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**Marketing Soybeans: A Survey of Seasonal Price
and Price Variation Characteristics**

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Marketing Soybeans

A Survey of Seasonal Price and Price Variation Characteristics

Introduction

The soybean market has seasonal structures. The manager/decision maker that understands these structures can potentially translate this knowledge into improved price results and at the same time reduce the marketing component of the risk associated with growing and marketing soybeans. The focus of this study is to review the seasonal structures of the soybean market for the period 1988 through 1999, and to suggest in broad terms the main management implications for those that seek to improve their marketing performance.

The Time Frame: Crop Years 1988 through 1999

The time frame chosen is the market price history associated with the twelve soybean production years 1988 through 1999 inclusive. Years prior to 1988 have strange characteristics that will likely convey false notions of the true nature of today's markets. The years 1983 through 1987 were almost totally disconnected from the fundamental principles of supply and demand. The government programs of the time dominated. The market prices were quite artificial, especially from the side-effects of the corn PIK (payment in kind) certificates that were prominent in 1986 and 1987. After the drought of 1988, the overwhelming stocks of corn in the background were sharply reduced and both the corn and soybean markets began to be markets again.

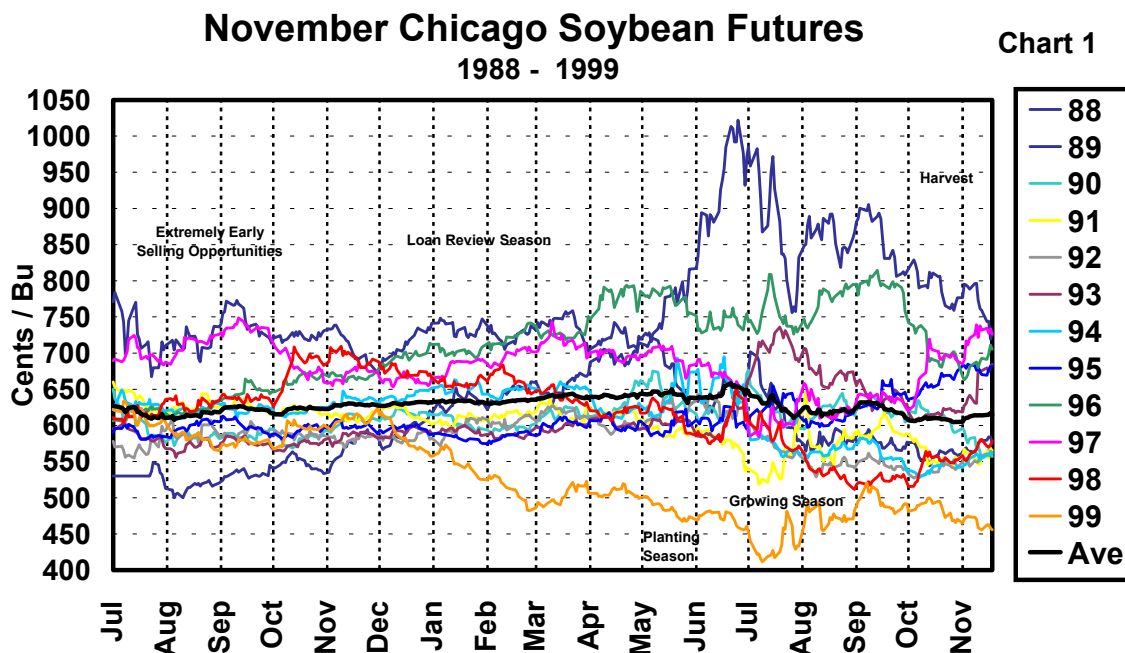
Defining A Soybean Price Level Measuring Rod

Various measuring rods for the price of soybeans are available. The two main categories are, one, the Chicago soybean futures markets and, two, the various local soybean markets that link to the soybean-belt. Local soybean markets tend to be higher or lower than the Chicago soybean futures markets by some fairly stable amount called the local basis adjustment (a local basis adjustment is equal to the local soybean price minus the Chicago soybean futures price) at a point in time. So, once a basis adjustment is made much of the seasonal price level and price variation traits of the Chicago futures carry through to become the local market price level and price variation traits as well.

