

Alternative Grain Price Benchmarks for Evaluating Market Performance

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Part I. Introduction

Differing opinions exist regarding what price benchmarks are most appropriate to use in grain marketing performance studies. A key issue in this debate seems to be whether one believes the performance of grain marketing strategies or advisory services should be compared to a) pricing opportunities that were available to a grain marketer throughout the period in question, b) simplistic routine strategies such as harvest sales, c) typical farmers' marketing practices in the absence of market advisory service advice, d) the published average price received by farmers, or some other systematic/planned marketing strategy. This issue is particularly relevant in light of questions originating from the grain marketing advisory service industry about the price benchmarks used by the Agricultural Market Advisory Services (AgMAS) project.

The AgMAS project was initiated in 1994, and is jointly directed by Dr. Darrel L. Good and Dr. Scott H. Irwin of the University of Illinois at Urbana-Champaign. Funding for the AgMAS project is provided by the Illinois Council on Food and Agricultural Research and the following United States Department of Agriculture entities: the Cooperative State Research, Education, and Extension Service; the Economic Research Service, the Risk Management Agency, and the Initiative for Future Agriculture and Food Systems. The AgMAS website address is <http://web.aces.uiuc.edu/farm.doc/agmas/>.

The AgMAS program has been using 24 and 20 month average adjusted prices as market benchmarks for evaluation of corn, soybean and wheat marketing strategy recommendations from selected marketing advisory services. These two market benchmarks are consistent with efficient market theory in economics, and are most useful in analyzing whether market advisory services can perform better than grain markets when all preharvest, harvest, and postharvest pricing opportunities are considered. In its most recent report of market advisory service performance, AgMAS has added a second type of benchmark, i.e., a season average cash price. This season average cash price benchmark (net of storage and interest costs) is oriented toward farmer's behavior rather than market efficiency. It does not account for any preharvest pricing strategies, and is measured using cash grain markets in sections of Illinois. Although some efforts have been made to evaluate and compare alternative types of price benchmarks by AgMAS, there is need for further examination of alternative price benchmarks and consideration of other issues relevant to price benchmark selection.

In the first part of this paper, alternative grain market price performance benchmarks are identified and initially critiqued. Then an analysis of marketing survey data is presented which illustrates the diversity or heterogeneity of grain marketers with respect to their grain marketing practices, the information they use to make marketing decisions with, and which types of price benchmarks are appropriate to meet their varying needs. A statistical analysis of alternative grain market price performance benchmarks for corn, grain sorghum, soybeans, and hard red winter wheat are then presented. Particular emphasis is placed on how well alternative benchmark strategies would have protected farmer-sellers from potentially harmful downward price moves and/or low price outcomes. Finally, recommendations are given regarding which price benchmarks, either alone or in combination with others, should be used in market price performance studies. The results of this research are relevant

to current discussions among farmers, agricultural economists, and industry groups about the appropriateness of alternative price benchmarks for market performance studies.

Part II. Alternative Grain Price Performance Benchmarks

An important factor in the selection of grain price benchmarks for market performance studies involves how effectively such benchmarks represent reasonably attainable grain marketing practices and strategies on the part of different categories or types of grain marketers. At issue is how grain marketing practices differ among marketers who may or may not be willing to a) utilize certain types of marketing tools or transactions such as forward contracts, futures and/or options, and b) perform marketing transactions at specific times during the marketing year, such as during the preharvest and/or postharvest periods. To examine this issue further, survey-based information will be presented in the following section on the grain marketing practices and marketing information preferences of different types of farmer-marketers.

The choice of price benchmarks should be made with an understanding of acknowledged “points of market reference” or “price standards” used by grain marketers. Minimum selling prices as represented by USDA marketing loan rates are such a point of reference. From a particular farmer’s perspective, minimum selling prices may have a bearing on how the performance of grain marketing program is evaluated. Enterprise profitability, or grain selling price relative to cost of production, is another such point of reference. However, costs of production will likely vary among individual farmers to a much greater degree than do county level marketing loan rates. Production cost measures also vary based on which costs are being accounted for, whether they are total variable costs (TVC), total variable and fixed costs (TC), or total costs excluding land & management (TC*).

Benchmark prices should represent sellers’ attention to and/or investment in price risk management strategies in addition to their efforts to maximize selling prices. The price risk management benefits of using put and call options, futures hedges, forward contracts, minimum price contracts, and particularly USDA marketing loans should be accounted for in the development of grain price benchmarks for evaluating market performance. Some measure of the “price risk protected against” would be beneficial to consider in price benchmark development and marketing strategy performance analysis in addition to average net price received benchmarks which are typically used.

Varying risk management attitudes among grain marketers and the impact of these attitudes upon grain marketing strategy and tool selection is an issue to consider in price benchmark selection. A related issue involves understanding what farm producers view to be “risky behavior” in terms of grain marketing strategies. For instance, the phrases “risk minimizing hedge” and “optimal hedge ratio” may be contradictions in terms to many cash market or even some forward contract-oriented grain marketers, given their aversion towards directly using futures hedges. Lack of familiarity with and understanding of commodity options (puts and calls) may overshadow the risk management benefits of these marketing tools in the perceptions of some farmers. Farmer’s recognition of what comprises “speculative” or “at risk” marketing behavior often fails to acknowledge that unhedged postharvest grain storage is largely speculative in nature, while postharvest storage hedges actually decrease price risk by eliminating the effect of futures variability. Upon consideration of these and other examples, it seems that farmer’s perceptions about what types of grain marketing strategies to use to reduce price risk may vary from those commonly held in economic theory.

Several alternative grain price performance benchmarks are analyzed in this study. They include:

- 1) **Harvest cash price**
- 2) **Harvest plus postharvest average cash price**
 - a. Weighted by sales and adjusted for storage costs
- 3) **24 Month Average Price (i.e., AGMAS 24 Month Price)**
 - a. An average of preharvest forward contract, harvest cash, and postharvest net cash (net of commercial storage + interest) prices, with LDPs included
- 4) **USDA marketing loan rates**
- 5) **Grain enterprise breakeven cost of production**
- 6) **Minimum available selling price**
 - a. The worst possible price outcome during the full preharvest - harvest - postharvest time period
- 7) **Maximum available selling price**
 - a. The best possible price outcome during the full preharvest - harvest - postharvest time period
- 8) **Ex-post probability distribution-based comparisons of marketing performance**
 - a. Performance relative to available marketing opportunities
- 9) **Ex-ante probability distribution-based comparisons of marketing performance**
 - a. Performance relative to available marketing opportunities
- 10) **Other potential price benchmarks**

1) **Harvest Cash Price:** Harvest cash prices are simple to calculate and represent a strategy accomplished with “minimal effort” by grain marketers. By definition, harvest cash sales involve no preharvest forward contracts sales, futures hedges, or put options purchases, and similarly no postharvest grain storage or call option purchase-related marketing activity. Over a series of years harvest cash prices for grain may be extremely volatile. During periods of “normal” or “large” crops, cash prices at harvest may fall below farm program marketing loan rates, necessitating consideration of either loan deficiency payments (LDPs) or marketing loan gains (MLGs) in the calculation of marketing performance benchmarks.

