

GRAIN ELEVATOR MANAGEMENT GAME*

*G. Ray Prigge**(no designated
month 1977)*Situation

In this game you are the manager of a cooperative grain elevator which is doing almost \$3 million in sales. The elevator has a history of moderate earnings, and its financial position is reasonably strong. As new management, the board and your members have charged you with the responsibility to improve performance and financial strength while servicing the needs of members. They have given you a relatively free hand in making decisions to meet these objectives.

There are two to eight elevators competing with one another in your trade area. The game administrator will inform you as to the number of rivals. This is a relatively mature grain production area, but there has been some increase in grain marketed because of higher yields and shift from livestock production to more specialized grain production. Grain A marketed has increased about 5 per cent each year, and Grain B production has increased about 3 per cent. These trends are expected to continue, except that marketings in the trade area will not increase smoothly. Marketings will be affected by weather, government programs and the like. You will receive market news to help you anticipate variations in production. Further, sales for the total trade area will be influenced by price and other factors which are the results of decisions by all elevator managers in the area. For

*Based on a modification of a grain elevator management game written by E.M. Babb, Purdue University.

example, if all managers reduced prices paid farmers for grain or increased storage charges, some farmers would sell to elevators outside the trade area. If this happens it will be reported to you. Likewise, if all elevators raised prices paid or reduced drying charges, they would attract farmers outside the normal trade area. Thus, total sales for the area contract or expand to some extent depending upon the decisions of all elevators in the area.

More important, from the standpoint of your company, is the decisions you make relative to those made by your rivals. If you increase prices paid or otherwise make your elevator a more attractive outlet to farmers than your competitors, you can expect to experience increased sales and market share. Of course, you must have the facilities to handle these sales, otherwise they go to your rivals by default.

Decisions made by the previous manager for the past year are shown in Table 1. The results of these decisions are shown in Table 2 in the form of an operating statement, balance sheet and general information. Each elevator will start the game on the basis of data in Table 2. That is, each elevator will start with the same assets, inventory and the like. All decisions are made at the beginning of the calendar (and fiscal) year.

Decisions and Rules

You are to record your decisions for each year on the blank decision forms provided by the game administrator. Please fill in the form completely, and carefully place decimals where intended.

The following sections provide rules and information needed to complete the decision form.

Prices Paid Farmers for Grain

1. Prices you set for Grain A and Grain B at the beginning of the storage season (December) and at the beginning of the harvest season (August) are price policies or average prices. In reality you would deviate from these prices on a day-to-day basis.

2. Prices paid farmers for Grain A must be within a ± 4 cents range of the terminal price less 9 cents. This reflects a normal margin of 4 cents on Grain A and a 5 cent location differential between your elevator and the terminal market to which you sell.

3. Prices paid farmers for Grain B must be within a ± 4 cents range of the terminal price less 11 cents. This reflects a normal margin of 6 cents on Grain B and the above 5 cent location differential.

4. The market news sheet you receive shows the permissible range of prices that can be paid as discussed above. Be sure to keep your prices paid for Grain A and Grain B within these ranges.

5. Futures prices normally close about 4 cents above the terminal prices.

Desired Percentage of Company Owned Grain

1. You are to indicate the percentage of your storage capacity you wish to devote to company owned Grain A and Grain B, during both the storage and harvest season.

2. Farmer owned grain has first priority on available storage capacity. In other words, you will get company owned grain only to the extent that storage capacity is available after all farmer demand for storage is satisfied.

3. To insure utilization of storage capacity, you can indicate a very high desired percentage of company owned grain, for example 50 per cent Grain A and 50 per cent Grain B. Of course, you may not want to own grain if the basis is very narrow, but farmer demand for storage is also likely to decline in this situation.

4. All company owned grain is assumed to be immediately hedged.

Charges and Discounts

1. Record minimum and monthly charges for storing farmer owned Grain A and Grain B. In addition to affecting the volume of grain you store, these charges plus recent seasonal increases in prices influence farmers' decisions to build on-farm storage. Once this storage is built it is used. In the absence of incentives to build on-farm storage, some of this storage deteriorates each year and is not replaced. The amount of on-farm storage capacity is reported to you each year (Table 2).