The Chicago November Soybean Futures History

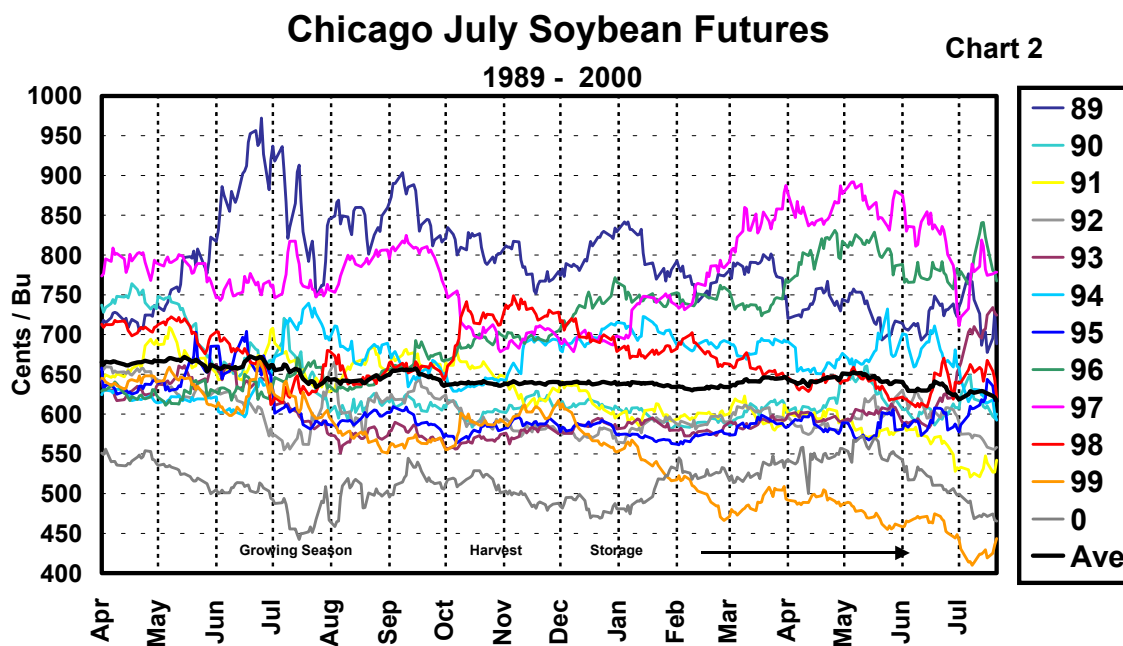
November soybean futures sometimes trade years in advance, but not always. In the period 1988 to 1999 they were always available from July 1, one year ahead of planting until the November following harvest. Keeping in mind that in some years it may have been possible to sell futures even earlier, our November futures measuring rod will be for

the 17-month period that precedes the expiration of any November futures contract (See Chart 1).



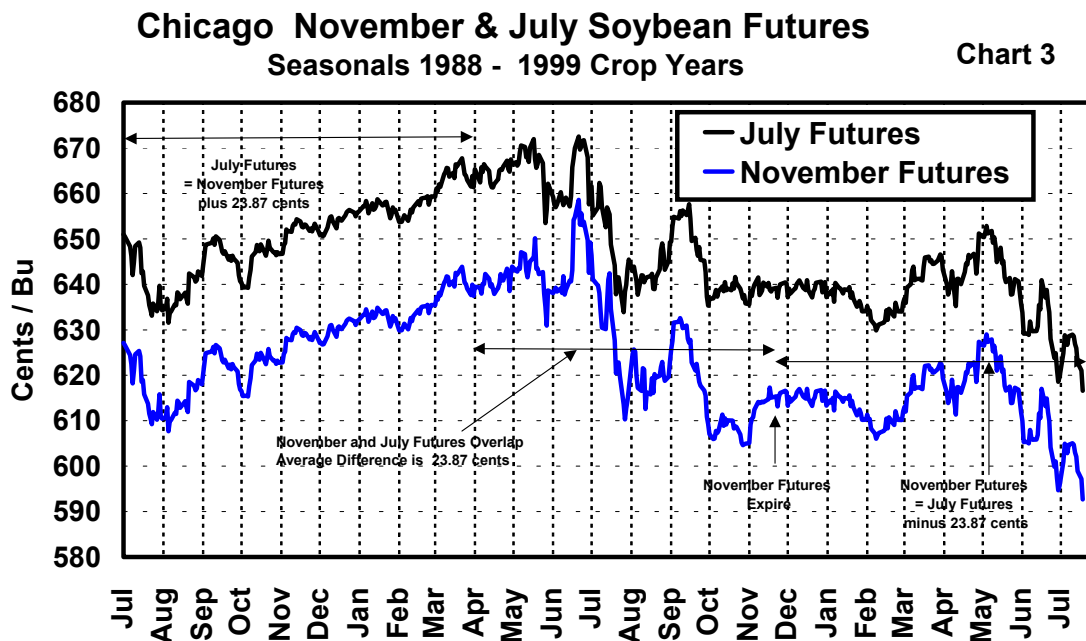
The Chicago July Soybean Futures History

Since delayed marketing strategies need a price reference beyond the expiration of the November soybean futures contract (just after harvest), the July futures contract is available. For the crop production years 1988 through 1999, data for the April 1 through expiration of the July, (July 1989 soybean futures are associated with the crop grown in 1988, etc.), 1989 through 2000 futures contracts is presented in Chart 2. There is a period of overlap from April 1 until the expiration of the November futures contract, and then price information from the July futures contract alone carries forward for another eight months. Since at any point in time during the period of overlap these two contracts are typically not the same price, they need to be reconciled for our purpose of measuring objectively the price of soybeans. We can measure the price characteristics in terms of November soybean futures or we can measure it in terms of July soybean futures. It is important to have a single measuring rod operating as we think about marketing management decisions over the total time range of possibilities.