2) **Harvest Plus Postharvest Average Cash Price** (weighted by sales and adjusted for storage costs): A sales-weighted average of harvest and postharvest cash selling prices would represent average prices received by typically cash marketers who avoid using preharvest marketing strategies. In calculating average sales prices, the USDA weights prices by the amount of actual cash sales made at the state and/or national level during specific harvest and postharvest time periods. These sales-weighted harvest plus postharvest cash price series provide the opportunity for benchmark comparisons with the “average farmer’s” cash marketing strategies. Grain prices are weighted by quantity of grain sold during specific periods by all farmers at either state or the national level. Adjustments for postharvest storage costs and possibly marketing loan LDPs or MLGs are needed to make USDA sales weighted cash price series represent the true net price received for grain sold during the harvest and postharvest period.

3) **24 Month Average Price:** Of the alternative benchmarks considered in this study, the 24 month (2 year) average price benchmark used by AGMAS provides the most complete accounting of grain marketer’s utilization of all available preharvest, harvest, and postharvest marketing opportunities. This price benchmark utilizes an inherent “uniform averaging” of all available pricing opportunities throughout the 24 month preharvest through postharvest period, assuming that approximately 50% of all grain

produced is forward priced prior to grain harvest. This degree of forward pricing would be more than cash grain-oriented marketers would typically engage in. Furthermore, such a disciplined “average pricing” approach is not consistent with the uneven flow of critical supply-demand information that will affect price prospects for the crop. This price benchmark likely gives excessive weight or value to early preharvest hedging or forward contracting opportunities relative to the willingness of grain marketers to carry out such preharvest (and in some cases preplant) marketing transactions.

Commercial off-farm grain storage rates are used throughout the postharvest period. Given the high cost of commercial storage relative to on-farm storage, grain marketers have a disincentive to store any portion of their grain production commercially for up to a year after harvest. Where available, there is an economic incentive to utilize lower cost on-farm storage as opposed to commercial storage for longer postharvest time periods.

In summary, this market price benchmark tends to over-weight or over-value the pricing opportunities available during the both the early preharvest and late postharvest time periods. Consequently, the 24 month AgMAS price benchmark under-weights or under-values the other pricing opportunities available during the remainder of the 24 month period, when grain marketers are more likely to be making grain marketing transactions. By accounting for nearly 50% of its marketing transactions during the preharvest period, this benchmark is of limited relevance to those grain marketers who use strictly harvest and postharvest cash market transactions.

4) USDA Marketing Loan Rates: In most normal-to-large crop production and associated moderate-to-low price years, marketing loan rates represent a minimum price performance standard. From a price risk management point-of-view, marketing loans serve to limit or effectively truncate the distribution of low price outcomes. The price level represented by marketing loan rates may also have crossover effects on the integrity of other grain price benchmarks. For example, if available preharvest pricing opportunities are not at least marginally higher than USDA marketing loan rates, grain marketers are less likely to enter into preharvest forward pricing transactions. This tendency could impact the integrity of price benchmarks that heavily weight preharvest forward pricing opportunities such as the AGMAS 24 month benchmark price. Alternatively, if available postharvest pricing opportunities are not greater than marketing loan rates plus interest, the option exists in current farm policy to forfeit grain to the government at the end of the 9 month marketing loan period, although substantial storage costs would likely have accumulated. In either of these situations, the level of the marketing loan rate relative to other pricing opportunities is likely to have an impact upon grain marketer’s decisions and the integrity of alternative grain price performance benchmarks.

5) Grain Enterprise Breakeven Cost of Production: The use of enterprise cost of production estimates as market price benchmarks introduces a useful profitability orientation into the evaluation of marketing performance. However, a number of problems exist in using costs per unit for this purpose.

First, variations in actual production from preharvest expectations will affect the level of costs on a per unit basis. This is particularly troublesome for preharvest marketers who have used expected cost of production estimates as a basis for preharvest pricing decisions, but who then suffer significant yield shortfalls, thereby raising their breakeven costs per unit. Second, a number of alternative cost standards may be used, such as total variable cost, total fixed plus variable costs, total cost before land and management expenses, etc. Third, in some cases enterprise breakeven costs may be high enough relative to pricing opportunities for a particular commodity that breakeven much less profitable pricing opportunities never present themselves during a particular marketing period. In these situations a breakeven cost of production will be nearly impossible to attain using conventional, non-speculative marketing strategies. Fourth, enterprise costs of production are likely to vary considerably from farmer to farmer, particularly as fixed machinery and land costs are accounted for.

Variable costs will also vary on a farmer-to-farmer basis, but likely not as much as the fixed cost items. Although estimates of grain enterprise cost of production provided by University Extension or other sources have value as general representations of price performance benchmarks, individual farmer's cost of production figures are of greater value for evaluation of their individual grain marketing performance.

6) Minimum Available Selling Price: Although not commonly used, there may be value in comparing a farmer's marketing performance for a particular crop to the minimum price marketing opportunity available during the relevant marketing period. Alternatively, a multi-year rolling average of minimum price outcomes may also be of value for comparison and evaluation purposes, especially in the development of future marketing plans and strategies. Comparisons to minimum selling prices or even a low-end selected percentile along the distribution of available pricing opportunities will give some idea of the amount of harmful price risk avoided by using a particular marketing strategy.

It would be also worthwhile to evaluate the duration of time or proportion of the marketing period during which pricing opportunities equal to or near the minimum available selling price occurred. Similarly, it is useful to know when such opportunities occurred during the preharvest, harvest, or postharvest periods, and with which marketing tools and/strategies did they occurred. During medium-to-low price years, the distribution of minimum selling price opportunities may be truncated or limited by marketing loan price levels for major U.S. commodities. Therefore, the USDA marketing loan rate may be nearly equal to the minimum available selling price benchmark during these periods.

7) Maximum Available Selling Price: The use of the maximum available selling price as a performance benchmark would indicate how well marketing decision makers took advantage of the most profitable marketing opportunities available to them during a marketing period. In similar fashion to minimum available selling price benchmarks, comparisons to maximum selling prices or even higher-end selected percentiles along the distribution of available pricing opportunities will give some idea of the degree to which the most profitable pricing opportunities available during a marketing period were taken advantage of by using a particular marketing strategy.

The duration of time or proportion of the marketing period during which pricing opportunities equal to or near the maximum available selling price occurred are also worthwhile to evaluate. Just as for minimum available selling price benchmarks, it is important to determine whether the maximum or highest pricing opportunities available to grain producer-marketers occurred during the preharvest, harvest, or postharvest periods, and to identify the marketing tools and strategies used to obtain the high price.

8) Ex-post Probability Distribution-Based Comparisons: Probability distributions of available grain pricing opportunities hold potential as a market performance evaluation tool, particularly in evaluating the degree of harmful outcome avoidance for a particular transaction. By adopting reasonable assumptions to limit the number of marketing tools evaluated and the frequency of possible marketing observations during a marketing period, ex-post (i.e., after the fact) probability distributions of available grain pricing opportunities during a marketing period can be developed. For a single or limited number marketing transactions, these ex-post probability distributions of marketing outcomes can identify the proportion of alternative transactions that netted at least a specific selling price during a marketing period. Unless stringent, limiting assumptions are applied regarding the type, frequency, number, and possible combinations of potential transactions considered, calculation of the probability distribution of all the potential combinations of transactions throughout a marketing period would be a time consuming, impracticable, and likely infeasible task.

