

Comparing Returns for Grain Corn Production under Various Marketing Strategies

Prepared for:

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Executive Summary

Introduction

For corn producers, decisions regarding the marketing of their crop can be very difficult to make, as a significant amount of uncertainty surrounds these decisions. With considerable fluctuation in the price of corn, it can be challenging to determine the optimal timing of marketing decisions and the appropriate marketing tools to use to ensure that sales or contracts are made during periods of relatively higher prices. The development of a marketing plan or marketing strategy may assist with this decision making. However, the development of an appropriate strategy can be difficult, particularly due to a lack of information regarding the relative effectiveness of various marketing strategies. This report addresses this issue through the development and use of a simulation model to compare the returns from a set of specific marketing strategies for corn producers in Ontario.

There have been a number of previous studies, primarily in the United States, that have examined the effectiveness of marketing strategies for various agricultural commodities. Many of these studies involved comparing the returns of alternative marketing strategies to a baseline strategy in which the entire crop is sold at harvest. There is no clear consensus in the results of these studies with respect to the effectiveness of alternative marketing strategies, such as pre-harvest strategies. In some cases, pre-harvest strategies were found to generate significantly higher prices than the baseline strategy, while in other cases, any differences in returns were not statistically significant. However, the results of these studies may not necessarily apply to producers in Ontario, as cash price determination differs due to the influence of the exchange rate. While one previous study has examined marketing strategies in Ontario, this study was conducted using data from 30 years ago, before options were available.

Methods

The simulation model developed for this report uses historical cash and futures pricing data to determine average prices generated by specific marketing strategies. Data for this model was derived from the Ontario Commodity Reports, which provide daily futures prices and cash prices at specific locations across Ontario from 1992 to the present time, as well as from the Chicago Board of Trade, which provides margin requirements and daily options data. The marketing strategies evaluated by this model were developed through consultation with marketing specialists and producers to ensure that these strategies are representative of those currently used by corn producers in Ontario. There are 18 strategies incorporated into the simulation model, which include the use of marketing tools such as cash sales (Strategies #1-4), forward contracts (#5-7), futures contracts (#8-10), options (#11-14), basis contracts (#15), and combinations of these tools (#16-18).

Prices for each strategy are selected from a range of dates, to allow for more flexibility and to avoid using a specific date on which prices may be relatively high or relatively low compared to the average price during that time period. For simplicity, there are five three-week time periods that are used across all strategies during which the marketing activities may occur: harvest (October 21 – November 10), early in the new year (January 5 – 25), spring (April 10 – 30), early summer (June 20 – July 10), and late summer (August 10 – 30). These time periods were selected in an attempt to reflect periods when a larger amount of corn is marketed. The tools used and the timing of marketing activities for each strategy are fixed across all years to allow for direct comparison of specific marketing strategies. However, multiple strategies are included for cash sales, forward contracts, futures contracts, and options, to allow for variation in the timing of the use of these tools.

The returns generated by the simulation model take into account costs that are associated with the use of specific marketing tools. For strategies in which the entire crop is not sold by harvest, storage and inventory costs are deducted from the selling price. Strategies that involve the use of futures contracts factor in the interest costs on funds required for trading accounts and margin calls. Commission fees for futures contracts and options are also taken into account.

The simulation model is run multiple times across all years to generate an average price per bushel for each strategy. The price for each strategy is compared to the baseline strategy (selling the entire crop at harvest) and t-tests are conducted to determine whether the differences in the average prices are statistically significant. In addition, the relative level of risk associated with each strategy is determined based on the standard deviation of the average price and on the probability that the price generated for a specific strategy would be less than the costs of production (COP).

Results

The results of the simulation model are provided in table 1. The strategies with the highest average prices across all years and the greatest price premiums over the baseline are Strategies #10, #8, #9, and #16, all of which incorporate short hedges using futures contracts. These strategies returned prices that are between 29.8 and 32.8 cents per bushel higher than the baseline strategy. The put option strategies (Strategies #11, #12, #13, and #17) also tended to have much greater returns than the baseline, generating price premiums ranging from 17.9 to 27.5 cents per bushel, only slightly lower than those of the futures contracts strategies. While most of the differences in average prices for the pre-harvest strategies relative to the baseline strategy are found to be significant, many of these differences are only significant at the 10% level.

