Abstract

Price risk management strategies are analyzed for NuSun™ oil sunflower producers. Correlations indicate that changes in NuSun prices are the most closely correlated with canola futures. Soybean oil futures were a distant, second-best correlation. A cross-hedge ratio of .99 hundredweight of November canola futures was derived for October. With December soybean oil futures, the cross-hedge ratio was .33 hundredweight. On the basis of net price received, seven strategies ranked better than harvest sales only. Soybean oil futures performed somewhat better across all strategies, but with somewhat higher variability on average. The analysis was based on 1997-2004 data.

Price Risk Management Strategies for Sunflowers

By George Flaskerud

Introduction

U.S. sunflower production ranked seventh in the world during 2003 although during the last 10 years, it has ranked as high as fourth according to USDA-FAS. Oil sunflower has dominated U.S. production, comprising 80 to 87 percent of total sunflower production during the period. Oil sunflower production in the United States occurs primarily in North Dakota (National Agricultural Statistics Service), and NuSunTM has become the predominant type of oil sunflower (55 percent of total oilseed acres planted in 2003), according to the National Sunflower Association (NSA). NuSun is a midrange oleic (monounsaturated) sunflower oil that needs no hydrogenation and has a nine percent saturated fat level.

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Sunflower crushing plants are located at Enderlin and West Fargo in North Dakota. Plants are also located at Red Wing, Minnesota, Goodland, Kansas, and Lamar, Colorado (NSA). The Enderlin plant discontinued crushing regular oil sunflowers in August 2003 in favor of NuSun.

Sunflowers compete well economically with other crops (Swenson). In the 2004 budgets for South Central North Dakota, for example, oil sunflowers ranked fifth out of 18 crop budgets with a projected net cash flow of $36.16 per acre.

Producers usually market their sunflowers by selling in the cash market and by using the cash forward contract. Sunflowers can be sold at harvest or later by taking the cash price offered by elevators and crushing plants. They can be sold prior to harvest by using the cash forward contract. For a discounted price, the cash forward contract may include an "Act of God" clause to protect growers from production failures beyond their control. The cash forward contract can also be used to sell sunflowers for delivery after harvest at a time when needed by the processor, generally at a premium price.

Use of the cash forward contract may be appropriate on a portion of the sunflower crop, but so may the use of other marketing tools such as futures or options. Since a sunflower futures market does not exist, relationships between the sunflower cash price and other closely related futures market need to be considered. Using the futures market of a different commodity for hedging is cross-hedging while the cash and futures price relationship is the cross-basis.

This article analyzes price risk management strategies for U.S. sunflower growers. Various time series of prices are analyzed to identify patterns and relationships useful for developing marketing strategies, and pre-harvest and harvest/post-harvest marketing strategies are evaluated.

Methods and findings from several studies were reviewed to determine the appropriate design of the marketing analysis for NuSun sunflowers. Flaskerud and Shane examined the cash market, cash forward contract, and cross-hedging. The soybean oil futures contract was used for cross-hedging based on the oil content of the sunflowers. O'Brien, Stockton, and Belshe described the markets for oil sunflowers, confections, and birdseed. They examined four methods for selling sunflowers: cash sales, forward cash contracts, forward cash grower contracts, and cross-hedges in soybean oil futures. They also presented oil sunflower cash price forecasting models and a sunflower marketing plan. Flaskerud, Dahl, and Wilson determined that the use of canola futures at the Winnipeg Commodity Exchange (WCE) is preferred to the use of futures for soybeans, soybean oil, or soybean meal to manage price risk for canola which is important because the oil content of sunflowers is similar to that of canola.

Data and Methods

Data were gathered from several sources during 1997-April 2004. Cash prices were obtained for NuSun oil sunflowers (40% oil) from Northern Sun - ADM, Enderlin, North Dakota. Canola futures were obtained from the WCE Web site. Soybean oil futures on the Chicago Board of Trade (CBT) were obtained from the Great Pacific Trading Company Web site. Exchange rates were obtained from the Federal Reserve Bank of St. Louis Web site.

