



Storage Plus Interest Costs and Marketing Decisions

Kim Anderson
Extension Economist, Marketing

Storage and interest costs, also called carrying costs, are essential parts of grain marketing. At harvest, a manager may accurately predict a price increase, sell wheat at a higher price than at harvest, and still receive a lower net price than if wheat had been sold at the lower harvest price.

For example, the June 20, 1988, central Oklahoma wheat price was \$3.58 per bushel. By November 1, the wheat price had increased to \$3.71, a 13 cents per bushel increase. If a producer had 10,000 bushels of wheat, the wheat could have been sold for an additional \$1,300 on November 1 compared to June 20.

However, in 1988, commercial storage costs were 0.085 cents per bushel per day (85 thousandths), and there are 135 days between June 20 and November 1. For 135 days, storage cost was 11.5 cents per bushel or \$1,150 for 10,000 bushels. After subtracting storage costs from the additional \$1,300 storage return, only \$150 remained (\$1,300 - \$1,150), or 1.5 cents per bushel.

Wheat in storage also has interest costs (Table 1). If 10,000 bushels of wheat were sold on June 20 for \$3.58 per bushel, the \$35,800 may be used to repay loans, purchase a certificate of deposit, or placed in other interest-bearing accounts.

Assume the \$35,800 was used to pay off a loan with an annual interest rate of 12 percent. A 12 percent annual interest rate is equal to .0329 percent per day (12 divided by 365 days). Interest on \$35,800 for 135 days is \$1,590 (\$35,800 x .000329 = \$11.77 per day; \$11.77 x 135 days = \$1,590).

Thus, after storage cost (\$1,150) and interest cost (\$1,590) were subtracted from the \$1,300 storage return, the manager had \$1,400 (14 cents per bushel) less than if the wheat had been sold on June 20 at the lower price of \$3.58. The November 1 price of \$3.71 was equal to a June 20 price of \$3.44 (\$3.71 - \$0.27 carrying costs).

Calculating Storage Cost

If wheat is sold within 30 days or so of harvest (the time period varies), some elevators do not charge for storage. If

Table 1. Calculating Daily Interest Cost per Bushel

Item	(Price in Cents per Bushel)
Wheat Price	358 cents
Daily Interest Rate (.12/365)	x .00033
Daily Interest Costs	.1177 cents
Number Days Stored	x 135
Total interest Costs	15.89 cents

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: <http://osufacts.okstate.edu>

wheat is not sold by the specified date, the storage charge may revert back to the harvest delivery period. The point is to find out exactly what the storage charge and storage time actually are.

Commercial elevators charge for storage by the day. This charge is quoted as thousandths of a cent per bushel per day. During the 1990 Oklahoma wheat harvest, Oklahoma wheat elevators' average charge was 85 thousandths (0.085 cents) per bushel per day. For example, if wheat is stored for 120 days at 85 thousandths, the storage cost would be 10.2 cents per bushel (0.085 cents x 120 days).

On-farm storage costs are difficult to calculate. If the storage has not been constructed, all costs should be used to calculate storage costs. If the storage bins are in place, then the costs to put the wheat in the bin, take it out, haul it to the market, shrinkage, and chemical pesticide costs should be included. Wheat in the bin should include only additional shrinkage and chemical costs.

On-farm storage costs used in the marketing decision vary depending on the location of the wheat. Extension Facts F-210, "Grain Storage Costs in Oklahoma", gives detailed explanation of on-farm storage costs.

Interest Cost

Interest cost is the interest savings from paying off a loan or the interest return the wheat income could earn. In an example given earlier in this fact sheet, wheat income was used to pay off a production loan. The wheat income could also be placed in an interest earning account. The difference between the loan example and an interest earning account would be the interest rate.

In 1990, some wheat producers placed wheat in the government wheat loan program (Table 2). The loan was \$1.95 per bushel. Nine months storage (270 days x .085 = 22.95 cents) had to be paid in advance. Thus, the net loan was \$1.72 (\$1.95 - \$0.23). The government loan annual interest rate was 8.125 percent or 0.022 percent per day.