9) Ex-ante Probability Distribution-Based Comparisons: To evaluate real-time, sequential marketing decisions, comparisons to ex-ante (projected or before the fact) probability distributions of potential price outcomes are of more value than ex-post (after the fact) distributions. Ultimately, the marketing performance of a decision maker should be evaluated relative to the ex-ante projected probability distributions of potential price outcomes that existed at various times throughout the marketing period. The projected probability distributions of potential grain price outcomes are developed based on grain marketers' probability-weighted perceptions of grain price prospects during a marketing period, many of which may not actually come to fruition. Therefore, when the performance of grain marketers is instead evaluated using ex-post probability distributions of actual pricing opportunities, inadequate attention is paid to the information about potential price outcomes used by the grain sellers to make their real time marketing decisions with.

It is hypothesized here that the ex-ante distributions of potential net price outcomes are typically "broader" or cover more possible price outcome regimes for a marketing period than the ex-post distribution of available pricing opportunities that actually occurred. Therefore, there is the potential for misrepresentation and under-valuation of the grain marketers' efforts both to manage downside price risks and to take advantage of upside price opportunities when ex-post price probability distributions are relied upon as opposed to ex-ante distributions.

10) Other potential price benchmarks: Other possible market price performance benchmarks include those based on specific strategies, carried out either routinely or systematically each year. Routine strategies involve the use of the same strategy routinely or repetitively each year without variation. With routine strategies, grain is marketed each year during the same period of time using the same marketing tools regardless of market conditions. Systematic strategies allow for year-to-year variation in marketing approach and actions based on key market information. Of the price benchmarks identified above, harvest sales, harvest+postharvest sales, and the AgMAS 24 month average price represent "routine" strategies.

Part III. Differences Among Farmers' Marketing Practices and Market Information Usage

An important argument for the use of multiple grain price benchmarks follows from the differences that exist among grain farmers with respect to their grain marketing practices and the types of information they use in making grain marketing decisions. A key assertion of this paper is that grain price benchmarks should be relevant to both the grain marketing practices and the types of grain marketing information they are being utilizing by individual farmers.

Following are the results of a survey presenting information about the differences among farmers' with regard to their marketing practices and their marketing information usage. The survey also presents information about farmer's actual preharvest and postharvest marketing practices that is relevant to this discussion of the appropriateness of alternative grain marketing price benchmarks.

Survey of Farmers' Marketing Practices and Information Usage

A survey of Kansas, Iowa, and Texas marketing decision makers was conducted in 1998 to investigate the factors affecting their use of alternative marketing tools and what types of marketing information they preferred to use. A total of 351 complete survey observations were obtained. Details on

how this survey was conducted and survey results pertaining to factors affecting farmer’s grain marketing practices are available from the author (Sartwelle, O’Brien, et al.)

Survey observations were divided into three categories or groupings of marketing practices (Table 1). The three categories are:

(1) Cash Market-oriented Marketing Practices

Category #1 survey observations were those oriented primarily toward cash market-oriented transactions, with limited use of forward contracts, futures and options.

(2) Forward Contract-oriented Marketing Practices

Category #2 observations were those that regularly use alternative types of forward contracts in their marketing practices. These contracts include standard forward contracts plus basis, hedge-to-arrive, minimum price, delayed price, and other types of specialty production contracts. Farm marketers in this category may have also used cash market and futures and options transactions, but the primary orientation of their marketing practices was toward forward contracts.

(3) Futures/Options-oriented Marketing Practices

Category #3 observations were those that made extensive use of futures and/or options in their grain marketing activities. This group may also have used cash marketing transactions as well as forward and other types of marketing contracts, but to a lesser degree than futures and/or options.

Table 1. Categorization of Farmers’ Grain Marketing Practices ¹

Models and Dependent Variable Categorizations	Description of Categories	No. Obs.
1. Cash Market Oriented Marketing Practices	≥ 90% Cash Practices, ≤ 10% Forward Contracts, ≤ 15% Futures/Options	95
2. Forward Contract Oriented Marketing Practices	10%-100% Forward Contracts Forward Contract % Greater than Futures/Options %	128
3. Futures/Options Oriented Marketing Practices	15%-100% Futures/Options Futures/Options % Greater than Forward Contract %	128
Total Usable Survey Observations:		351

1. In this analysis, 27.1% (95/351) of the observations are determined to be in category #1, 36.5% (128/351) in category #2, and 36.5% (128/351) in category #3.

Values for selected variables from the 1998 marketing survey are listed in Table 2. These variables can be divided into two general groups.

The first group of variables describes respondents’ preferences for marketing related information. The types of marketing information include futures prices (Futures\$), futures price charts (Fut\$Chrts), price forecasts (PricFrst), marketing strategy recommendations (Strategy), supply-demand fundamentals (SpIyDmd#s), cash and forward contract prices (CashFC\$), and the opinions of other farmers (FOpinion).

The second group of variables describes respondents’ grain marketing management practices. Here management practices are referred to as storage practices and the impact of crop insurance purchases on their pre-harvest marketing decisions. These variables include annual percent of grain in commercial storage (ComIStor%), annual percent of grain in on-farm storage (FarmStor%), the total proportion of

grain in either type of storage (TotalStore%), the use of either multiperil crop insurance or crop revenue coverage (CropIns), and the impact of crop insurance use upon a farmers' willingness to forward price grain (FwrnPric).

Table 2. Grain Marketing Information Use and Management Practices ¹

Independent Variables	Variable Descriptions	Mean	Std. Dev.
Futures\$	Preference for Futures Price information. Range: 0-3: 0. Do not use, 1. Low preference, 2. Medium preference, 3. High preference	2.15	0.94
Fut\$Chrts	Preference for Charts of Futures Prices. Range: 0-3 (See FUTURESS\$)	1.35	1.03
PricFrcst	Preference for Price Forecast information from Marketing Experts. Range: 0-3 (See FUTURESS\$)	1.63	0.80
Strategy	Preference for Buy/Sell Recommendation information. Range: 0-3 (See FUTURESS\$)	1.07	0.93
SplyDmd#s	Preference for Supply-Demand Fundamentals information. Range: 0-3 (See FUTURESS\$)	1.92	0.90
CashFC\$	Preference for Cash and Forward Contract Price information. Range: 0-3 (See FUTURESS\$)	1.96	0.98
FOPinion	Preference for Opinions of Other Farmers About Market Analysis or Buy/Sell Strategies. Range: 0-3	0.78	0.71
ComlStore%	Percentage of annual grain production that is stored commercially prior to marketing.	0.38	0.38
FarmStore%	Percentage of annual grain production that is stored on-farm prior to marketing.	0.31	0.34
TotalStore%	Percentage of annual grain production that is stored either commercially or on-farm prior to marketing.	0.68	0.41
CropIns	0/1 variable indicating whether producer purchases either MPCCI or CRC insurance	0.77	0.42
FwrnPric	0/1 variable indicating whether purchases of MPCCI or CRC insurance affects producer's willingness to preharvest forward price grain.	0.23	0.42

1. Overall averages and standard deviations for 351 survey observations, across three categories of grain marketers

Differences in Grain Marketing Information Use

Differences exist among alternative types of grain marketers with regard to their preferences for using alternative types of grain market information (Table 3). These differences provide support for the idea that alternative types of grain price benchmarks are relevant to different types of grain sellers.

A. Futures Prices: Cash marketers had lower preferences for daily futures price information than either forward contract or futures/option-oriented sellers (Table 3). In addition, forward contract-oriented sellers had a lower preference for daily futures price information than futures/options-oriented marketers. Overall, the strong preference of futures/options-oriented marketers for futures information is shown by the highest average rating for futures information (2.52 on a 0 to 3.00 scale) across the three categories of marketers for any type of marketing information source. Futures/options-oriented marketers had a higher preference for futures price information than either cash or forward contract-oriented marketers. Conversely, cash marketers had a lower preference for futures price information than either forward

contract or futures/option-oriented marketers.