Data were compiled as monthly averages except for the calculations of correlations and hedge ratios where weekly (Thursday or nearest day) cash and futures closing prices were used. Prices were standardized in U.S. dollars per hundredweight (US$/cwt). The sunflower marketing year used was October through September as defined by the NSA.

The data were analyzed using methods to identify patterns and relationships useful for developing marketing strategies (Flaskerud, Dahl, and Wilson). Methods included seasonal distributions, correlations, cross-hedge ratios and regression.

The analysis of seasonal distributions of prices (Flaskerud and Johnson) and basis (Flaskerud) was limited to the most recent five marketing years, beginning October 1998 and ending September 2003, to reflect the impact of rapidly expanding Brazil soybean production. The seasonal distributions were reviewed by marketing year and summarized using the average derived after excluding the lowest and highest values. The standard deviation is used as an indicator of variability.

Basis is the difference between a cash and futures price. The basis with respect to a nearby futures is derived by subtracting the nearby futures contract price from the corresponding local cash price. Prices from the nearby futures contract month are used until the last day in the month before the futures contract month. After that day, prices from the following futures contract month are used. Knowledge of the basis is critical to good marketing. Information about the use of basis in making marketing decision can be found in Flaskerud (1992 and 2003).

Hedging of commodities relies, in part, on the relationship or correlation between futures and cash prices. Correlations were calculated since they indicate the degree that prices tend to move in the same direction. Higher correlations, between cash and futures prices, would indicate that prices move similarly, thus risk in cash prices can be offset by hedging with futures.

A cross-hedge ratio is the proportion of the futures position required to minimize the risk associated with a cash position. Note that the emphasis is on minimizing risk, not maximizing returns. Hedging price risk for a commodity with both cash and futures markets is generally accomplished by taking equal and opposite positions in the cash and futures markets, i.e., selling a futures contract and then buying it back when an equal amount of the commodity is sold on the cash market. This implies a hedge ratio of one. For cross-hedging the NuSun cash price with a closely related futures market, the cross-hedge ratio needs to be determined.

Regression analysis was used to estimate optimal cross-hedge ratios for each of the different futures contracts (Blank, Carter, and Schmiesing). Cash and futures prices were converted to similar units and then cash prices were regressed as a function of futures contract prices. Separate equations were estimated for various canola and soybean oil futures. Ordinary least squares estimates were derived adjusting for auto-correlation when present.

Using the hedge-ratios derived, various marketing strategies are evaluated on the basis of net returns that could have been received during 1997-04, on average. They are also evaluated on the basis of net return variability as measured by the standard deviation and range. The evaluations illustrate the tradeoff among strategies between potential returns and risk. Strategies include harvest sales only, storage, and various futures market positions that are identified and explained under the "Marketing Strategies" section.

Seasonal Price Patterns

NuSun prices are presented in Figure 1 as a percent of nearby futures prices for canola and for soybean oil. NuSun prices averaged 93 percent of the canola price and 49 percent of the soybean oil price. The NuSun price ranged 79-115 percent of the canola price and 38-67 percent of the soybean oil price.

Patterns were examined by marketing year for Enderlin NuSun, nearby canola futures and nearby soybean oil futures. They were also examined for specific futures contracts that may be useful for pre-harvest and post-harvest marketing strategies.

NuSun Prices

Seasonal patterns for NuSun prices were examined for the marketing year. The distribution of prices reveals that the pattern, on average, was for lows to occur at the beginning of the marketing year and peak in June before declining into the next marketing year (Figure 2). A broad range of price behavior occurred during individual years. Highs occurred during August 2000 and 2001, April 1999, October 1998, and November 2002. When prices were significantly above the average at the beginning of the marketing year and tended to decrease, such as in 1998 and 2002, prices generally declined into harvest. The price was also above the average early in the marketing year during 2001 but tended to increase.

The range in the monthly average prices was only $0.53 per cwt. The within-year variations were considerably greater. The average within-year range was $3.07. During the 2000 and 2001 marketing years when prices trended up, the average within-year range was $3.98. During the other years, the average within-year range was $2.47.