Toward a Single Measuring Rod-November or July Futures?

In order to stretch the November soybean futures measuring rod forward past its expiration until the next July, and/or attempting to stretch the July soybean futures measuring rod back in time prior to its official April 1 record, we have resorted to looking closely at how they are related during the period of time that they do overlap and then have simulated what would have been their price in the extended periods if this relationship had in fact held. For purposes of this adjustment we have calculated the average overlap price difference between November and July futures for the crop years 1988 through 1999. It is 23.87 cents; that is on the average over these twelve years July futures have been higher than November futures by 23.87 cents during the period of overlap. Chart 3 shows the average November and July futures (as extended by this simulation) for the period beginning July 1, about a year in advance of growing the crop to the expiration of the July futures contract and about a year after growing the crop. Either of these two measuring rods will now be adequate for our purposes, but we will choose the November futures contract-measuring rod.



Local Soybean Markets

Local markets in southern Minnesota tend to be lower than the November or July futures prices. They also have a strong tendency to gain relative to the Chicago futures environment from fall to spring. For most southern Minnesota markets, bids for spring delivery tend to be about 40 cents per bushel higher than bids for fall delivery as the market normally appreciates about this much to generate a return to the storage of soybeans through the winter. Chart 4 illustrates this for Rice County, Minnesota for the years 1988 through 1997 using the July Chicago futures as a benchmark.

Notice in Chart 4 that Rice County soybean bids for fall delivery averaged approximately about 75 cents under the July Chicago futures, but by spring they had appreciated to about 35 cents under the July Chicago futures. Where July Chicago soybean futures tend to be higher than November Chicago soybean futures by about 24 cents per bushel this translates into southern Minnesota fall bids of about 51 cents per bushel less and spring bids 11 cents per bushel less than the November Chicago futures.

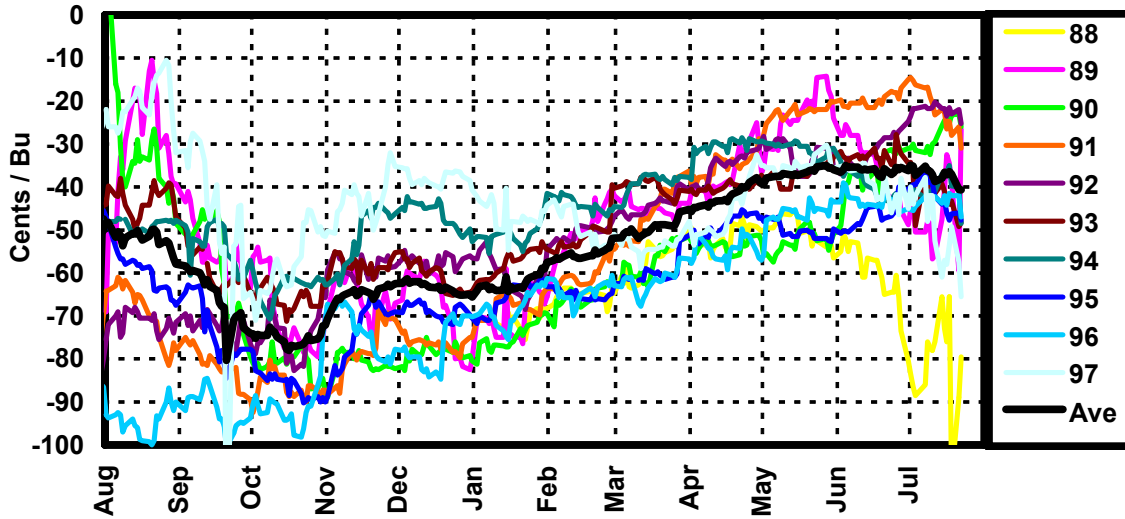
Therefore, it is appropriate for the “fall sales” line in Chart 5 to be calculated by subtracting about 51 cents from the November futures or about 75 cents from the July futures to generate this approximation to the local southern Minnesota cash markets. The “spring sales” line in Chart 5 is calculated by subtracting about 11 cents from the November futures or about 35 cents from the July soybean futures contracts. If your

local fall bids tend to be more or less than 51 cents under November soybean futures, you should adjust accordingly to evaluate these results in the context of your local markets.

