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Drying and Storage Costs in 2008: Comparing Alternatives with the *Grain Delivery Model*

Commercial drying and storage charges for grain will be higher in 2008 than in recent years. Moreover, corn likely will be harvested at higher moisture levels, further increasing drying costs in 2008. For corn, commercial drying costs could approach \$.50 per bushel for corn harvested at 25% moisture. Drying costs for 20% moisture corn will range from \$.15 to \$.25 per bushel. Commercial costs for storing corn for January sale can range from \$.15 to \$.30 per bushel.

As is usual, each elevator uses different shrink factors, storage moisture levels, drying charges, and storage charges, thereby causing net revenues farmers receive for grain to vary across elevators. Given higher costs, differences across elevators could widen this year relative to previous years. A *FAST* Microsoft Excel spreadsheet called the *Grain Delivery Model* has been developed that compares net revenues across delivery points. This program is demonstrated for three elevators typical of charges in central Illinois. Also, storage economics given higher costs is discussed.

Example Shrink Factors, Drying Costs, and Storage Charges

Table 1 shows shrink factors, moisture levels, drying costs, and storage costs for three example elevators. In the example, all elevators have the same shrink factor of 1.4; however, each elevator uses a different moisture level for storage. Elevator 1 uses a 14.5% moisture level, elevator 2 uses 15.0%, and elevator uses 14.0%. Difference in storage moisture levels cause different number of bushels sold for each bushel delivered. For grain delivered at 20% moisture, .923 “dry” bushels will be sold at elevator 1, .930 at elevator 2, and .916 at elevator 3.

The three elevators also have different drying schedules. These schedules were used to estimate drying costs for grain sold at 20% and 25% moisture level. For grain delivered at 20% moisture, drying cost for elevator 1 is \$.27 per dry bushel, elevator 2 is \$.20 per bushel, and elevator 3 is \$.17 per bushel. At a 25% moisture level, drying costs are \$.55 per dry bushel for elevator 1, \$.40 for elevator 2, and \$.34 for elevator 3.

Storage charges also vary across elevators. Elevator 1 has a drop charge of \$.22 per bushel, meaning that elevator 1 charges \$.22 per bushel to store grain no matter how long grain is stored. Elevator 1 charges a monthly storage charge of \$.04 per bushel with storage charges beginning in the month of January. Elevator 2 has a \$.16 drop charge, \$.06 lower than elevator 1. Unlike elevator 1, however, elevator 2’s monthly storage charges begin at delivery and are \$.04 per bushel. Elevator 3 has a \$.15 per bushel drop charge and a monthly storage charge of \$.025 per bushel which begins in January.

Table 1. Example Drying and Storage for Three Elevators in Central Illinois.

	Elevator 1	Elevator 2	Elevator 3
Shrink factor	1.4	1.4	1.4
Storage moisture level	14.5%	15.0%	14.0%
Dry buhels per wet bushel ¹	0.923	0.930	0.916
Drying charge per sold bushel ² :	\$ per Dry Bushel		
20% moisture level	0.27	0.20	0.17
25% moisture level	0.55	0.40	0.34
Storage costs	\$ per Dry Bushel		
Drop charge	0.22	0.16	0.15
Monthly storage costs	0.03	0.04	0.025
Monthly storage costs begins in:	Jan	On delivery	Jan

¹ Based on a wet bushel with 20% moisture. Dry bushels will decrease as moisture level increases.

² Elevator 1's has a drying schedule for different moisture levels, elevator 2 changes \$.04 per point for drying, and elevator 3 charges \$.03 per point for moisture levels below 21.1% and \$.025 per point above 21.1%.

Grain Delivery Model

Figure 1 shows an example of input and output from the *Grain Delivery Model* for the three example elevators described above. The example output is for 1,000 bushels of grain delivered at 20% moisture, as indicated by the input in the "Grain for Delivery" input box at the top right of the screen. Inputs for the three elevators are given in the "Input for Alternative Delivery Points". For each elevator, grain is sold in January for \$4.40 per bushel.

The middle part of the report gives a "Report on Revenue from Delivery Alternatives". For elevator 1, revenue from sales are \$4,061.20, which equals 923 bushels sold time \$4.40 per bushel. Transportation, drying, storage, and interest costs are subtracted to arrive at net revenue. Elevator 1 has \$60 of transportation costs, \$247.50 of drying costs, \$230.75 of storage costs, and \$89.59 of interest costs, giving \$626.94 of total costs. Elevator 1's net revenue then is \$3,433.36, which equals \$4,061.20 of sales revenue minus \$627.84 of costs. Net revenues can be compared across alternatives to determine the most economic alternative. For this example, elevator 1 has \$3,433.36 of net revenue, elevator 2 has \$3,458.81 of revenue, and elevator 3 has \$3,563.01 of net revenue. In this case, elevator 3 would result in the highest return of the three elevators. From high to low, net revenue differences total \$129.65 (\$3,563.01 for elevator 3 minus \$3,433.36 for elevator 1), or a difference of \$.129 per wet bushel delivered.