Canola Futures

Seasonal patterns for canola nearby futures revealed wide price behavior similar to the behavior for NuSun prices. Highs for nearby futures occurred during October 1999, November 2002, December 1998, August 2000, and September 2001. On average (Figure 2), nearby futures reached lows in February-May and highs in August-September with a range in the monthly average prices limited to $0.75. The average within year range was $2.45 per cwt. During the 2000 and 2001 marketing years when prices trended up, the range within each year was $2.87, on average. During the other years, the range within each year was $2.17 on average.

The seasonal average price pattern for the November canola futures is presented in Figure 3 and shows a price peak in August. Annual patterns for the November contract indicate highs occurring in no particular month. For those years when prices generally declined into harvest, 1999 and 2000, the highs occurred in November and April, respectively. Of the two contracts, 1999 and 2003, that were well above the average early in the marketing year, the 1999 contract declined into harvest while the 2003 contract traded sideways.

On average, the May canola futures contract peaked in November (Figure 4). The only year when the May contract did not peak close to harvest was during 2004 when the peak occurred in March.

Soybean Oil Futures

Seasonal patterns for soybean oil nearby futures varied widely. The average price pattern is presented in Figure 2. Prices generally decreased during the 1998 marketing year and generally increased during the 2000 and 2001 marketing years. When they decreased, prices peaked early, and when they increased, prices peaked late. The average price pattern fluctuated during the year; prices were the highest during November, April and August, and the lowest during October, February, and June. Monthly average price increases per cwt from the October low were $0.70 to November, $0.51 to April, and $0.98 to August. The average within year range was $4.49.

For the December soybean oil futures contract, annual highs occurred in November, April, May, and August. On average, the price peaked in April (Figure 3). Of the two contracts that were significantly above the average early in the marketing year, 1999 and 2003, the 1999 contract declined into harvest while the 2003 contract increased sharply.

The 2004 May soybean oil futures contract was the only contract to make significant gains. The others traded sideways. On average, the May contract peaked in April (Figure 4).

NuSun Cross-Basis

Relative to Nearby Canola Futures

The tendency for the Enderlin NuSun cross-basis relative to nearby canola futures (Figure 5) was to decline to a low in September and to remain nearly as low during October and November, and then to increase to a high in February-April before generally declining into the end of the marketing year. During three of the five years, the cross-basis was near its low in October. The range of the cross-basis was the narrowest during September and the widest during May. During October, the average cross-basis per cwt ranged from $-1.64 to $-.16 and averaged $-.99.

Variability, as measured by the standard deviation, was less for the cross-basis relative to nearby canola futures than for the cross-basis relative to nearby soybean oil futures. This suggests lower basis risk when cross-hedging with canola futures rather than with soybean oil futures.

Relative to Nearby Soybean Oil Futures

Relative to nearby soybean oil futures (Figure 5), the Enderlin average cross-basis showed a pattern of marketing year lows per cwt in November ($-9.15), April ($-9.25) and September ($-9.16), and highs in February ($-8.08) and July ($-8.30). During October, the average cross-basis ranged from $-14.47 to $-6.59 and averaged $-8.95.

Correlations

Correlations were estimated among NuSun prices, canola futures prices, and soybean oil futures prices (Table 1). These correlations indicate that changes in NuSun prices are more closely correlated with canola futures than soybean oil futures. These correlations suggest that canola futures should provide more risk reduction for cross-hedging NuSun prices than soybean oil futures.

Cross-Hedge Ratios

Cross-hedge ratios (Table 2) were derived for cross-hedging NuSun sunflowers with canola futures and with soybean oil futures using regression analysis. These were estimated for cross-hedging during specific time periods. Again, the emphasis with cross-hedge ratios is on minimizing risk, not maximizing returns.

A cross-hedge ratio of .99 cwt of November canola futures was derived for October. In effect, .99 cwt of canola November futures should be used to cross-hedge each cwt of NuSun sunflower production when the cross-hedge is offset in October.

Using this ratio, about 95 percent of the variability in prices could be eliminated.

When cross-hedging production with December soybean oil futures, the cross-hedge ratio should be .33 cwt of futures to a cwt of production. This strategy would provide less risk reduction (controlling 87 percent of price variability) than the canola futures strategy which eliminated 95 percent.