B. Futures Price Charts: Cash marketers' preferences for futures price chart information did not differ from forward contract-oriented marketers (Table 3). However, futures/options-oriented marketers had higher preferences for futures price chart information than either cash or forward contract-oriented sellers.

Table 3. Marketing Information Use by Alternative Types of Grain Marketers^{1,2}

	Cash vs. Forward Contract Marketings		Cash vs. Futures + Options Marketings		Forward Contract vs. Futures + Options	
	Cash	Forward Contract	Cash	Futures + Options	Forward Contract	Futures + Options
A. Futures Prices						
Average	1.45	2.18	1.45	2.52	2.18	2.52
Observations	74	147	74	130	147	130
t-statistic ¹	** -4.90		** -7.41		** -3.74	
B. Futures Price Charts						
Average	0.95	1.16	0.95	1.80	1.16	1.80
t-statistic	-1.47		** -5.68		** -5.63	
C. Expert Price Forecasts						
Average	1.62	1.52	1.62	1.76	1.52	1.76
t-statistic	0.91		-1.18		** -2.58	
D. Strategy Recommendations						
Average	0.72	0.92	0.72	1.45	0.92	1.45
t-statistic	-1.57		** -5.48		** -5.01	
E. Supply-Demand Fundamentals						
Average	1.62	1.89	1.62	2.12	1.89	2.12
t-statistic	* -1.94		** -3.58		** -2.29	
F. Cash-Forward Contract \$						
Average	1.51	2.12	1.51	2.03	2.12	2.03
t-statistic	** -4.01		** -3.33		0.85	
G. Other Farmer's Opinions						
Average	0.86	0.77	0.86	0.75	0.77	0.75
t-statistic	0.89		1.07		0.28	

1. * and ** indicate statistical significance at 0.10 and 0.05 levels, respectively.

2. Range of responses: 0 = Do not use, 1 = Low preference, 2 = Medium preference, and 3 = High preference

C. Expert Price Forecasts: Cash marketers' preferences for expert price forecasts did not differ from those of either forward contract or futures/option-oriented marketers (Table 3). However, futures/options-oriented marketers had higher preferences for expert forecasts than forward contract-oriented marketers.

D. Marketing Strategy Recommendations: Cash and forward contract-oriented marketers had a very low preference for marketing strategy recommendations. Cash marketers' low preferences for expert price forecast information did not differ from those of forward contract-oriented marketers (Table 3). While futures/option-oriented marketers had higher preferences for marketing strategy information than either cash or forward contract-oriented marketers, they were still relatively low (1.45 on a 0 to 3.00 scale).

E. Supply-Demand Fundamentals: Cash marketers had lower preferences for information on supply-demand fundamentals than either forward contract or futures/option-oriented sellers (Table 3). Forward contract-oriented sellers also had a lower preference for information on grain supply-demand fundamentals than futures/options oriented-marketers. Taken together, these findings show that futures/options-oriented marketers had the highest preference for information on supply-demand fundamentals.

F. Cash and Forward Contract Prices: Even though cash and forward contract price information was one of the more highly preferred types of marketing information for cash marketers, this group still had lower preferences for than either forward contract or futures/option-oriented sellers (Table 3). Forward contract and futures/option-oriented sellers did not differ in their preferences for local cash and forward contract price information. For forward contract and futures/options-oriented marketers, cash and forward contract prices were the second most preferred type of marketing information (behind futures prices).

G. Other Farmer's Opinions: Cash marketers, forward contract-oriented marketers, and futures/options-oriented marketers each had a very low preference for the opinions of other farmers as a source of marketing information. No differences existed among cash, forward contract, and futures/options-oriented marketers in their preferences for taking into account the opinions of other farmers in making their marketing decisions (Table 3).

Differences in Grain Marketing Management Practices

Differences also exist among alternative types of grain marketers with regard to their grain marketing and management practices (Table 4). These differences provide more support for the use of alternative types of grain price benchmarks for different types of grain sellers.

A. Commercial Grain Storage: No significant differences were reported among these groups of grain marketers in terms commercial storage use. However, it is somewhat surprising that such a high proportion of the grain marketed across all survey respondents was as high as 38% of all grain produced (Table 1). Although the average of all production that was stored in commercial facilities was surprisingly high, the standard deviation (i.e., 38%) is also very high. This indicates that considerable variability exists among survey respondents regarding the use of postharvest commercial storage.

B. On-Farm Grain Storage: Differences did exist between cash, forward contract, and futures/option-oriented grain marketers with regard to their use of postharvest on-farm storage (Table 4). Futures/options-oriented marketers placed less of their grain in on-farm storage (20%) than either cash marketers (33%) or forward contract-oriented grain marketers (39%).

C. Total Grain Storage: Total use of both commercial and on-farm grain storage follows from the results for on-farm storage, in that futures/options-oriented grain marketers use less grain storage from all sources than do either cash or forward contract-oriented grain marketers.

D. Crop Insurance Use: Cash grain marketers used less crop insurance (65%) in the form of either multiple peril crop insurance (MPCI) or crop revenue coverage (CRC) than did either forward contract (81%) or futures/options-oriented grain marketers (81%) (Table 4). These results indicate that there was no difference between forward contract and futures/options-oriented marketers in regards to using crop insurance.

E. The Impact of Crop Insurance Use on Preharvest Forward Pricing Decisions: Crop insurance use had less effect upon the willingness of cash marketers to utilize preharvest forward pricing in combination with crop insurance purchases in their grain marketing strategies than for either forward contract or futures/options-oriented marketers (14%). No statistically significant differences existed between forward contract-oriented marketers (27%) and futures/option-oriented marketers (24%) in this respect.

Table 4. Marketing & Management Practices by Alternative Types of Grain Marketers ¹

	Cash vs. Forward Contract Marketings		Cash vs. Futures + Options Marketings		Forward Contract vs. Futures + Options	
	Cash	Forward Contract	Cash	Futures + Options	Forward Contract	Futures + Options
A. Off-Farm (Commercial) Grain Storage % ²						
Average	0.44	0.35	0.44	0.37	0.35	0.37
Observations	74	147	74	130	147	130
t-statistic ¹	1.48		1.11		-0.35	
B. On-Farm Storage % ²						
Average	0.33	0.39	0.33	0.20	0.39	0.20
t-statistic	-1.12		**2.40		**4.84	
C. Total Combined On+Off Farm Grain Storage % ²						
Average	0.77	0.74	0.77	0.57	0.74	0.57
t-statistic	0.46		**3.34		**3.39	
D. Crop Insurance Use ³						
Average	0.65	0.81	0.65	0.81	0.81	0.81
t-statistic	** -2.49		** -2.42		0.04	
E. Willingness to Forward Price in combination with Crop Insurance Use ³						
Average	0.14	0.27	0.14	0.24	0.27	0.24
t-statistic	** -2.40		** -1.88		0.51	

1. * and ** indicate statistical significance at 0.10 and 0.05 levels, respectively.

2. Range of responses: 0 = Do not use, 1 = Low preference, 2 = Medium preference, and 3 = High preference

3. Range of responses: 0 = Do not use, 1 = Do use

Relevance Of These Results to the Selection of Grain Price Benchmarks

These survey results indicate that distinctly different types of marketing practices are used by some grain producer/marketers. Furthermore, differences exist among these different types of grain marketers with regard to the marketing information and marketing management practices that they use. The following discussion will focus on what general types of price benchmarks would be most relevant to these different types of grain marketers.

