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STORING WHEAT TO INCREASE NET RETURN

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Storing harvested wheat increases a producers marketing alternatives. But, storing wheat can increase the risk of losses while offering the opportunity for increased returns. Because prices change rapidly, the opportunity to get a higher price for stored wheat is normally short lived and sometimes nonexistent.

Producers should not ignore potential losses due to storing wheat one or two months too long. For example, in 1976, the price of wheat droped 47 cents per bushel between July and August. The price continued to decline from $3.40 to $2.34 between July and December 1976. The total loss would have been $1.36 per bushel in six months. Potential loss due to price decline was $1.06 per bushel. Storage and interest cost (carry charges) added another $0.30 per bushel loss. The highest increased net return from storing wheat was $1.04 in 1974.

Producers consistently search for methods to increase returns. Since 1970, per acre wheat yields in Oklahoma have increased about 38 percent. Producers are also improving net returns through marketing. Marketing involves more than price outlook and hedging. Outlook and hedging are part of marketing. But, net returns may be increased by using other marketing techniques. These techniques include selling wheat on forward contracts, price later contracts, deffered contracts, and other marketing alternatives offered by local elevators. These marketing techniques are presented in a forthcoming OSU Fact Sheet.

In this paper, historical wheat prices and carrying charges (interest and storage) are used to determine the net return from storing and selling wheat for the highest average monthly price. The analysis concentrates on the MAXIMUM return from storing wheat. Thus, the results are biased for storage.

Analysis

Each producer's storage and interest costs will be different. Most producers store wheat in commerical storage, and commercial storage costs vary by location. If on-farm storage facilities are in place, storage costs included in the analysis will probably be less than commercial storage costs. In-place, on-farm storage facilities may have lower costs because only variable costs are included. Fixed costs for in-place, on-farm storage facilities must be paid whether grain is stored or not and is not normally included in the storage decision. Analyses show that farms without existing farm storage minimize costs by using commercial storage rather than building on-farm storage (OSU Fact Sheet 157, "On-Farm Versus Commercial Storage Cost").

Market Price compared to Net Price

Around the coffee table or at producer gatherings, wheat prices are often discussed. The producer that received the highest price normally has bragging rights. However, that producer may not have received the highest net price. There are costs associated with holding grain past harvest. For example, compare two producers, one sold at harvest for $3.45 and the other sold wheat in September for $3.56. If storage costs were 2.5 cents per bushel per month and interest costs were four cents per bushel per month, the producer that sold at harvest ($3.45) should have bragging rights.

Net price is a concept that producers must understand to do a good job of marketing. All too often we look at that $3.45 price received and covet the $3.56 price received by our neighbor four months later. However, $3.45 is a higher net price than $3.56 received four months later. Point--it's the highest net price that counts, and the highest net price may be the lowest price during the marketing year.

Commercial storage costs are easy to calculate. Interest costs are a little more difficult. For example, if a producer has a 15 percent operating loan that would be paid from wheat income, the per month interest can be calculated by dividing 15 percent by 12 months

(15 divide 12 = 1.25 percent per month). A producer with no operating loan should use the rate that could be earned in an interest earning account. For example, if the money market interest rate is 10 percent, ten would be divided by 12 to determine the monthly interest rate (10 divide 12 = 0.83). The point is that there is no set interest rate to use.

The per month interest cost can be calculated by multiplying the harvest price times the calculated per month interest costs. If the harvest price of wheat is $3.35 and the annual interest rate is 15 percent, the per month interest cost is about four cents per bushel ($3.35 times .0125 = $0.04). Carrying cost per month is calculated by adding the storage and interest costs. In this example, carrying cost is 6.5 cents per bushel per month (2.5 cents per month for storage plus 4 cents per month for interest). Table 1 shows the price required to cover carrying costs based on a harvest price of $3.35 (June 1984 average price).

Table 1
Price Required to Cover Carrying Costs

Month	Price
June	$3.35
July	$3.42
August	$3.48
September	$3.55
October	$3.61
November	$3.68
December	$3.74
January	$3.81
February	$3.87
March	$3.94
April	$4.00
May	$4.07

Based on $3.35 average harvest price and $0.065 per month carrying charge.

Table 1 indicates that producers who sold wheat for $3.35 at harvest received a higher net price than producers who sold wheat for anything less than $3.55 in September. To have a higher net price than $3.35, the January price has to be higher than $3.81 per bushel. Even a $4.00 wheat price in April will not cover carrying costs. Four dollar wheat in April will not net a producer more than $3.35 wheat at harvest.