Cross-hedge ratios were also derived for time periods farmers would traditionally use futures for storage cross-hedge strategies or as an alternative to storage. These are provided to give an indication of how much price risk could be controlled and to indicate how cross-hedge ratios can change depending on the specific time period of the cross-hedge. Two periods were examined.

Cross-hedges in May futures were examined that were offset in February. For canola futures, a cross-hedge ratio of .85 was estimated (91 percent effective), and for soybean oil futures, a cross-hedge ratio of .16 was estimated (84 percent effective).

Ratios were also derived for cross-hedges in May that were offset in April. In this cross-hedge, a cross hedge ratio of .97 was calculated for canola (92 percent effective) and .30 for soybean oil (88 percent effective).

Exchange Rates

Price quotations for canola are in Canadian dollars per metric ton. Converting price quotations to dollars per cwt requires knowing the exchange rate and the relationship between a metric ton and hundredweight. A metric ton is equal to 2204.6 pounds or 22.046 hundredweight. The price quotation for November canola was C$352 on August 25, 2003, and the exchange rate was 1.41 C$/US$0. In U.S. dollars per hundredweight, this quotation would be US$11.32 (C$352 divided by 1.41 divided by 22.046 = US$11.32).

Using the canola futures market to establish a hedge in a distant futures contract means that the sunflower cross-hedge in that market is subject to uncertainty about changes in the exchange rate. Changes from month to month were generally small for large periods of most marketing years although a significant decline did occur from January through June, in 2003. The more typical pattern of minimal changes, however, suggests that variability in exchange rates may be of lesser importance for sunflower growers, especially for shorter-term cross-hedges.

The exchange rate could be hedged just as the sunflower price is cross-hedged. But, including an exchange rate hedge would increase the transaction cost. Since variability is usually minimal, hedging the exchange rate would likely provide little risk reduction, on average, for the increase in transaction costs.

Marketing Strategies

Pre-harvest and harvest/post-harvest marketing strategies are evaluated. The specific strategies are identified at the beginning of each subsection: pre-harvest sales, storage, storage cross-hedge, and replace with futures. The various strategies are compared in the final subsection.

Historical illustrations provide a systematic framework for analyzing and planning marketing strategies. The illustrations indicate what could have happened if decisions were made as of certain dates. These dates where selected according to the seasonal patterns derived for prices and basis. In practice, producers would use the seasonal patterns as guides and select dates and strategies depending on current supply and demand conditions and current behavior of futures prices and basis. Also, producers may choose to diversify strategies and/or combine strategies. Caution must be exercised in generalizing about what might happen in the future based on the illustrations since relatively few years were analyzed. Illustrations matching future expectations can be examined for possible strategy outcomes.

Cross-hedge ratios were applied to the gain or loss from futures transactions and the net amount less transaction fees was added to the cash price to arrive at a net price received. The average net prices received from various marketing strategies during 1997-04 are summarized in Table 3. The standard deviation and range of net prices received are also presented, as indicators of risk.

Pre-harvest Sales

Pre-harvest marketing strategies were initiated during January and April (Table 3). Those months were used since November canola futures and December soybean oil futures were usually the strongest during January-April in years of declining prices. The cross-hedges established in November canola futures and December soybean oil futures were offset in October. Potential users of the cross-hedges would be farmers planting sunflowers.

The cross-hedges in soybean oil were generally more profitable than in canola. During 1997-2003, on average, the soybean oil cross-hedge provided a net price that was $0.18 per cwt higher than the harvest price for strategies initiated in January and $0.28 for April. The returns were negative for canola cross-hedges, on average. The canola cross-hedge was more profitable only once and that was when the cross-hedge was initiated in January 1998.

The net price per cwt for the cross-hedge established in January ranged from $7.05 to $10.93 for Canola and $6.85 to $11.02 for soybean oil. When established in April, returns ranged from $7.25 to $11.25 for Canola and $7.45 to $11.30 for soybean oil.

The variability of net price as measured by the standard deviation was slightly lower for the January cross-hedge in soybean oil ($1.30) than in canola ($1.36). For the April cross-hedge, the variability was higher than in January but the same for soybean oil and canola ($1.41). Variability was the highest for harvest sales ($2.09).