A. Cash Grain Marketers

Cash marketers' focus on marketing information appears to be at least as great if not more on supply-demand fundamentals, expert price forecasts, and cash-forward contract prices than on futures prices or

marketing strategy recommendations. In comparison to forward contract-oriented marketers, cash marketers have lower preferences for information on futures prices, supply-demand fundamentals, and cash-forward contract bids. In comparison to futures/options-oriented marketers, cash marketers have lower preferences for information on futures prices, futures price charts, strategy recommendations, supply-demand fundamentals, and local cash-forward contract prices.

Cash marketers also make greater use of postharvest on-farm storage than futures/options marketers. They also make lower use of crop insurance and are less likely to forward price grain in conjunction with crop insurance usage in comparison to futures/options-oriented marketers.

Recommended Benchmarks for Cash Marketers: Given these results, cash grain marketers may be best served by focusing on simple cash market-oriented price benchmarks such as harvest price and the production weighted average harvest-postharvest selling price calculated by USDA. The marketing practices of this group are inconsistent with the use of price benchmarks that place heavier emphasis upon preharvest pricing opportunities (such as a 2 year or 24 month preharvest-harvest-postharvest price benchmark) or maximum/minimum selling price opportunities that include those available during the preharvest period. Conversely, postharvest storage-oriented strategies are relevant to this group, supporting the need for representation of postharvest pricing opportunities in benchmark selection. However, the use on on-farm as opposed to commercial storage on the part of cash marketers is at odds with the predominant use of commercial storage costs in price benchmark calculations.

B. Forward Contract-Oriented Marketers

Forward contract-oriented marketers' focus on marketing information appears to be primarily on futures prices, cash-forward contract prices, and supply-demand fundamentals. In comparison to cash marketers, forward contract-oriented marketers have higher preferences for information on futures prices, cash-forward contract bids, and supply-demand fundamentals. In comparison to futures/options-oriented marketers, forward contract-oriented marketers have lower preferences for information on futures prices, futures price charts, expert price forecasts, strategy recommendations, and supply-demand fundamentals.

Forward contract-oriented marketers also make greater use of postharvest on-farm storage than futures/options marketers. They also make greater use of crop insurance and are more likely to forward price grain in conjunction with crop insurance usage in comparison to cash marketers.

Recommended Benchmarks for Forward Contract-Oriented Marketers: Forward contract-oriented marketers are in an intermediate position relative to cash grain and futures/options-oriented marketers with regard to their use of futures-related marketing information and strategies. Consequently, this group would benefit from a "portfolio" or composite of both more basic harvest and postharvest oriented benchmarks (also relevant to cash marketers) as well as price benchmarks that include futures and forward contract based pricing opportunities available throughout the entire preharvest, harvest, and postharvest periods (also relevant to futures/options-oriented marketers).

Greater use of postharvest on-farm grain storage by forward contract-oriented marketers relative to futures/options-oriented marketers supports the need for price benchmarks that account postharvest returns to storage. Greater use of crop insurance and preharvest forward pricing in conjunction with crop insurance relative to cash marketers also indicates that they would benefit from price benchmarks that include pricing opportunities available throughout the preharvest period (i.e., the 12-24 month average price and maximum/minimum selling opportunities benchmarks).

C. Futures/Options-Oriented Marketers

Futures/Options-oriented marketers' focus on marketing information appears to be primarily on futures prices, cash-forward contract prices, and supply-demand fundamentals. In comparison to cash marketers, forward contract-oriented marketers have higher preferences for information on futures prices, futures price charts, strategy recommendations, supply-demand fundamentals, and cash-forward contract bids. In comparison to forward contract-oriented marketers, futures/options-oriented marketers have higher preferences for information on futures prices, futures price charts, expert price forecasts, strategy recommendations, and supply-demand fundamentals.

Futures/Options-oriented marketers also make less use of postharvest on-farm storage than either cash marketers or forward contract-oriented marketers, although they use the same amount of commercial storage as other types of marketers. They also made greater use of crop insurance and are more likely to forward price grain in conjunction with crop insurance usage in comparison to cash marketers.

Recommended Benchmarks for Futures/Options-Oriented Marketers: Futures/options-oriented marketers will benefit from price benchmarks that account for preharvest hedging or forward contracting as well as maximum/minimum available pricing opportunities. Although they will not benefit as much from price benchmarks that are heavily weighted toward postharvest sales as other types of grain marketers, they still are involved in postharvest storage activities (Table 4). Therefore, the 12-24 month average price benchmarks which account for preharvest-harvest-postharvest pricing opportunities are likely more relevant to this group than to cash marketers who are not as inclined to carryout preharvest forward pricing activities.

Part IV. Properties of Kansas Grain Price Benchmarks

A number of grain price benchmarks for Kansas commodities are presented in the following tables and figures. Crop reporting district level cash prices are used in this analysis. The choice of crop reporting district for each Kansas crop was based on recent crop production figures, with the top rated district in terms of total bushels selected. These benchmark price series represent various combinations of preharvest hedges, harvest sales, and postharvest cash sales net of storage costs. Prices for all harvest and postharvest cash sales were assumed to be the higher of either the USDA commodity loan rate (with adjustment for interest expense) or the cash price.

Prices are examined for the period approximating the 1988/89 through 2000/01 marketing years. The only instance in which price data was not available involved soybean loan rates, which were not available for the 1988, 1989, and 1990 U.S. soybean crops.

Both commercial and on-farm grain storage enterprises are considered. Commercial storage is assumed to have two components: a \$0.05 per bushel "up front" or fixed cost, with an additional \$0.03 per bushel charge per month of storage. On-farm storage is also assumed to have two components: a \$0.097 per bushel "up front" or fixed cost, with an additional \$0.003 per bushel charge per month of storage. An annual interest charge of 7.50% is also figured for both commercial and on-farm postharvest storage, based on the harvest time sales price (or loan rate, whichever is higher).

In these tables, average benchmark prices and the standard deviation of the benchmark over time (a measure of annual variability) are presented. The distributional properties of these benchmark prices are also presented in terms of minimum-maximum prices and their associated percentiles in between. Finally, the skewness of these price benchmarks is presented, indicating to what degree a small number of relatively high (positive skewness) or relatively low (negative skewness) prices exist. If prices are highly skewed, then average prices may be unduly influenced by a small number of outlier observations. In such cases, it may be preferable to rely on the 50% median or “middle” price for comparison purposes.

The following figures show the monthly average price observations that were used to calculate the overall average prices for these benchmarks. They show the monthly pricing opportunities that occurred during the preharvest, harvest, and postharvest periods.

A. Corn Price Benchmarks: Southwest Kansas corn price benchmark statistics for the 1988/89 through 2000/01 period are presented in Table 5. Figure 1 shows the monthly average preharvest, harvest, and postharvest pricing opportunities that, taken together, comprise these separate corn price benchmarks.

B. Grain Sorghum Price Benchmarks: North central Kansas grain sorghum price benchmark statistics for the 1988/89 through 2000/01 period are presented in Table 6. Figure 2 shows the monthly average preharvest, harvest, and postharvest pricing opportunities that, taken together, comprise these separate grain sorghum price benchmarks.

C. Soybean Price Benchmarks: Northeast Kansas soybean price benchmark statistics for the 1988/89 through 2000/01 period are presented in Table 7. Figure 3 shows the monthly average preharvest, harvest, and postharvest pricing opportunities that, taken together, comprise these separate soybean price benchmarks.