Southern Minnesota Soybean Prices

Bids for Current Delivery minus July Soybean Futures
Rice County: 1988-1997 Crop Years

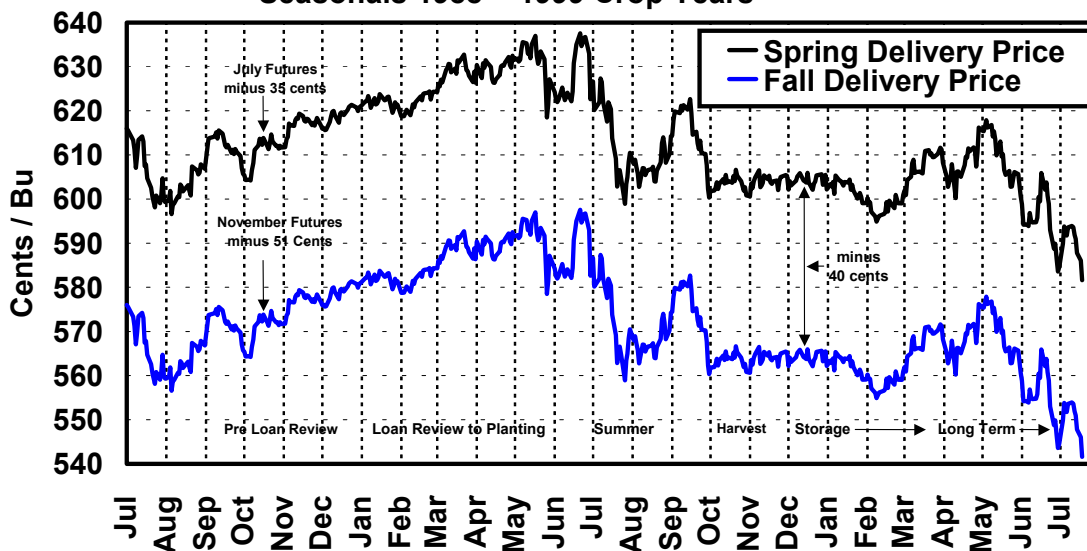
Chart 4



Southern Minnesota Soybean Market

Seasonals 1988 - 1999 Crop Years

Chart 5



Marketing Management Time Frames

Corn/soybean farming operations encounter considerable risk as an inherent part of the business. Let's try to segregate this risk into two components: production risk and marketing risk. Production risk is the risk associated with optimizing the possibilities for good yields, some of it within the realm of good management decision-making and some of it not. Unfavorable weather and crop infestation by insects and disease cannot always be avoided by a management decision. Marketing risk is the risk associated with the variation in pricing possibilities that present themselves each season. Here we are focused on marketing risk and we define five seasons that are available for the marketing decision maker.

1. Pre Loan Review: July to December
2. Loan Review to Planting: January through May
3. Summer: June to September
4. Harvest: October - November
5. Storage: December through the following September
6. Long term holding: Beyond the next harvest.

Selling Early (Pre Loan Review)

The seasonal history of this period suggests that this is probably not a good idea. Better prices are usually possible in the spring.

Selling Early (Loan Review to Planting)

This is an attractive period for selling! Pricing opportunities are better than the previous fall by more than 20 cents per bushel. The rewards for holding into the summer are not there. The possibilities to do just as well by holding into the storage season are doubtful.

Summer Selling (June to September)

This is historically a very poor time to be selling. The possibility to recover back to missed opportunities in the spring is only partial at best.

Harvest (October to November)

This is not a favorable time to be making sales. Delivery of previous sales made for fall delivery are fine, but here the question is when to set the price, regardless of when it is scheduled for delivery. The fall period typically does not offer attractive prices relative to what was offered in the previous spring or even what might be offered the following spring.

Storage (December to September)

Prices recover only partially to levels that could have been obtained the previous spring. In the meantime, working capital is tied up, and all the risks of maintaining the condition and quality of the stored crop are present. Sales made the previous spring are much more likely to offer better results.

Long Term Holding (Multiple Years)

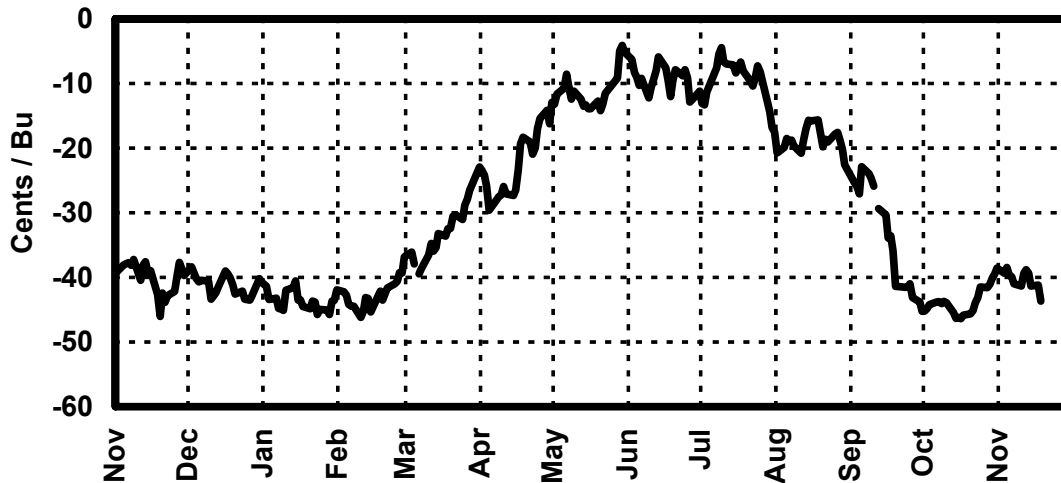
This is not a good idea for two reasons.

