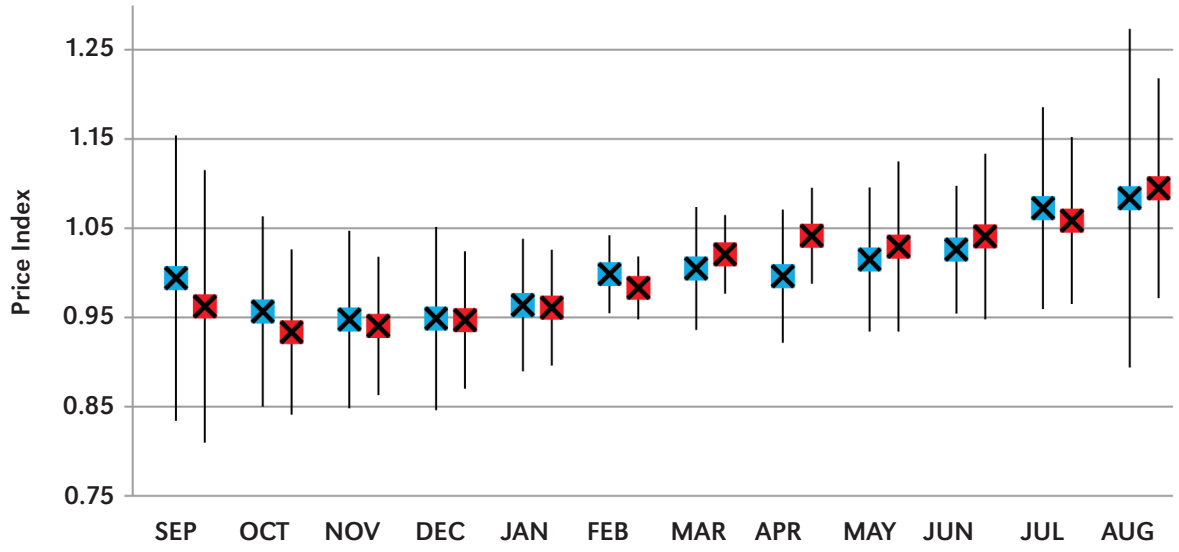


Figure 4. Monthly price index for CO/NE/WY pinto and great northern beans 2004/05 - 2013/14.

Table 5. Pinto and great northern regional price comparison.

	PINTO			GREAT NORTHERN	
Year	ID/ WA	ND/ MN	CO/NE/WY	ND/MN	CO/NE/WY
04/05	$29.10	$26.84	$27.15		$16.99
05/06	$18.03	$13.94	$15.84	$16.00	$16.73
06/07	$23.28	$21.15	$23.13	$18.33	$23.32
07/08	$30.40	$27.99	$30.16	$30.64	$35.61
08/09	$38.16	$26.94	$30.49	$37.17	$31.36
09/10	$30.34	$25.05	$28.12	$29.67	$29.76
10/11	$28.08	$24.52	$25.94	$28.01	$30.92
11/12	$47.84	$45.58	$47.19	$41.17	$41.97
12/13	$35.90	$33.97	$35.67	$40.75	$42.02
13/14	$37.62	$34.94	$36.55	$45.00	$49.38
Average	$31.88	$28.09	$30.02	$31.86	$31.81
Standard Dev.	8.40	8.57	8.48	10.14	10.83

For both bean market classes, an average price index for the 10-year period is calculated. *Table 3, Table 4,* and *Figure 4* show the monthly grower price indices and standard deviations for pinto and great northern beans in CO/NE/WY. In *Figure 4,* pinto bean indices are illustrated on the left side for each month in blue, and great northerns on the right side in red. The "X" represents the average price index for each month. The vertical lines in *Figure 4* represent the variance around the average index as calculated by the standard deviation. The longer the line, the more price uncertainty there is for a given month.

The average monthly index for pintos in November is 0.95, which means that November prices are 95 percent of the annual average or 5 percent below the annual average *(Table 3)*. The index for August is 1.08, or 8 percent above the annual average. November and August are the low and high index values for pintos. Therefore, on average, pinto prices increase about 13 percent during the marketing year. The price index for pintos shows that prices are least predictable just before harvest begins in August and September. They are most predictable in February and March.

Great northerns experience index lows in October and highs in August, with a 17 percent change in price over this time period. High prices experienced later in the marketing year could be a signal for producers to store beans until late summer to capture additional profit. Great northern prices are least predictable in August and September but have smaller standard deviation than pintos.

Regional Price Comparison

The supply and demand conditions for dry edible beans may not be the same in each geographically independent market. Growers in different regions should expect slight and temporary differences in prices. The only price differences between regions should be quality, transportation, and other regionally unique marketing costs.