Storage

For sunflowers that are not cash forward contracted, storage is an alternative. Note that this analysis assumes that sales are made during the month of highest returns net of storage costs. The analysis was done to determine if a particular length of storage is the most profitable. Sell or store decisions (Flaskerud 1992) are difficult and require frequent evaluation of supply and demand factors, cash prices, futures prices, basis and storage costs.

On average, storage was profitable during the 1997-2002 marketing years when sunflowers are stored to the month that provides the highest net return (Table 3). The net returns averaged $10.68 per cwt from storage versus $9.03 from harvest sales, in effect, a return to storage of $1.61 was achieved, on average. The variability of storage net returns was $2.22 versus $2.09 for harvest sales. Net returns were the least variable during September ($1.71) and the most variable during November ($2.32).

Although storage was profitable, on average, it would be difficult to achieve because the most profitable period of storage varied considerably. The most profitable sell or store strategy was to store the 1997 crop until May, sell the 1998 crop at harvest, store the 1999 crop until January, store the 2000 and 2001 crops until August, and store the 2002 crop for one month.

Storage Cross-Hedge

Storage cross-hedges were initiated by selling the May futures in October and off-setting in February and April (Table 3). Those months were chosen since the nearby cross-basis relative to nearby canola futures was the strongest during February-April, on average, and relative to nearby soybean oil futures, April had the strongest basis, on average. When the futures were offset, the sunflowers were sold in the cash market. The cash price received was net of storage costs and is compared to the harvest cash sales. Potential users of the storage cross-hedges would be farmers who have harvested sunflowers but have decided to keep them on farm and market them later in the year.

A cross-hedge in canola futures performed the best. Offsetting in February provided a net return that was $0.27 per cwt better than harvest cash sales, on average, and for April the net return was $0.40 better. Relative to harvest sales, the cross-hedge in soybean oil lost $0.14 in February and $0.07 in April.

Using canola for cross-hedging, May canola that was offset in April was not only the most profitable but also had the least variable net price per cwt ($2.00) on average. The variability in February was only slightly higher. For soybean oil, the April offset had the lowest variability ($1.70) but the February offset had the highest variability ($2.10).

Replace with Futures

Strategies involved selling the cash sunflowers at harvest and replacing the sold sunflowers with a long futures position (Table 3). May futures were purchased in October and offset in February and April. Sunflower producers may consider this strategy instead of storing the sunflowers.

In this case, holding a May soybean oil futures position until April was the most profitable by $0.23 per cwt on average; more than harvest cash sales, although more risky with a net price variability $0.58 higher on average. Holding until

February increased the average net price by only $0.02 over harvest cash sales and the variability in net price was $0.26 higher, on average, than for the harvest cash price. Losses were incurred for holding canola futures, on average.

Strategies Compared

Using the average net price as criteria, soybean oil futures performed somewhat better across all strategies with an overall average net price of $9.46 per cwt versus $9.26 for canola futures (Table 3). On average, however, positions in soybean oil futures also had the highest variability and the greatest net price range.

Seven strategies ranked better than harvest sales only according to the average net price criteria. Storage provided the highest average net price, however, the most profitable storage period varied from year-to-year. A storage cross-hedge in canola futures from October to April ranked second. A pre-harvest cross-hedge in soybean oil futures from April to October ranked third followed by a storage cross-hedge in canola futures from October to February. The replacement of harvest sales with soybean oil futures from October to April ranked fifth. Sixth place was taken by a pre-harvest cross-hedge in soybean oil futures from January to October. The replacement of harvest sales with soybean oil futures from October to February ranked seventh.

Summary and Conclusions

The Midwest is a major producer of sunflowers comprising most of U.S. production which ranked seventh in the world during 2003. Oil sunflower production dominates and occurs primarily in North Dakota. NuSun has become the predominant type of oil sunflower and was the type analyzed in this study.

Although sunflowers compete well economically with other crops, the profitability of producing sunflowers is dependent, in part, on how well price risk is managed. Various time series of prices were analyzed to identify patterns and relationships useful for developing marketing strategies; pre-harvest and harvest/post-harvest marketing strategies were evaluated. Cash prices were obtained for NuSun, and futures prices were collected for canola and soybean oil during 1997 to April 2004.