Reason #1: It is an especially bad idea if it involves storing the actual soybeans. The basis (local markets relative to the Chicago futures markets) appreciation from fall to spring that was illustrated in Chart 4 is given back from spring through the summer as the old crop encounters competition from new crop supplies. Chart 6 illustrates this phenomenon for Rice County, Minnesota for the period 1988 to 1997.

One way to sidestep the negative impact outlined here in reason #1 is to sell the soybeans after the period of basis appreciation illustrated in Chart 4, probably in the spring, but certainly by July 1, and replace it with a futures contract. The summer decline in the value of the stored crop relative to the futures prices illustrated in Chart 6 is then avoided. Soybean ownership is retained instead as a futures position, which, if in fact prices do go up will reward the holder. This kind of ownership can continue indefinitely into the future, because when the replacement futures contract is about to expire, it is possible to sell it and replace it with fresh ownership of an even more deferred contract that then has become available.

Southern Minnesota Soybeans Prices
 Bids for Current Delivery minus November Soybean Futures
 Rice County: Average for 1988-1997

Chart 6



Reason #2: Long term holding of futures contracts, where contracts are sold just before expiration and then replaced with subsequent futures contracts that have become available with more deferred expiration dates, just doesn't usually work out very well. This is visible in Table 1 which for the eleven years 1988 through 1998 shows the price, as of the first trading day of November, of the November futures contract that is about to expire, in comparison to the next year's (12 months away) replacement November futures contract. Over these particular years the replacement contract on the average cost slightly over 10 cents per bushel more. Years where the replacement cost were over 20 cents were common. The sought after benefits from higher soybean prices in the future are not captured when the replacement contract consistently costs more than the contract that is being replaced.

Table 1

Crop Year	Expiring November Soybean Futures	Next Years November Soybean Futures	Cost to Replace
88	776.75	727.50	-49.25
89	561.75	585.75	24.00
90	596.00	615.50	19.50
91	567.25	584.25	17.00
92	553.50	579.75	26.25
93	618.50	624.50	6.00
94	542.25	593.75	51.50
95	682.50	670.75	-11.75
96	663.25	658.50	-4.75
97	717.00	707.75	-9.25
98	553.25	595.50	42.25
Average			10.14

Market Variability

There is more to grain marketing than just getting a good price. A farmer that is able to consistently avoid low prices will gain “reputation” benefits. Consistently achieving results in the midrange of the possibilities offers some special advantages to the soybean growing and marketing enterprise. Advantages include:

- A better standing with creditors that translates into better access to working capital to run and possibly expand the business.
- A strong reputation in the local farming community as a good manager, respected for being able to avoid trouble and move ahead when others are stressed.
- An improved self-image and a more comfortable day-to-day working experience as the anxiety of the experience of the extremes of the market are avoided.

But the markets are very volatile. What can a good manager do? There are a few possibilities some associated with management decisions focused on the market variability **with-in** the marketing year, and others associated with management decisions **across** marketing years.

Measuring Market Variability With-in The Marketing Year

Just as we were able to construct the seasonal price level characteristics by blending the prices for the years 1988 through 1999 (See Charts 1 to 4), it is also possible to construct and illustrate the seasonal characteristics of market variability. Market variability becomes visible by looking not at price level, but at price change. A price level focus is as of a point in time. A price change focus is for an interval of time. It could be the price change in one minute, one hour, one day, one week, one month, etc. Consider a focus on a time interval of about one month. Although it varies by a day or so there are approximately 22 business days in a typical calendar month.

Table 2 shows how the one calendar month market variability is calculated for the very volatile July period for the years 1988 through 1999. Specifically, it calculates the difference between the November futures closing price, as of the close on the first trading day of July, versus its closing price twenty-two trading days later (early August).