Historical Storage Return

Oklahoma monthly average wheat prices are presented in Table 2. The marketing year is shown in the extreme left hand column. The June average price is shown in the next column. June was used because Oklahoma's wheat harvest month is June, and June is the first month of the wheat marketing year. Using this table, producers may review historical prices. The seasonal high price during each marketing year is placed in a box. For example in the 1983-84 marketing year, the highest monthly average price was in September. The September 1984 monthly average price of wheat was $3.52 per bushel.

The highest monthly average net price is marked with an asterisk. The net price was calculated by subtracting per month storage and interest costs from the price. Actual commercial storage rates were used for storage costs. Interest rates were derived from operating loan interest for each year. For example, the highest monthly average price for wheat in the 1982-83 marketing year was in March ($3.69). But, the highest net price occurred in June ($3.47). In 1982-83 the carrying costs (storage plus interest) was about seven cents per bushel per month. Cost to hold the wheat from June to March was about $0.45. Thus, the effective March price was $3.24, $0.23 less than the June price. The maximum price was also the highest net price in four out of ten years. Three out of ten, the highest net price occured at harvest. But in 1983-84, producers were only one cent per bushel better off by not selling at harvest compared to selling in September. Thus, it could be said that producers would have been better off selling at harvest in four out the last ten years. And, in only three years was the highest price the best price.

Table 3 shows the average June price and the highest average monthly price during the wheat marketing year. Some liberty was taken which will bias the results favoring the storage decision. If the price only increased a few cents, the earliest price was used. For example, in the 1978-79 marketing year the November price was $3.14, but the highest average price was $3.26 in May. The November price was used because it would cost about $0.30 to carry the wheat until the following May resulting in a net loss of $0.16 per bushel.

When reviewing the following tables, producers should realize that the returns represent maximum returns. And, the odds are small that a producer could sell at the top of the market each year. Also, note the penalties for missing the high month. In the 1974-75 marketing year, producers had one month to take advantage of the $0.66 per bushel increase. Again in 1976-77, how many producers would have sold wheat out of storage in July. But, it would cost $0.47 per bushel to hold into August plus carrying costs. And the price continued to decline. Producers that stored wheat in 1976 probably lost money.

Table 3 shows how with 20-20 hindsight producers could have received a higher wheat price compared to the June price. Note that four out of the last six years the highest price was in November, and only two out of the last ten years has the maximum price occured after November. Both times the maximum price occured late in the marketing year. In the 1977-78

Table 2
Average Monthly Wheat Prices, June 1974 Through May 1984

Marketing Year	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
74-75	3.48	4.07	4.03	4.03	4.69*	4.55	4.60	4.00	3.76	3.41	3.41	3.11
75-76	2.87	3.39	3.73	3.85*	3.78	3.39	3.22	3.36	3.63	3.58	3.43	3.29
76-77	3.36*	3.40	2.93	2.84	2.52	2.38	2.34	2.43	2.45	2.33	2.23	2.05
77-78	1.99	2.06	2.05	2.19	2.32	2.52	2.54	2.55	2.59	2.71	2.87*	2.87
78-79	2.86	2.84	2.90	2.97	3.12*	3.14	3.10	3.10	3.15	3.16	3.17	3.26
79-80	3.85	3.98*	3.95	4.07	4.13	4.15	4.12	3.98	3.88	3.62	3.39	3.63
80-81	3.57	3.77	3.86	4.03	4.22	4.44*	4.16	4.23	4.03	3.94	3.99	3.82
81-82	3.82*	3.76	3.83	3.83	3.77	4.00	3.92	3.91	3.84	3.77	3.84	3.76
82-83	3.47*	3.39	3.33	3.37	3.40	3.43	3.49	3.54	3.54	3.69	3.60	3.44
83-84	3.27	3.24	3.39	3.52*	3.42	3.40	3.42	3.44	3.33	3.42	3.53	3.47
84-85	3.35	3.30	3.35	3.45	3.47	3.42						

Source: Agricultural Prices, ERS, USDA, Washington, D.C.