The seasonal pattern for Enderlin NuSun prices, on average, was for lows to occur at the beginning of the marketing year and peak in June before declining into the next marketing year. When prices were significantly above the average at the beginning of the marketing year and tended to decrease, prices generally declined into harvest. The average within year price range was $3.07 per cwt for NuSun prices, $2.45 for nearby canola futures, and $4.49 for nearby soybean oil futures.

The tendency for the NuSun cross-basis relative to nearby canola futures was to weaken to a low in September and strengthen to a high in February-April before generally weakening into the end of the marketing year. Relative to nearby soybean oil futures, the average cross-basis showed a pattern of marketing year lows in November, April, and September, and highs in February and July. Variability, as measured by the standard deviation, was less for the cross-basis relative to nearby canola futures than for the cross-basis relative to nearby soybean oil futures.

Correlations indicate that changes in NuSun prices are the most closely correlated with canola futures. Soybean oil futures were a distant, second-best correlation. These correlations suggest that canola futures should provide the most risk reduction for cross-hedging NuSun prices.

A cross-hedge ratio of .99 cwt of November canola futures was derived for October. When cross-hedging with December soybean oil futures, the cross-hedge ratio should be .33 cwt of futures to a cwt of production. Cross-hedges in May futures were examined that were offset in February. For canola futures, a cross-hedge ratio of .85 was estimated, and for soybean oil futures, a cross-hedge ratio of .16 was estimated. Ratios were also derived for cross-hedges in May that were offset in April. In this cross-hedge, a cross hedge ratio of .97 was calculated for canola and .30 for soybean oil.

On the basis of net price received, seven strategies ranked better than harvest sales only. Soybean oil futures performed somewhat better across all strategies, although they also had somewhat higher variability, on average.

The study suggests that canola cross-hedges have the most risk reduction, whereas soybean oil cross-hedges may be preferred when looking at profitability of strategies. Also, soybean oil futures are not subject to exchange rate variability. Current fundamental and technical features in both markets need to be evaluated when considering a futures position in a marketing strategy.

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Table 1. Correlation of Enderlin NuSun Sunflower Prices with Various Futures Contracts During Specific Calendar Months and Data Periods[a]

Futures Contract	Calendar Month	Data Period	Correlation with NuSun Prices
November Canola	October	1997-2003	0.986
December Soybean Oil	October	1997-2003	0.744
May Canola	February	1998-2004	0.937
May Soybean Oil	February	1998-2004	0.703
May Canola	April	1998-2004	0.963
May Soybean Oil	April	1998-2004	0.835

[a] *Based on weekly (Thursday or nearest day) cash and futures closing prices*

Table 2. Estimated Cross-Hedge Ratios and Cross-Hedge Effectiveness for Enderlin NuSun Sunflower Cross-Hedge Alternatives[a]

Cross-HedgeIn Futures Contract Month	Cross-Hedge Offset Month	Cross-Hedge Ratio	Cross-Hedge Effectiveness
Canola Futures:			
November (1997-2003)	October	0.99	0.95
May (1998-2004)	February	0.85	0.91
May (1998-2004)	April	0.97	0.92
Soybean Oil Futures:			
December (1997-2003)	October	0.33	0.87
May (1998-2004)	February	0.16	0.84
May (1998-2004)	April	0.3	0.88

[a] *Based on weekly (Thursday or nearest day) cash and futures closing prices*

Table 3. Net Prices Received from Alternative Marketing Strategies, $/cwt, 1997-2004[a]