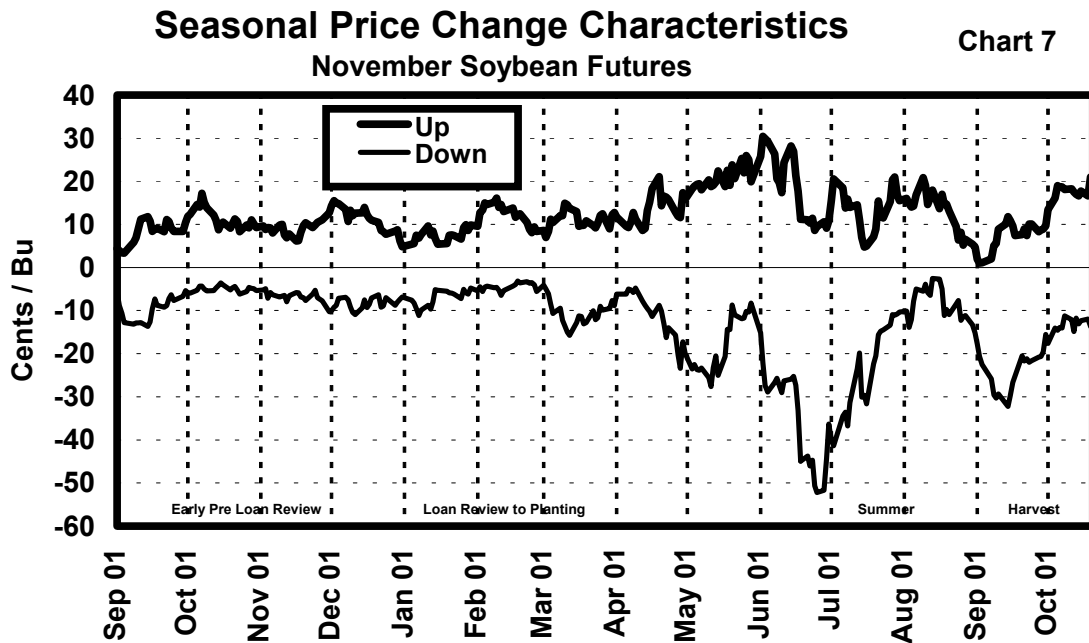
Table 2

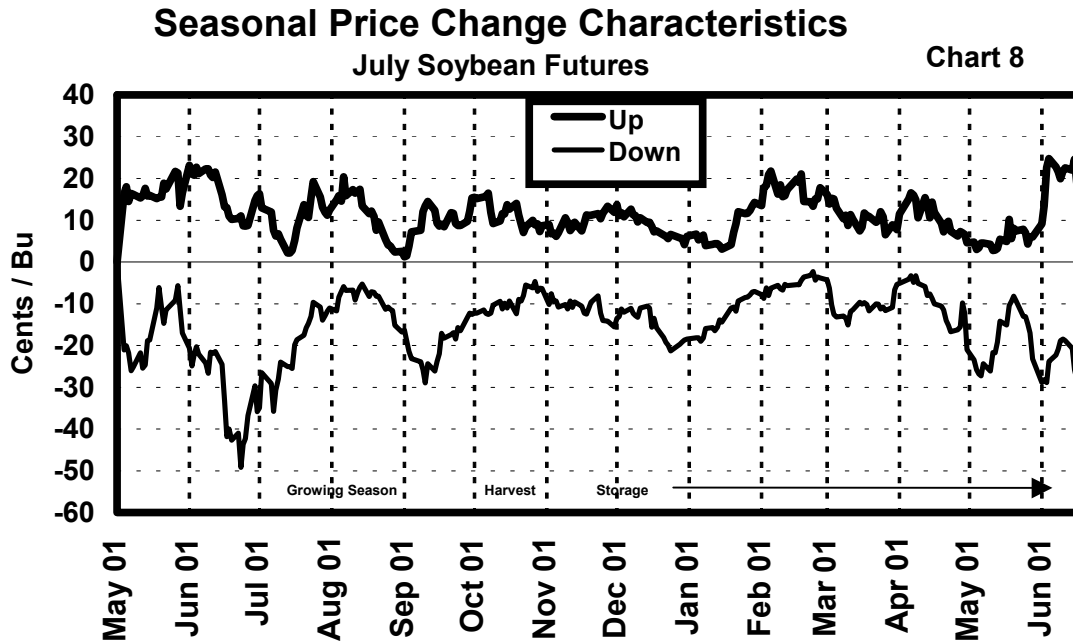
Seasonal Price Variability: Calculation Example

Crop Year	Early July	Early August	Change	Up	Down
1988	985.00	850.50	-134.50	0.00	-134.50
1989	672.00	564.25	-107.75	0.00	-107.75
1990	672.00	595.00	- 77.00	0.00	-
77.00					
1991	543.00	628.00	85.00	85.00	0.00
1992	614.00	550.25	-63.75	0.00	-63.75
1993	664.00	706.00	42.00	42.00	0.00
1994	609.75	559.50	-50.25	0.00	-50.25
1995	604.50	608.50	4.00	4.00	0.00
1996	754.75	746.50	-8.25	0.00	-8.25
1997	589.50	658.00	68.50	68.50	0.00
1998	607.50	552.00	-55.50	0.00	-55.50
1999	452.75	478.50	-27.05	0.00	-27.05
Average			-22.65	18.77	-41.42

In this example calculation, the roughly one month price change is segregated by whether the change was positive (up) or negative (down).

Chart 7 (based on November futures) and Chart 8 (based on July futures) illustrate the seasonal capacities for prices to move either higher or lower. Clearly most of the variation in market prices comes in the late spring/summer period when the crops are being planted and grown. Selling before this volatile period is a potentially effective way of avoiding it. This fact along with the observation that the best seasonal price levels also tend to be offered ahead of the planting/growing season strongly suggest that over a period of years early selling will likely outperform holding. The benefits to early selling come in terms of the long-term average price level and the tendency for the results to avoid the price variation within the marketing period. In the following section the potential for this to also translate into a capture of the long-term year-to-year “reputation” benefits are evaluated.