D. Wheat Price Benchmarks: South central Kansas wheat price benchmark statistics for the 1988/89 through 2000/01 period are presented in Table 8. Figure 4 shows the monthly average preharvest, harvest, and postharvest pricing opportunities that, taken together, comprise these separate wheat price benchmarks.

General Observations: A number of general observations can be made in comparing these alternative grain price benchmarks across these four Kansas commodities.

Observation #1: Harvest cash sales prices WERE affected by government loan-oriented price floors across all commodities. The loan rate price benchmark effectively truncated low end price outcomes. This is most clearly seen in the truncation of the lower end of the price percentiles and in the lower standard deviation of the cash price relative to other price benchmarks.

Observation #2: The use of on-farm as opposed to commercial storage has a marked impact upon the profitability of longer-term grain storage. This is most clearly seen in the later months of the strategies that incorporate 10 months of postharvest storage.

Observation #3: Net returns from longer term grain storage do not seem to differ appreciably from shorter term grain storage, especially in the case of on-farm storage. Some minor differences do occur in regards to shorter term versus longer term commercial storage. Generally, returns to shorter term commercial storage are higher.

Observation #4: The average prices for longer term (12-23 month) preharvest-harvest-postharvest price benchmarks are essentially equal to or slightly higher than harvest prices with a loan rate floor. Evidence of the impact of preharvest pricing upon these average benchmark prices is found in Figures 1 – 4. Monthly returns from preharvest pricing strategies for corn, grain sorghum, and soybeans appear to at least as great if not greater than harvest and postharvest sales. However, this is not true for wheat.

Part V. Conclusions

In the first part of this paper, alternative grain market price performance benchmarks were identified and critiqued. Then an analysis of marketing survey data was presented illustrating the diversity of grain marketers with respect to their grain marketing practices, the information they use to make marketing decisions with, and which types of price benchmarks are appropriate to meet their varying needs. Recommendations were given regarding which price benchmarks, either alone or in combination with others, should be used in market price performance studies for different types of grain marketers. Finally, a statistical analysis of alternative grain market price performance benchmarks for corn, grain sorghum, soybeans, and hard red winter wheat was presented.

This paper is a work in progress. More information than has been presented here has been developed regarding ex-post and ex-ante price distributions as “benchmarks”, and how pricing opportunities in any one year compare to these benchmark distributions of pricing opportunities over time.

Table 5. Corn Price Benchmarks for Southwest Kansas (1988 Through 2000 Crop Years)

Corn Price Benchmarks	Average Price	Percentiles							Standard Deviation	Skewness
		Minimum Price	Low 10%	Low 25%	Middle 50%	High 75%	High 90%	Maximum Price		
A. Harvest \$ (Loan Floor)	\$2.44	\$2.08	\$2.09	\$2.16	\$2.34	\$2.74	\$2.95	\$3.13	\$0.37	0.804
B. Marketing Loan	1.97	1.73	1.79	1.89	2.08	2.08	2.08	2.08	0.13	-0.667
C. Harvest + Postharvest Sales (10 mo.) (Farm Storage)	2.39	1.87	1.93	2.10	2.27	2.52	2.83	4.75	0.53	2.541
D. Harvest + Postharvest Sales (6 mo.) (Farm Storage)	2.39	1.90	1.95	2.10	2.27	2.55	2.82	4.75	0.47	2.327
E. Harvest + Postharvest Sales (10 mo.) (Commercial Storage)	2.30	1.64	1.83	1.99	2.16	2.43	2.78	4.60	0.54	2.279
F. Harvest + Postharvest Sales (6 mo.) (Commercial Storage)	2.34	1.84	1.94	2.08	2.21	2.55	2.81	3.74	0.40	1.326
G. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Farm Storage)	2.45	1.84	1.97	2.19	2.39	2.59	2.85	4.75	0.46	2.158
H. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Farm Storage)	2.46	1.84	2.02	2.16	2.39	2.61	2.88	3.83	0.40	1.389
I. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Com. Storage)	2.41	1.64	1.92	2.13	2.35	2.58	2.85	4.60	0.47	1.76
J. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Com. Storage)	2.44	1.84	2.00	2.16	2.38	2.61	2.88	3.83	0.41	1.328

Figure 1. Corn Price Benchmarks for Southwest Kansas
 Monthly Performance for the 1988 – 2000 Crop Marketing Periods

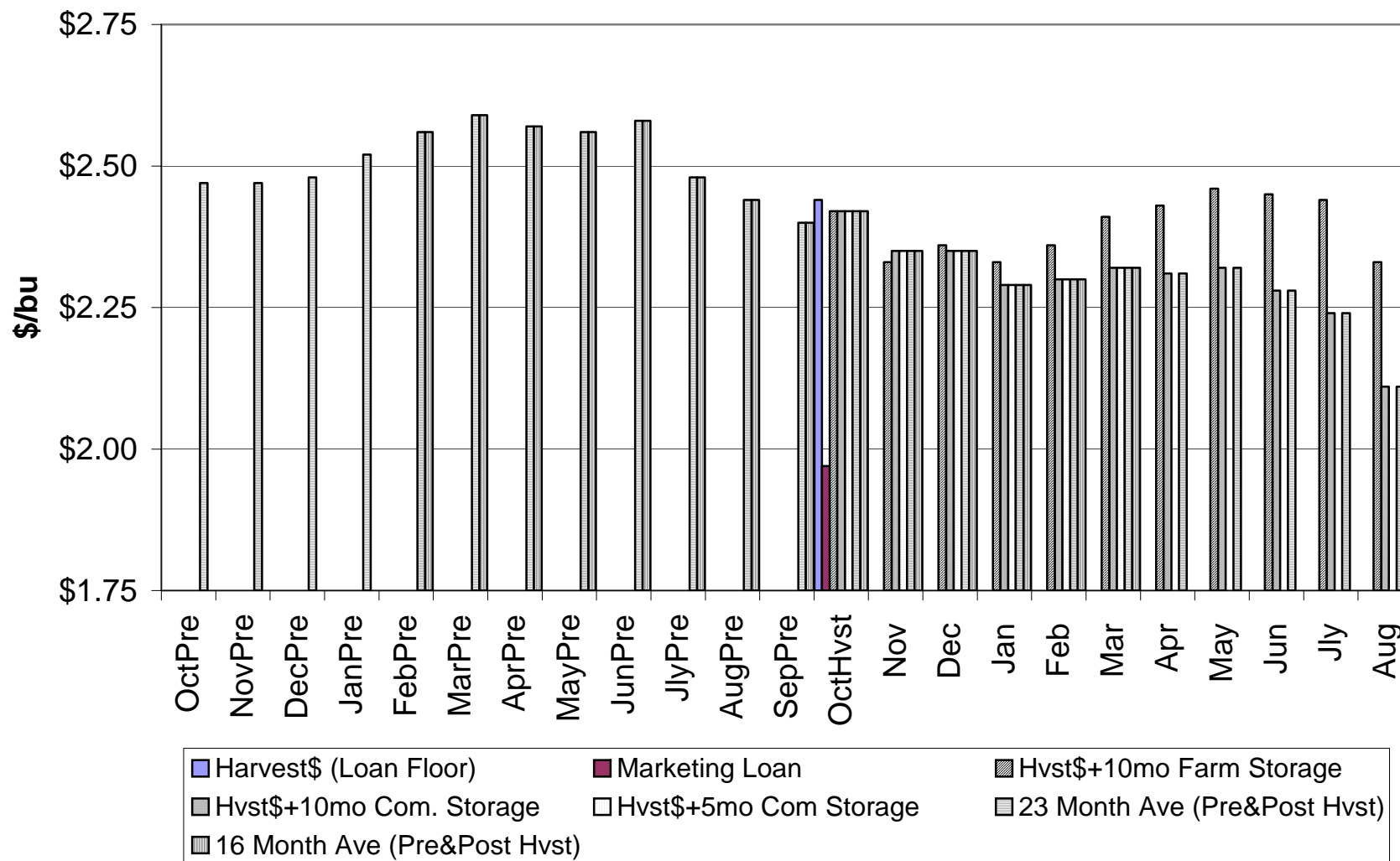


Table 6. Grain Sorghum Price Benchmarks for North Central Kansas (1988 Through 2000 Crop Years)