The wheat price was \$2.90 per bushel. Interest had to be paid on the \$1.95 loan (0.022 percent daily government loan rate) plus commercial interest (0.033 percent daily commercial loan rate) on the \$1.18 (\$2.90 - \$1.72) not received. Note that commercial interest is paid on the difference between the market wheat price and the net loan (\$1.72) rather than the actual loan (\$1.95). Elevators do not charge for storage until

Table 2. Calculating Interest Costs for Government Loan Wheat

Item		
Net Government Loan^a		
Loan Rate	195	cents
Storage (.085x270)	-23	
	<u>172</u>	cents
Government Loan Interest^a		
Government Loan Rate	195	cents
Government Interest Rate (.08125/365)	x 0.00022	
Daily Interest Cost	<u>0.043</u>	cents
Remaining Cash Price Interest Rate^b		
Cash Price minus Net Loan (290-172)	118	cents
Commercial Interest Rate (0.12/365)	x0.00033	
Daily Interest Cost	<u>0.039</u>	cents
Total Interest Cost	<u>0.082</u>	cents

^a Government loan is 195 cents per bushel and the interest rate is 8.125 per year and .022 percent per day.
^b Cash wheat price is 290 cents per bushel, and the commercial loan interest rate is 12 percent per year or .033 percent per day.

the wheat is sold. The government requires that storage for wheat in a government loan be prepaid.

Interest cost for the government loan was .043 cents per day (\$1.95 x 0.022). Interest cost for the value of the wheat not under loan was 0.039 cents per day (\$1.18 x 0.033). Total interest cost was 0.082 cents per day, 2.46 cents per month (.082 x 30 days), or 9.8 cents for 120 days.

How much better off were producers who placed wheat in the government loan than producers who did not? Interest cost for wheat not under the loan was 0.095 cents per bushel per day (0.033 x \$2.90). For 30 days, the interest cost was 2.86 cents per bushel and for 120 days the cost was 11.5 cents. Placing the wheat in the loan saved .4 cents per bushel per month or 1.66 cents per bushel for four months.

Market Decisions and Carrying Costs

Oklahoma wheat market conditions on June 20, 1990, were used to show how producers may use carrying cost in marketing decisions. The central Oklahoma wheat price was \$2.90 per bushel. The Kansas City Board of Trade December wheat contract price was \$3.48, and the KCBT December \$3.40 call option contract premium was 15 cents plus \$0.02 brokerage fee. Carrying cost was 0.167 cents per day or five cents per bushel per month (0.085 cents storage plus .082 cents interest costs).

The marketing decisions were: 1) sell wheat on June 20; 2) store wheat until a later date; or 3) sell wheat on June 20

Table 3. Break-Even Wheat Prices^a

Month	Price
June	\$2.90
July	\$2.95
August	\$3.00
September	\$3.05
October	\$3.10
November	\$3.15
December	\$3.20
January	\$3.25
February	\$3.30
March	\$3.35
April	\$3.40
May	\$3.45

^a Carrying costs are \$0.05 per bushel per month.

and buy a KCBT December \$3.40 call option contract. Selling wheat would net \$2.90 per bushel.

Monthly break-even prices may be calculated by adding the carrying cost to the \$2.90 wheat price (Table 3). The break-even price for October 20, four months, was \$3.10 per bushel (\$2.90 + (\$0.05 x 4 months). November 20 breakeven price would be \$3.15. Wheat prices must increase at least five cents per month for storing wheat to produce a higher net price than selling at harvest. Whether to store or sell wheat may be determined by comparing wheat price projections with the calculated break-even price.

An alternative to storing wheat was to sell the wheat for \$2.90 and buy a KCBT December \$3.40 call option contract for \$0.17 per bushel (\$850 for a 5,000 bushel contract). Selling the wheat stops the five cents per month carrying cost. The cost of the call option contract was the same as the carrying cost of wheat for 3.4 months. Thus, if wheat was to be stored for more than 3.4 months, the cost of the call option contract would be less than the carrying cost (\$0.17 premium divided by \$0.05 carrying costs).

On October 19, 1990, the central Oklahoma price of wheat was \$2.36; the KCBT December wheat futures contract price was \$2.69; and the premium on a KCBT \$3.40 wheat call option contract was zero. On October 19, the net prices for the three alternatives were \$2.90 for June 20 cash sale; \$2.16 (\$2.36 - .20 carrying cost) for storing wheat and selling on October 19; and \$2.73 for selling the wheat and buying a call option contract on June 20.

Summary

Before a marketing decision is made, carrying cost should be calculated. Carrying cost, along with price projections, futures contract prices, and futures option contract premiums, may then be used to compare potential returns from potential marketing strategies.

Oklahoma State University, in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Robert E. Whitson, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President, Dean, and Director of the Division of Agricultural Sciences and Natural Resources and has been prepared and distributed at a cost of 20 cents per copy. 1203