Focus on Measuring Variation in Marketing Performance Across Marketing Years

Previously several basic marketing decision making time-frames were defined:

1. Pre Loan Review: July to December
2. Loan Review to Planting: January through May
3. Summer: June to September
4. Harvest: October - November
5. Storage: December to September

and preliminary observations were made with a price level focus. The seasonality of monthly level price variation reinforced the preliminary results that were based only on price level objectives. Since the better price levels tend to be present during the loan review through planting period and this period also has low month-to-month price variation, it would seem reasonable to expect that the year-to-year variation in marketing performance might turn out well. Table 3 presents for inspection a survey of the long-term year-to-year price level and year-to-year price variation results. The results remain favorable to spring focused market timing.

Specifically, Table 3 posts for each crop year (1988 through 1999) the historical prices as of the first trading day of the month for each of twelve months: starting July 1 approximately one year ahead of growing the crop and ending with June 1 of the year after harvesting the crop. November soybean futures prices are used during the first 17 months until November futures expire. Then for the December through June period following harvest the July futures contract is used. A 23.87 cent per bushel adjustment (July futures equals November futures plus 23.87 cents) is used to standardize the price level measuring rod as was discussed previously in the section entitled **“Toward a Single Measuring Rod-November or July Futures?”**.

Table 3

Crop Growing Year	Early	Early	Early	Early	Early	Early	Loan Rev.	Loan Rev.	Loan Rev.	Loan Rev.	Plant	Grow
	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut	Nov Fut
	Jul 1	Aug 1	Sep 1	Oct 1	Nov 1	Dec 1	Jan 1	Feb 1	Mar 1	Apr 1	May 1	Jun 1
88	537.00	524.00	517.25	545.00	536.75	587.75	620.25	633.50	659.25	687.50	713.50	817.00
89	783.00	715.50	736.25	713.50	727.50	672.50	732.25	737.75	731.25	702.50	723.50	635.00
90	643.00	587.00	581.50	595.75	585.75	607.25	613.50	593.50	602.75	609.50	655.00	615.75
91	664.00	617.50	629.25	614.50	615.50	624.75	602.75	606.25	625.25	630.50	608.50	597.00
92	578.00	604.00	584.00	586.75	584.25	585.75	574.50	604.75	619.50	601.75	604.75	635.50
93	598.75	568.00	571.75	569.00	579.75	582.25	587.75	587.75	597.25	608.75	596.25	586.25
94	622.00	620.25	628.25	620.50	624.50	630.50	651.75	642.75	649.75	617.00	627.75	673.75
95	602.00	583.50	605.00	587.75	593.75	588.25	587.00	574.75	586.00	606.75	605.50	607.25
96	600.50	618.25	634.50	643.50	670.75	675.75	705.75	713.00	730.25	750.50	785.50	731.00
97	689.50	687.50	728.25	718.25	658.50	666.50	665.75	679.75	709.50	695.00	696.00	691.25
98	611.00	637.00	639.50	626.00	707.75	687.50	658.25	666.75	648.25	620.25	617.00	586.00
99	622.00	593.00	570.25	567.75	595.50	614.25	562.00	524.75	486.25	506.25	502.00	469.50
Nov 88-99	629.23	612.96	618.81	615.69	623.35	626.92	630.13	630.44	637.10	636.35	644.60	637.10
Spread Adj	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87
Jul 89-00	653.10	636.83	642.68	639.56	647.22	650.79	654.00	654.31	660.97	660.22	668.47	660.97
Ave. Dev.	43.76	36.38	47.19	40.55	45.37	33.03	43.85	48.48	50.94	48.35	58.41	60.76