Pintos

Table 5 lists historical grower prices for pinto beans in three markets: ND/MN, CO/NE/WY, and ID/WA. ND/MN produces over half of the pinto supply in the United States. Bean growers in this area, on average, received lower prices and experienced greater price variation when compared to the other two regions. ID/WA received slightly higher average prices for pintos and has a lower variance in price. Monthly average prices and standard deviations in CO/NE/WY fall in the middle of ID/WA and ND/MN. Because ND/MN leads production, it is likely that ID/WA and CO/NE/WY follow the price trends of this region.

Table 6 and *Figure 5* show average monthly price indices and standard deviations for pinto beans in the three markets. All three regions have a 12 or 13 point difference between the average index high and low, but the seasonal patterns are slightly different. Prices for ID/WA and CO/NE/WY have a fairly similar pattern, dipping through harvest, then increasing to a peak in July or August. ND/MN, on the other hand, experiences lows in October, followed by a stair step increase through February. This market then dips back below average until returning a price incline from May through August.

ND/MN also has the highest price variance of the three regions. However, the other two regions show great price instability in particular months. ID/WA has the highest price variance in four months: October, February, March, and April. CO/NE/WY shows the greatest variance of the three regions in September and May.

The CO/NE/WY region has the largest difference between the monthly average high and low of 14 percent. ND/MN and ID/WA show the same percentage increase from average harvest lows to annual highs at 12 percent.

Great Northerns

Table 5 lists historical grower prices for great northern beans in two markets. There is only a $0.05 per cwt difference

Table 6. Pinto regional index comparison.

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
ID/WA												
Average	0.98	0.95	0.94	0.96	0.97	1.00	1.02	1.02	1.04	1.04	1.06	1.06
Standard Dev.	0.15	0.11	0.09	0.07	0.06	0.09	0.09	0.08	0.07	0.06	0.08	0.19
ND/MN												
Average	0.97	0.96	0.99	0.97	0.99	1.02	1.00	0.98	0.98	1.01	1.05	1.09
Standard Dev.	0.15	0.10	0.15	0.13	0.10	0.07	0.09	0.08	0.08	0.09	0.15	0.26
CO/NE/WY												
Average	0.99	0.96	0.95	0.95	0.96	1.00	1.01	1.00	1.02	1.03	1.07	1.08
Standard Dev.	0.16	0.11	0.10	0.10	0.07	0.04	0.07	0.07	0.08	0.07	0.11	0.19

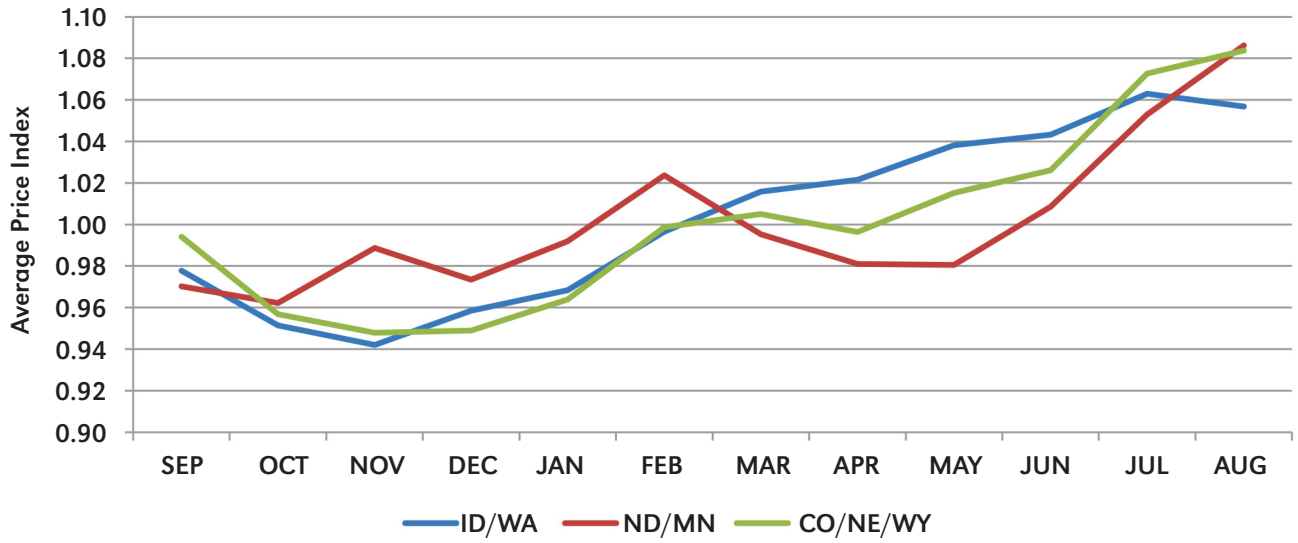


Figure 5. Regional average monthly price index comparison for pinto beans.

between the ND/MN and CO/NE/WY regions for this market class. However, CO/NE/WY shows greater variation in expected prices through a higher average annual standard deviation. Because CO/NE/WY leads the U.S. in great northern production, it is likely that ND/MN follows its price trend.