Grain Sorghum Price Benchmarks	Average Price	Percentiles							Standard Deviation	Skewness
		Minimum Price	Low 10%	Low 25%	Middle 50%	High 75%	High 90%	Maximum Price		
A. Harvest \$ (Loan Floor)	\$2.03	\$1.75	\$1.76	\$1.78	\$1.93	\$2.22	\$2.25	\$2.73	\$0.29	0.804
B. Marketing Loan	1.72	1.52	1.58	1.67	1.76	1.80	1.84	1.85	0.11	-0.563
C. Harvest + Postharvest Sales (10 mo.) (Farm Storage)	1.97	1.27	1.60	1.66	1.88	2.04	2.29	4.01	0.47	2.496
D. Harvest + Postharvest Sales (6 mo.) (Farm Storage)	1.97	1.27	1.63	1.69	1.91	2.08	2.29	3.45	0.38	1.775
E. Harvest + Postharvest Sales (10 mo.) (Commercial Storage)	1.88	1.27	1.44	1.61	1.77	1.99	2.22	3.87	0.47	2.212
F. Harvest + Postharvest Sales (6 mo.) (Commercial Storage)	1.94	1.27	1.58	1.69	1.88	2.06	2.26	3.36	0.38	1.703
G. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Farm Storage)	2.01	1.27	1.60	1.78	1.98	2.18	2.31	4.01	0.39	1.851
H. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Farm Storage)	2.02	1.27	1.61	1.78	1.99	2.19	2.36	4.01	0.39	1.650
I. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Com. Storage)	1.97	1.27	1.50	1.69	1.94	2.17	2.30	3.87	0.40	1.424
J. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Com. Storage)	1.99	1.27	1.54	1.75	1.95	2.18	2.36	3.87	0.39	1.435

Figure 2. Grain Sorghum Price Benchmarks for North Central Kansas
 Monthly Performance for the 1988 – 2000 Crop Marketing Periods

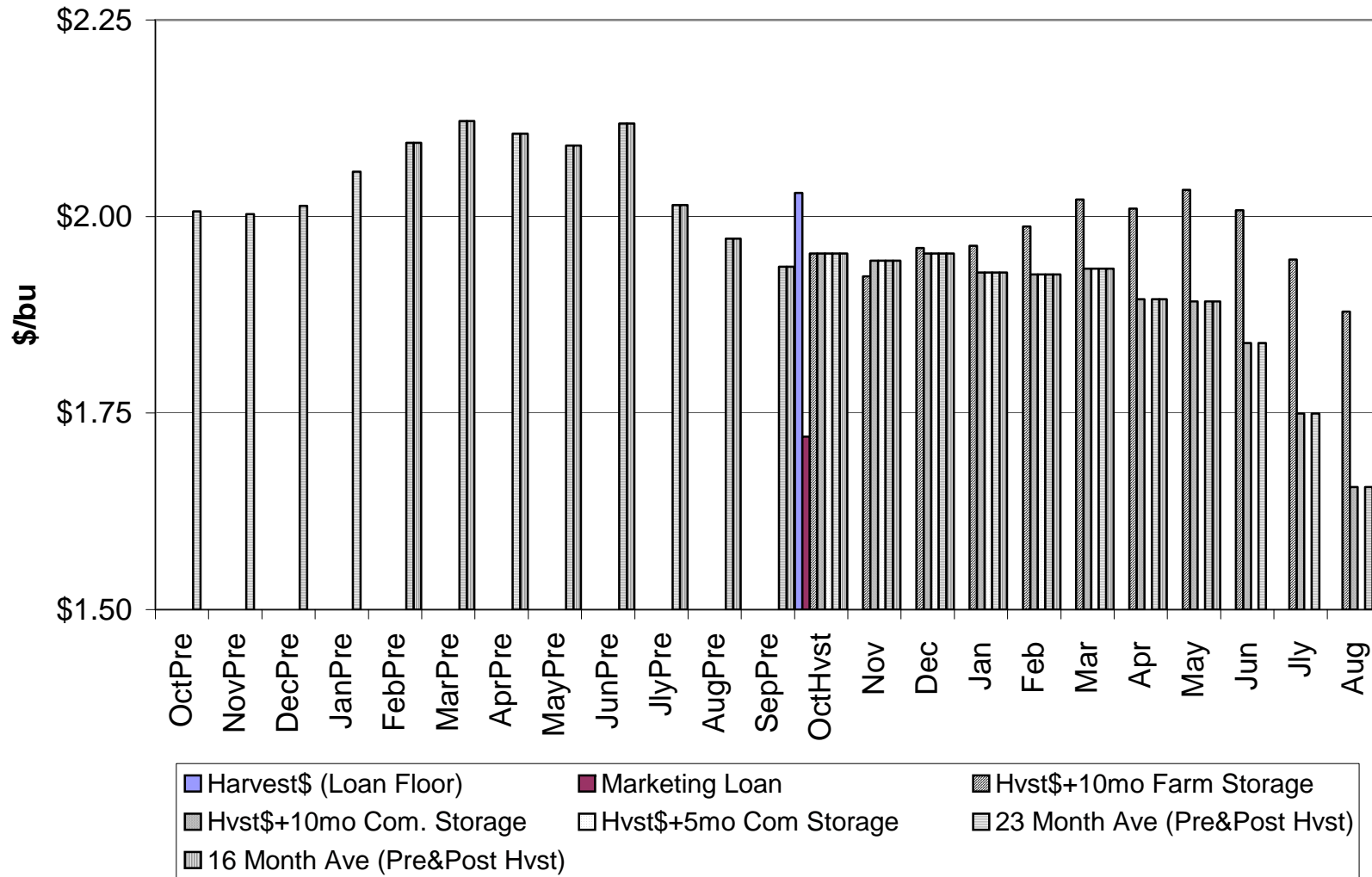


Table 7. Soybean Price Benchmarks for Northeast Kansas (1988 Through 2000 Crop Years)