**Table 3
Continued**

Crop Growing Year	Grow Nov Fut Jul 1	Grow Nov Fut Aug 1	Grow Nov Fut Sep 1	Harvest Nov Fut Oct 1	Harvest Nov Fut Nov 1	Store Jul Fut Dec 1	Store Jul Fut Jan 1	Store Jul Fut Feb 1	Store Jul Fut Mar 1	Store Jul Fut Apr 1	Store Jul Fut May 1	Store Jul Fut Jun 1	Pre-Harv 6 Mos. Ave. Jan 1-Jun 1
88	985.00	832.50	881.50	817.00	776.75	774.00	829.25	784.75	790.00	720.25	744.50	708.00	688.50
89	672.00	580.50	579.00	577.00	561.75	610.50	602.25	584.50	593.00	598.00	643.50	602.00	710.38
90	672.00	596.50	624.25	604.50	596.00	628.00	638.50	593.75	610.00	611.50	592.75	585.25	615.00
91	543.00	628.00	587.00	588.50	567.25	581.75	564.75	591.00	602.00	585.50	590.25	620.50	611.71
92	614.00	550.25	545.25	532.50	553.50	575.25	587.25	580.00	589.50	599.50	594.00	589.00	606.79
93	664.00	706.50	654.75	618.00	618.50	678.25	713.75	691.50	687.25	653.50	669.75	700.50	594.00
94	609.75	561.00	574.00	538.25	542.25	577.75	574.00	561.25	573.50	593.25	589.00	580.75	643.79
95	604.50	614.00	626.00	637.25	682.50	704.75	762.25	752.75	746.25	769.25	817.50	765.50	594.54
96	754.75	746.50	795.50	749.25	663.25	695.50	697.25	733.00	806.50	878.50	877.00	875.25	736.00
97	589.50	655.50	633.75	620.50	717.00	728.25	678.75	682.25	662.75	644.50	641.75	619.25	689.54
98	607.50	552.00	518.00	515.25	553.25	607.00	557.00	517.25	471.25	491.75	489.25	458.00	632.75
99	452.75	463.25	488.75	481.00	464.75	495.25	474.50	527.75	515.00	558.50	567.75	522.50	508.46
Nov 88-99	647.40	623.88	625.65	606.58	608.06	614.15	616.09	609.44	613.38	618.13	627.55	611.67	635.95
Spread Adj	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87	23.87
Jul 89-00	671.27	647.75	649.52	630.45	631.93	638.02	639.96	633.31	637.25	642.00	651.42	635.54	659.82
Ave. Dev.	85.13	74.94	77.21	68.18	69.61	65.11	80.24	79.61	84.42	76.00	83.85	84.51	48.07

The four summary lines of Table 3 convey the overall results:

Nov 88-89: November 1988 to November 1999 Soybean futures: The average November futures price that would have been realized if a contract had been sold on the first trading day of the month during each of the twelve crop year marketing time-frames.

Spread Adj: The Spread Adjustment: This is the adjustment described in the paragraph entitled “**Toward a Single Measuring Rod-November or July Futures?**”.

Jul 88-89: July 1989 to July 2000 Soybean futures: The average July futures price that would have been realized if a contract had been sold on the first trading day of the month during each of the twelve crop year marketing time-frames.

Ave Dev. The Average Deviation: The following example shows how the calculations were made to derive a value for the Average Deviation of the right most column in the table that bears the heading “Pre-Harv 6-Mos. Ave. Jan 1-Jun 1”

Table 4

Crop Year	6 Month Average Price	12-Year Average Price	Deviation From 12-Yr Ave	Absolute Value of Dev.
1988	688.50	635.95	52.55	52.55
1989	710.38	635.95	74.43	74.43
1990	615.00	635.95	-20.95	20.95
1991	611.71	635.95	-24.24	24.24
1992	606.79	635.95	-29.16	29.16
1993	594.00	635.95	-41.95	41.95
1994	643.79	635.95	7.84	7.84
1995	594.54	635.95	-41.41	41.41
1996	736.00	635.95	100.05	100.05
1997	689.54	635.95	53.59	53.59
1998	632.75	635.95	-3.20	3.20
1999	508.46	635.95	-127.49	127.49
Average	635.95	635.95	0.00	48.07

The value of the Average Deviation is--the average amount by which the market price achieved in any particular year deviated from the twelve-year average price. In this example the Average Deviation is 48.07. The smaller this number is, the better are the “reputation” benefits that have previously been discussed. Year-to-year marketing outcomes are tending to be similar from year to year. The wild extremes of very poor and also very high market price outcomes are being avoided more than with other scenarios that register a higher Average Deviation.

A scan of the year-to-year variability in marketing performance as measured by the Average Deviation show clearly that the “reputation” benefits of marketing prior to growing the crop are present just as expected from earlier analysis. Long term year-to-year variation in marketing performance increases dramatically for market timing scenarios that operate after the crop is planted. Although the data suggest that selling as early as the fall before planting would generate the lowest variation in marketing price outcomes, the price level during this period is modestly lower than the loan-review through planting period. Overall the loan-review through planting period seems to offer the best balance between good prices and long-term “reputation” building objectives.

Since it is not necessary to market the total crop at a single point in time, it is likely that the “reputation” outcome could be improved (with an even lower year-to-year Average Deviation) by marketing over a period of time. The loan review through planting period: January through June looks especially attractive. A special column at the extreme right of Table 3, calculates the necessary figures for an evaluation of this prospect. The results, an average price level of \$635.95 based on November futures and an Average Deviation result (48.07) is a nice smoothing of the one-time point sales in the January through June time frame.

Management Implications

These results suggest that for conservative approaches to marketing soybeans superior prices accompanied by low long-term year-to-year variation in marketing outcomes can be achieved by selling aggressively in the loan review through planting seasons.

Aggressive and/or long term holding approaches that do not place a heavy weight on the risk associated with price variation, and perhaps seek to do better than the modest seasonal advantages suggested by the results of this study, will find these results useful as a base line against which to measure. To be considered as worthwhile, aggressive and/or long term holding approaches need to do better than this passive seasonal approach in terms of price level, “reputation risk” or some combination of the two.