2. A lower charge for May to August storage will encourage farmers to hold grain in storage longer.

3. It is assumed that no Grain B is stored on the farm and that Grain B is dry when it is received.

4. Your foreign material discount on Grain A has the effect of slightly reducing the price you offered.

Contracting Activity

1. You may contract for Grain A and Grain B during the May-July period for delivery at harvest. Record the bushels you are willing to contract and the price you will pay at delivery. If you do not wish to contract, record 0. in both blanks.

2. Currently, about 5 per cent of Grain A and 7 per cent of Grain B are contracted. All contracted grains are immediately hedged at the time of contracting and delivered during harvest.

3. The potential amount of grain you could have contracted at your offer and the amount of grain you actually contracted are reported to you (Table 2).

Truck Purchases

1. You can purchase 800 bushel capacity trucks at a cost of \$30,000 each. Depreciation is on a 6-year basis. Variable cost of trucking is 4.28 cents per bushel, which includes labor, and is reported under truck expenses.

2. About 25 per cent of the grain you sell is trucked to your terminal market. It is assumed that each truck can make 400 trips each year. If your trucks cannot handle the required movements, additional truck capacity is automatically rented at a cost of 10 cents per bushel.

3. If a truck is purchased it is available for the harvest season and is paid for at time of receipt.

Storage Expansion

1. You can build concrete silos in units of 50,000 bushel capacity at the cost shown in Table 3. Silos are depreciated on a 40-year basis and related equipment is depreciated on a 10-year basis.

2. You can build corrugated or bolted steel storage (minimum size of 100,000 bushels and 50,000 bushel units above minimum size) at the cost shown in Table 3. Steel storage is depreciated on a 25-year basis, and related equipment is depreciated on a 10-year basis.

3. If a decision to expand storage capacity is made, the added storage is available at harvest time. Thirty per cent of construction costs are paid in February and the remainder in September.

4. The maximum amount of grain which can be handled above grain that is stored is 480,000 bushels during the storage season and 500,000 bushels during the harvest season.

5. A report of utilization of storage capacity and any grain sales lost because of inadequate storage is reported to you (Table 2). Such lost sales go to your rivals, to the extent they have capacity available.

Equipment Replacement

1. Equipment can be replaced during any year with the minimum investment of \$10,000. The computer will automatically make the best replacement, whether for trucks or other equipment.

2. You will receive any net value remaining for the piece of equipment carried on your books for the replaced item.

3. Maintenance cost increases as the equipment gets older. You can reduce this cost by replacement.

Distribution of Earnings

1. The amount of income for distribution is shown at the end of the operating statement. You distribute these earnings to retained earnings, federal and state income tax, patronage cash refund and patronage stock refund. The sum of these four items must equal the net income for distribution. At the time you make this distribution, you need to adjust cash, patronage stock and retained earnings to reflect your decisions. You record cash patronage refund and retained earnings for the previous year on your decision form so that the computer will also update your balance sheet.

2. The federal and state income tax is 25 per cent of retained earnings for the first \$25,000 and 50 per cent above \$25,000. This is a tax exempt cooperative.

3. You must give a cash refund equal to 20 per cent of the total patronage refund (cash plus stock). Any remainder goes to patronage stock. Cash refunds increase the attractiveness of your elevator to farmers.

Investments

1. You can make or call investments in 15-day notes which pay 5.5 per cent interest or in 90-day Treasury notes that pay

5.75 per cent interest. Investments are assumed to be made or called at the beginning of the year.

2. If you do not have cash to meet your obligations, these notes are called with loss of interest. The 15-day notes are called first and then the Treasury notes if cash is still required.