The results indicate that the standard deviation and probability that the price is below the costs of production are similar to or greater than the baseline for many of the pre-harvest strategies. This implies that risk may not be reduced through the use of these strategies. However, the standard deviation for the pre-harvest strategies is somewhat

inflated due to the price volatility that occurred in 2008. If this year is omitted from the analysis, the standard deviation for these strategies would be lower than for the baseline strategy.

The results also indicate that making multiple cash sales throughout the year does not generate significantly higher prices relative to the baseline strategy. Any price increases that occur in the months after harvest may be offset by storage and inventory costs. In addition, spreading cash sales out over the year does not reduce risk, as the standard deviation of returns is greater for these strategies as compared to the baseline, while there is little difference in the probability of generating a price below the costs of production.

Table 1: Results of the simulation model by strategy, 1992-2008

Strategy	Description	Difference			
		Average Price ^a (\$/bu)	From Baseline ^b (cents/bu)	Standard Deviation ^a (\$/bu)	Probability Below COP (%)
1	Baseline	3.21	-	0.61	64.7
2	Jan. cash sale	3.32	10.4	0.61	55.6
3	3 cash sales	3.29	7.8	0.67	61.0
4	5 cash sales	3.31	9.4	0.86	68.8
5	Forward contract 1	3.32	11.2 *	0.55	68.0
6	Forward contract 2	3.38	17.0 **	0.51	68.5
7	Forward contract 3	3.39	17.5 *	0.63	76.5
8	Futures contract 1	3.53	31.8 *	0.93	58.1
9	Futures contract 2	3.52	31.1	1.34	68.5
10	Futures contract 3	3.54	32.8 *	1.13	65.6
11	Put option 1	3.39	17.9 *	0.77	64.7
12	Put option 2	3.49	27.5	1.18	65.1
13	Put option 3	3.44	23.1 *	0.96	65.5
14	Call option	3.26	5.1	0.73	62.6
15	Basis contract	3.38	16.4 **	0.67	62.9
16	Forward & Futures	3.51	29.8 *	1.07	70.0
17	Forward & Put option	3.49	27.3 *	0.97	71.0
18	Dynamic	3.48	27.2 **	0.92	58.7

^a Figures are rounded off to the nearest cent.

^b Asterisks (*,**) indicate statistical significance at the 10% and 5% levels, respectively.

Further analysis was conducted to determine whether differences in the relative effectiveness of strategies are evident across different types of market conditions. The model results were split into two groups – results for years in which pre-harvest prices are greater than costs of production and results for years in which prices are below costs of production throughout the primary pre-harvest periods (i.e., spring and early summer). The results for the high price years are similar in nature to those of the initial analysis, where strategies that involve the use of futures contracts and options generated the highest average prices, but with much greater differences between pre-

harvest strategies and the baseline strategy. Conversely, the results for the low price years indicate that only minimal differences occur in average prices across all strategies. None of the differences between the pre-harvest strategies and the baseline is statistically significant.

Overall, the results indicate that pre-harvest marketing strategies for corn that use futures contracts and options are most effective relative to the baseline strategy. These strategies were found to return a higher average price than strategies where the entire crop is sold through cash sales, particularly in years where the pre-harvest prices are greater than the costs of production. As a result, in such years there may be significant benefits to using these pre-harvest strategies, rather than waiting for prices to get even higher later in the year. In years when prices are lower, and are below costs of production, pre-harvest strategies may not offer a significant improvement over the baseline strategy.

The differences in the relative effectiveness of specific strategies between the high-price and low-price years imply that using only one specific strategy in every year may not be the best approach to marketing, even if the selected strategy has been found to perform better on average across all years compared to other strategies (in this case, Strategy #10). Rather, it may be prudent to use different strategies in response to the current set of market conditions.