Soybean Price Benchmarks	Average Price	Percentiles							Standard Deviation	Skewness
		Minimum Price	Low 10%	Low 25%	Middle 50%	High 75%	High 90%	Maximum Price		
A. Harvest \$ (Loan Floor)	\$5.83	\$5.16	\$5.17	\$5.21	\$5.45	\$6.36	\$6.82	\$7.63	\$0.79	1.167
B. Marketing Loan	3.82	0.00	0.00	4.82	4.82	5.16	5.17	5.18	NA	- 1.432
C. Harvest + Postharvest Sales (10 mo.) (Farm Storage)	5.80	4.39	4.92	5.13	5.50	6.45	7.12	8.09	0.86	0.826
D. Harvest + Postharvest Sales (6 mo.) (Farm Storage)	5.79	4.39	4.99	5.14	5.36	6.52	6.94	7.83	0.84	0.661
E. Harvest + Postharvest Sales (10 mo.) (Commercial Storage)	5.70	4.39	4.80	5.06	5.40	6.40	7.02	7.98	0.87	0.797
F. Harvest + Postharvest Sales (6 mo.) (Commercial Storage)	5.76	4.39	4.94	5.13	5.34	6.47	6.90	7.75	0.84	0.650
G. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Farm Storage)	5.88	3.93	4.91	5.28	5.77	6.38	7.03	9.03	0.85	0.685
H. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Farm Storage)	5.90	3.93	4.95	5.27	5.79	6.46	7.15	9.03	0.91	0.687
I. Preharvest Hedges (12 mo.) + Postharvest Sales (10 mo.) (Com. Storage)	5.84	3.93	4.83	5.24	5.76	6.35	6.97	9.03	0.86	0.651
J. Preharvest Hedges (9 mo.) + Postharvest Sales (6 mo.) (Com. Storage)	5.88	3.93	4.87	5.24	5.79	6.45	7.13	9.03	0.91	0.680

Figure 3. Soybean Price Benchmarks for Northeast Kansas
 Monthly Performance for the 1988 – 2000 Crop Marketing Periods

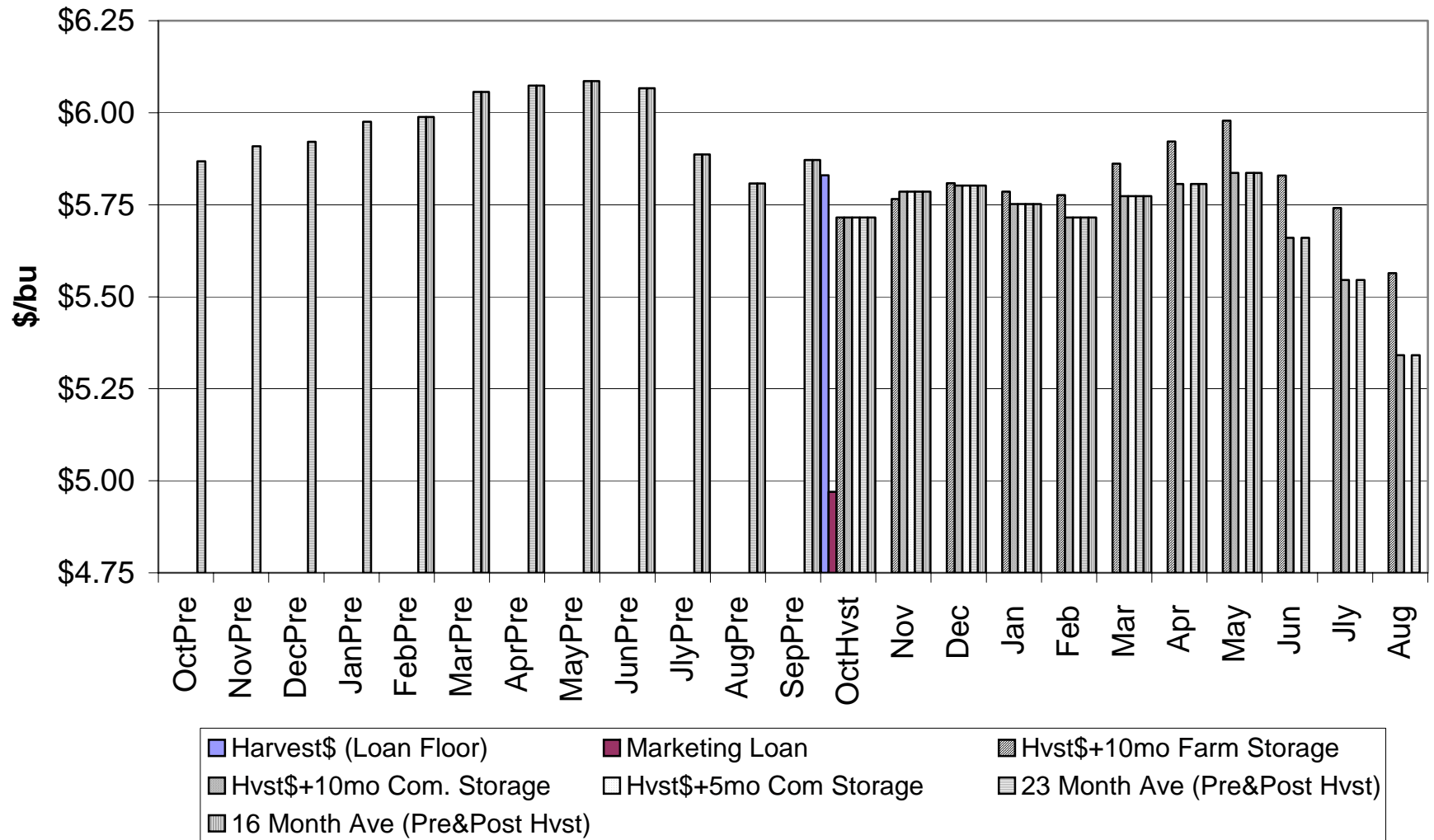


Table 8. Wheat Price Benchmarks for South Central Kansas (1988 Through 2000 Crop Years)

Wheat Price Benchmarks	Average Price	Percentiles							Standard Deviation	Skewness
		Minimum Price	Low 10%	Low 25%	Middle 50%	High 75%	High 90%	Maximum Price		
A. Harvest \$ (Loan Floor)	\$3.23	\$2.52	\$2.55	\$2.57	\$3.10	\$3.33	\$4.11	\$5.29	\$0.84	1.612
B. Marketing Loan	2.38	1.94	2.04	2.20	2.57	2.57	2.57	2.57	0.25	-0.712
C. Harvest + Postharvest Sales (10 mo.) (Farm Storage)	3.21	2.12	2.36	2.61	3.15	3.61	4.13	6.16	0.77	1.081
D. Harvest + Postharvest Sales (6 mo.) (Farm Storage)	3.21	2.12	2.42	2.61	2.18	3.60	4.16	5.29	0.72	0.720
E. Harvest + Postharvest Sales (10 mo.) (Commercial Storage)	3.12	2.01	2.24	2.51	3.08	3.53	4.08	5.94	0.77	1.017
F. Harvest + Postharvest Sales (6 mo.) (Commercial Storage)	3.17	2.01	2.39	2.59	3.10	3.54	4.16	5.29	0.71	0.737
G. Preharvest Hedges (10 mo.) + Postharvest Sales (10 mo.) (Farm Storage)	3.17	2.12	2.39	2.64	3.09	3.53	3.96	6.16	0.70	1.293
H. Preharvest Hedges (5 mo.) + Postharvest Sales (6 mo.) (Farm Storage)	3.20	2.12	2.44	2.61	3.12	3.59	4.15	5.93	0.72	1.098
I. Preharvest Hedges (10 mo.) + Postharvest Sales (10 mo.) (Com. Storage)	3.12	2.01	2.38	2.60	3.06	3.48	3.91	5.94	0.70	1.212
J. Preharvest Hedges (5 mo.) + Postharvest Sales (6 mo.) (Com. Storage)	3.17	2.01	2.42	2.60	3.09	3.53	4.13	5.93	0.72	1.112

Figure 4. Wheat Price Benchmarks for South Central Kansas
 Monthly Performance for the 1988 – 2000 Crop Marketing Periods