Obtain Capital

1. You have a line of credit (which in the game is viewed as long-term debt) with the Bank of Cooperatives, up to the limit that equity equals non-current debt. Interest on this loan is 6 per cent. In addition, you must purchase stock in the Bank of Cooperatives equal to 10 per cent of the annual interest cost (the computer does this for you). You receive a 4 per cent dividend on the bank stock. Each year, you must decide how much of your line of credit you want to borrow. The maximum amount you can borrow the next year (your line of credit) is given to you (Table 2). This does not include money borrowed on a short-term basis secured by company owned grain.

2. You can sell subordinated 10-year non-callable debentures for which you pay 7 per cent interest up to the limit of 50 per cent of the net value of non-current assets. The maximum amount of debentures you can sell next year is given to you (Table 2). Remember that if you sell debentures your non-current debt will increase so that your line of credit above declines. The \$50,000 of debentures outstanding at the start will fall due in year 4.

3. You can sell non-cumulative, preferred stock bearing dividends of 6.5 per cent if expansion of truck or storage capacity exceeds \$50,000. You can sell preferred stock up to the limit of 40 per cent of the cost of such expansions.

4. If cash is not available to meet obligations, you can borrow additional money from the Bank of Cooperatives which is secured by company owned grain. The interest cost is 6 per cent. You can borrow up to 90 per cent of the value of the grain you own (based on terminal price less 5 cents). The computer automatically makes this transaction for you, and does so before calling your notes.

5. After exhausting all possible sources of cash, if you still cannot meet cash obligations (including margin calls when they occur), the computer borrows the needed cash for you from Friendly Finance Company at an interest cost of 12 per cent. By making proper financial arrangements at the beginning of the next year, the computer will automatically clear this debt at the finance company.

Other Information

1. Your cash position can be projected by estimating net operating income - net other expenses + notes called - investments in added notes + debentures sold + preferred stock sold + loan from Bank of Cooperatives - stock in Bank of Cooperatives - trucks purchased - storage expansion - dryer expansion - equipment replacement + depreciation (\$28,874 + depreciation on new facilities and equipment) + beginning cash ⁺ change in value of inventory.

The above assumes that you have already made proper adjustments in cash as a result of distribution of earnings for the previous year. In this exercise, accounts payable and receivable change so as not to affect cash.

2. The flow of grain through your elevator during the calendar (fiscal) year is described as follows. You start the year with a given amount of company owned and farmer owned Grain A and Grain B in storage. You decide whether to sell company owned grain in December or in May (by decision on desired percentage of storage for company owned grain). Farmers decide when they want to sell their grain in storage to you (you do buy out all farmer owned grain in storage at some point in time). In addition you will buy Grain A stored on the farm some time between December and July, depending on when farmers want to sell. All grain held at the beginning of the storage season is sold by the end of August and your storage at that point is empty. During the harvest season, you receive grain you have contracted plus grain farmers want to sell at harvest. You also receive grain to be stored for farmers. Again, you decide how much grain you want to store as company owned grain, if space is available. Company owned grain and farmer grain in storage then appears at the beginning of the next year, and we start all over again.

3. Margins per bushel on Grain A and Grain B are based on gross margins. They are composed of initial margins (normal is 4 cents on Grain A and 6 cents on Grain B), plus the higher f.o.b.

terminal price on grain trucked (normal is 1.25 cents on Grain A and Grain B, i.e., one quarter of the grain is trucked to the terminal market where price is 5 cents above your f.o.b. price), plus seasonal rise in price including hedging gains or losses for company owned grain, plus moisture discount on Grain B purchased less the shrink on such Grain B. The margin associated with trucking to the terminal market is offset by trucking expenses in the operating expenses. The margin associated with the seasonal price rise is offset by brokerage fees, insurance and interest on capital, also in the operating expenses.

Game Results

The results of your decisions will be transmitted to you in the form of a report composed of an operating statement, balance sheet and general information (Table 2). You will receive a market news report indicating terminal and futures prices and information concerning expected production and demand and a report of competitors' activities and market share. Both of these reports should be carefully analyzed before making decisions for the next year. Remember, you start based on the information in Table 2. Your first task will be to distribute the net income for distribution shown in Table 2 and record retained earnings and cash refund on your decision form.