Figure 1. Example of the Grain Delivery Model.

GRAIN DELIVERY MODEL

(Version 2.1)



Grain for Delivery

Wet bushels for delivery:	1,000	
Delivery moisture level:	20.0%	
Interest rate:	6.8%	Yr:
Month of delivery:	Oct	2008

Input for Alternative Delivery Points			
Name of delivery point	Elevator 1	Elevator 2	Elevator 3
Cash price at delivery	\$4.25	\$4.25	\$4.25
Month of grain sale (End of mo.)	Jan	Jan	Jan
Sales price (\$/bu.)	\$4.40	\$4.40	\$4.40
Moisture/shrink factors			
Shrink factor:	1.4	1.4	1.4
Handling shrink:	0.0%	0.0%	0.0%
Cash sale moisture level:	15.0%	15.0%	15.0%
Storage moisture level:	14.5%	15.0%	14.0%
Pay drying to storage moist?:	Yes	Yes	Yes
Transportation costs			
Cost per wet bu:	\$0.06	\$0.06	\$0.06
Drying costs			
Based on wet or dry bu.	Wet	Dry	Wet
Charges vary by moisture level:	Yes	No	Yes
Drying charges (\$ per point):	Schedule	\$0.040	Schedule
Storage costs			
Drop charges (\$/bu.):	\$0.22	\$0.16	\$0.15
Monthly storage charge begins in:	Jan	Oct	Jan
Monthly storage costs (\$/bu.):	\$0.0300	\$0.0400	\$0.0250
Report on Revenue from Delivery Alternatives			
	Elevator 1	Elevator 2	Elevator 3
Wet bushels delivered	1,000.0	1,000.0	1,000.0
Dry bushels sold	923.0	930.0	916.0
Revenue from sales	\$4,061.20	\$4,092.00	\$4,030.40
Projected costs			
Transportation	\$60.00	\$60.00	\$60.00
Drying	247.50	186.00	157.50
Storage	230.75	297.60	160.30
Interest	89.59	89.59	89.59
Total costs	\$627.84	\$633.19	\$467.39
Net revenue	\$3,433.36	\$3,458.81	\$3,563.01
Net revenue per wet bu.	\$3.43	\$3.46	\$3.56
Net revenue per dry bu.	\$3.72	\$3.72	\$3.89
Price to break-even with cash sale at delivery:	\$4.63-Jan	\$4.65-Jan	\$4.59-Jan
Break-Even Prices by Month			
	Elevator 1	Elevator 2	Elevator 3
October-08	\$4.53	\$4.46	\$4.49
November-08	\$4.55	\$4.52	\$4.51
December-08	\$4.58	\$4.59	\$4.54
January-09	\$4.63	\$4.65	\$4.59
February-09	\$4.68	\$4.72	\$4.64
March-09	\$4.74	\$4.78	\$4.69
April-09	\$4.79	\$4.84	\$4.74
May-09	\$4.85	\$4.91	\$4.79
June-09	\$4.90	\$4.97	\$4.84
July-09	\$4.95	\$5.04	\$4.88
August-09	\$5.01	\$5.10	\$4.93
September-09	\$5.06	\$5.16	\$4.98

Storage Economics

Given higher storage charges, the cost of storage has increased. Hence, break-even prices to have the same income as selling grain at harvest also have increased. The bottom panel of Figure 1, labeled "Break-Even Prices by Month", shows how much must be received for grain to break-even for different months given that grain could be sold for \$4.25 at harvest. For elevator 1, the break-even price in January is \$4.63, a \$.38 per bushel increase in price over the \$4.74, harvest sale price, a \$49 per bushel increase over selling at harvest.

Commercial storage charges in 2008 have increased the costs of storage this year relative to previous years. As a result, storing grain for future sale requires higher price gains to warrant storage. While it is possible that grain may increase by these amounts, current futures prices and forward bids do not indicate price increases magnitudes needed to cover storage costs. Storing grain speculating on price increases has gotten more costly this year.

Summary

The *Grain Delivery Model* can be used to compare net revenues across elevators. This year consideration of delivery points could result in differences in net revenues. Storage will require higher increases in prices to economically justify grain storage.

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