Marketing Strategy	Average	Standard Deviation	Minimum	Maximum
Harvest Sales Only, 1997-03				
October	9.38	2.09	6.06	12.11
Preharvest Sales, 1997-03				
Canola - January to October	9.14	1.36	7.05	10.93
Soybean Oil - January to October	9.56	1.3	6.85	11.02
Canola - April to October	8.92	1.41	7.25	11.25
Soybean Oil - April to October	9.66	1.41	7.45	11.3
Storage, 1997-98 to 2002-03				
Various Months	10.68	2.22	6.96	13.04
Storage Cross-Hedge, 1997-98 to 2003-04				
Canola – October to February	9.65	2.02	6.7	12.82
Soybean Oil - October to February	9.24	2.1	6.43	11.97
Canola - October to April	9.78	2	6.87	12.41
Soybean Oil - October to April	9.31	1.7	6.64	11.62
Replace with Futures, 1997-98 to 2003-04				
Canola - October to February	9.02	2.16	5.81	11.31
Soybean Oil – October to February	9.4	2.35	5.88	12.31
Canola – October to April	9.07	2.18	6	11.79
Soybean Oil - October to April	9.61	2.66	5.73	13.38
Average of Positions in:				
Canola Futures	9.26	1.86	6.61	11.75
Soybean Oil Futures	9.46	1.92	6.5	11.93

[a] *Based on data compiled as monthly averages*

Figure 1. NuSun Prices as a Percent of Nearby Futures for Canola and Soybean Oil

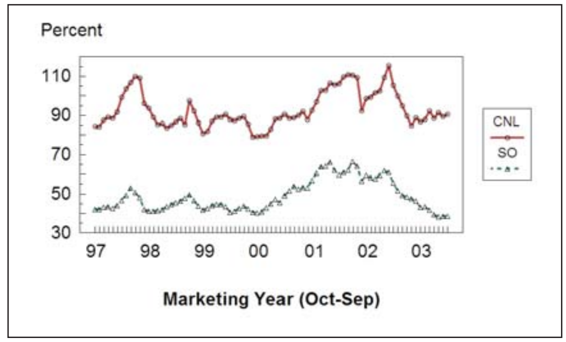

Figure 2. Seasonal Behavior of Enderlin NuSun Prices and Nearby Futures for Canola and Soybean Oil

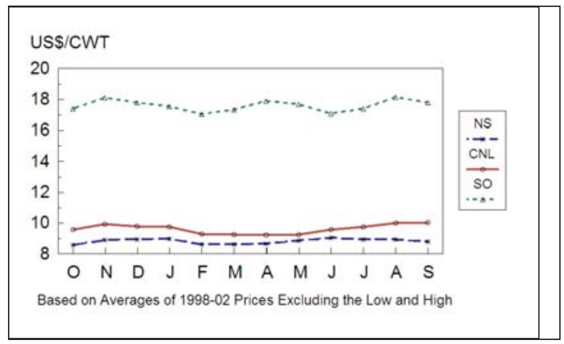

Figure 3. Seasonal Behavior of Futures for November Canola and December Soybean Oil

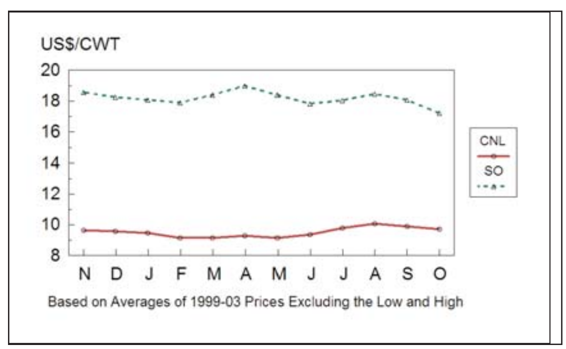

Figure 4. Seasonal Behavior of May Futures for Canola and Soybean Oil

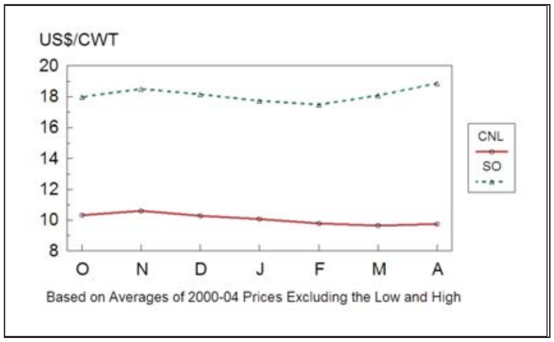

Figure 5. Enderlin NuSun Cross-Basis Relative to Nearby Futures for Canola and Soybean Oil