Table 7 and *Figure 6* show average monthly price indices and standard deviations for great northern beans in the two markets. The CO/NE/WY market shows a gradual increase in price from lows at harvest through highs in August. This market has a higher standard deviation nine months of the marketing year. ND/MN has a less steady pattern but has a slightly lower annual average standard deviation.

ND/MN has a larger range than CO/NE/WY between the highest and lowest monthly price index with a 24 percent increase. This indicates that bean producers in this area would have greater benefits from storing beans until late summer.

Summary

With the unpredictability of commodity prices, particularly corn, it is important for producers who have dry edible beans in their rotation to understand the price patterns and risks associated with the dry edible market to reduce risk in their long-term marketing plan. A simple compilation of actual grower prices does not adequately reveal the seasonal trends or price variations that are necessary to make marketing decisions. Thus, graphical presentations were portrayed and seasonal indices and measures of variation were calculated in this extension circular.

The price analysis between the market classes of the region showed that on average, pinto bean prices are lower and have a smaller range than great northerns. Although great northern beans have a higher average price, they also have higher price declines, compared to price spikes. When

Table 7. Great northern regional index comparison.

	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
ND/MN												
Average	0.95	0.94	0.99	0.97	0.99	1.03	1.03	1.05	1.05	1.04	0.99	1.18
Standard Dev.	0.12	0.11	0.01	0.07	0.05	0.03	0.04	0.07	0.06	0.08	0.01	0.25
CO/NE/WY												
Average	0.96	0.93	0.94	0.95	0.96	0.98	1.02	1.04	1.03	1.04	1.06	1.10
Standard Dev.	0.15	0.09	0.08	0.08	0.06	0.04	0.04	0.05	0.10	0.09	0.09	0.12

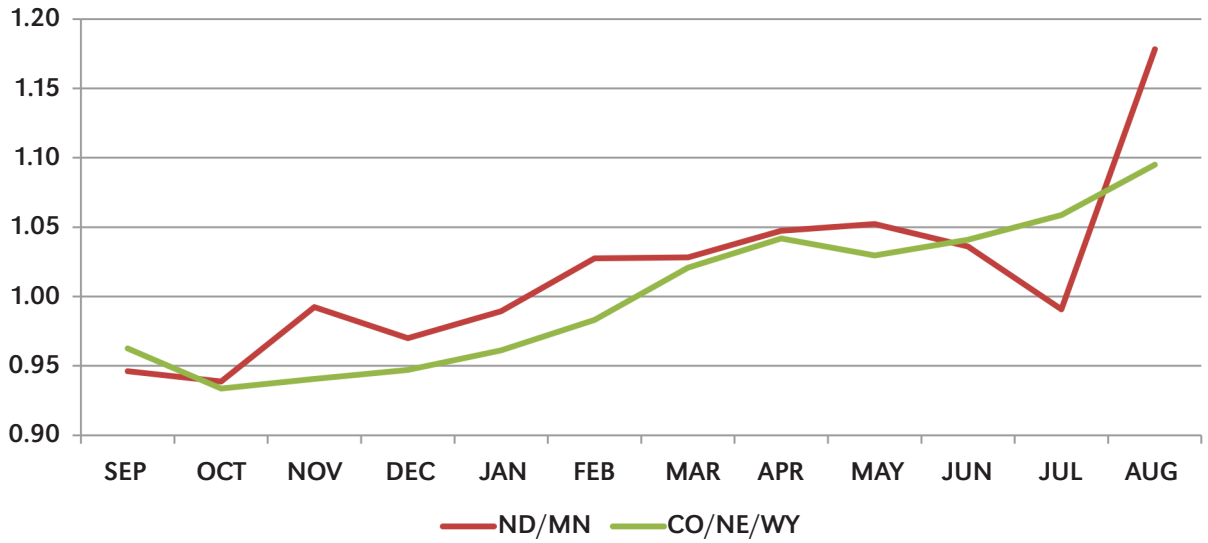


Figure 6. Regional average monthly price index comparison for great northern beans.

reviewing price indices, pintos had a smaller percentage increase from harvest lows to annual highs. Great northerns have a smaller average annual price index standard deviation.

When comparing CO/NE/WY to other regions, the pinto price and index ranked CO/NE/WY in the middle of the three regions in average price and average price variance. When comparing the CO/NE/WY price index, it has a range from high to low that is similar to that of the ID/WA and ND/MN regions. However, in terms of price index variance, it ranks in the middle of the three growing regions. CO/NE/WY sets the price trend for the great northern market. It has a lower average price and a slightly higher average price standard deviation. When comparing the price indices, CO/NE/WY is usually higher month to month but has a smaller range between the highest and lowest monthly price index than ND/MN.

Overall, the decision to produce pintos or great northerns in CO/NE/WY depends on the risk aptitude of the producer. Both market classes are competitive with other regional markets. Locally, pintos have a lower average price and a greater upside price probability with less price predictability. Great northerns have a higher average price, deeper downside price dips, potential for greater returns from storage, and are more predictable.

This publication has been peer reviewed.

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