Table 3
OKLAHOMA AVERAGE JUNE AND MARKETING
YEAR HIGH PRICES: 1974-84

MARKETING YEAR	JUNE PRICE	SEASONAL HIGH PRICE	HIGH MONTH	PRICE CHANGE	MONTHLY AVG. CHANGE
74-75	$3.48	$4.69	OCTOBER (4)	$1.21	$0.30
75-76	$2.87	$3.85	SEPTEMBER (3)	$0.98	$0.33
76-77	$3.36	$3.40	JULY (1)	$0.04	$0.04
77-78	$1.99	$2.87	APRIL (10)	$0.88	$0.09
78-79	$2.86	$3.14	NOVEMBER (5)	$0.28	$0.06
79-80	$3.85	$4.15	NOVEMBER (5)	$0.30	$0.06
80-81	$3.57	$4.44	NOVEMBER (5)	$0.87	$0.17
81-82	$3.82	$4.00	NOVEMBER (5)	$0.18	$0.04
82-83	$3.47	$3.69	MARCH (9)	$0.22	$0.02
83-84	$3.27	$3.52	SEPTEMBER (3)	$0.25	$0.08

The number of months wheat is stored is in parenthesis.

TABLE 4
NET RETURN FROM STORING WHEAT

MARKETING YEAR	AVG. MONTHLY PRICE INCREASE	TOTAL STORAGE COST PER MONTH	NET STORAGE RETURN PER MONTH	NUMBER MONTHS STORED	TOTAL STORAGE RETURN
74-75	$0.30	$0.04	$0.26	4	$1.04
75-76	$0.33	$0.04	$0.29	3	$0.87
76-77	$0.04	$0.05	$-.05	1	$-.05
77-78	$0.09	$0.05	$0.05	10	$0.50
78-79	$0.06	$0.06	$0.00	5	$0.00
79-80	$0.03	$0.08	$-.05	5	$-.25
80-81	$0.17	$0.08	$0.09	5	$0.45
81-82	$0.04	$0.07	$-.03	5	$-.15
82-83	$0.02	$0.07	$-.05	6	$-.30
83-84	$0.07	$0.07	$0.00	6	$0.00

marketing year, prices peaked in April and the gain was $0.88 per bushel or $0.09 per month before carrying costs. Table 4 shows that carrying costs were four cents per month. Thus, the net return was $0.50 per bushel. In 1982-83, the gain was $0.22 per bushel for a loss of $0.30 per bushel.

For the last six years, the total return from storage was a $0.25 per bushel loss or a yearly average loss of $0.04 per bushel. The ten-year total return was $2.11 or $0.21 per bushel per year. These values were obtained by adding the Total Storage Return values in Table 4.

These tables indicate that return from storing wheat has been profitable in two out the last eight years and four out of the last ten years. Thus, the majority of the time, storing grain does not increase returns. Maximum gains from storage appear to be relatively large--$1.04 in 1974-75, $0.87 in 1975-76, $0.50 in 1977-78, and $0.45 in 1980-81. But, the risk also appears to be relatively high. In three out of these four years, producers actually had a month or less to sell the wheat. If the wheat was not sold, the majority of the gain was lost.

Storage Length and Costs

If a producer's target was to receive the highest price, wheat would have been stored an average of five months over each of the last ten years. Average storage length was calculated by adding the number of months stored (shown in Table 3 in column High Month) and then dividing by ten. If a producer sold the wheat at the highest net price, the average storage length would have been about three months per year.

Commercial storage costs average about 2.5 cents per bushel per month. On the average, commercial storage costs would have been about 7.5 cents per bushel per year (3 months times 2.5 cents). Using the on-farm costs presented in OSU Fact Sheet 157, the on-farm storage construction and maintenance cost for a farm with 20,000-bushel capacity is about 16 cents per bushel per year. It costs farms with 5,000-bushel capacity about 21 cents per bushel per year. Farms with existing on-farm storage have per-bushel costs of 16 cents per year for 5,000-bushel capacity and 11 cents for 20,000-capacity.

Conclusions

The risk of storing wheat to increase net return are large. Historically, to sell stored wheat at a profit has required that producers recognize the peak price and react quickly. In six out of the last ten years, producers only had one month to sell the stored wheat at a substantial profit. Once that month was passed, only nominal returns were available. And, in two years, substantial losses would have occurred if wheat was not sold during the high month compared to selling at harvest.

Picking the peak price is almost impossible. Producers that store wheat must know the costs of carrying the wheat (storage and interest) and be able to relate carrying cost to a net market price. For some producers, the risk of storing wheat for a higher net return may be perferred to selling at harvest. But, for most producers the risk of storing for higher net return is excessive.

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