CHAPTER

4 The Company Environment and Rules

Overview

This chapter looks at rules and conditions defining the company gaming environment. The first section discusses the mechanics of operating the company. The second section serves as the primary reference source to be used throughout the game. An alphabetized cross reference to all rules is provided in the chapter Appendix.

Company Management Instructions

Company operating instructions and rules must be understood for successful management.

The following conditions are critical to sound management of a new FG company:

- The first reading of the rules will introduce the manager to the scope of the FG decision environment.
- Repeated review of the rules and conditions in this chapter will be necessary. The rules pertaining to a given decision should be scrutinized before each period of play. The game does not require memorization of the rules. A thorough understanding of the direct and indirect financial and operational consequences of decisions is critical in competently managing any firm, whether in finance or human relations or in FinGame or General Electric.
- Each time a new decision is made, the rules and conditions related to the decision need to be evaluated in detail. Just as a chef cannot make a soufflé with no knowledge of the ingredients and proportions, the method of combining ingredients, the cooking time and temperature, an FG manager cannot run a complex business by guesses and with limited to no information. In FG, the company's performance will indicate the manager's competence in understanding how decisions affect the company.
- To avoid misconceptions and unsound decisions, the manager should physically check off each point after determining the consequences of the rule on the company's financial plan.
- Because the manager makes irreversible decisions every quarter, a clerical error often irreparably harms a company for the rest of the game. Be careful! **Check all decisions!** In almost every class using FG, at least one

company will fail to produce units and another will not enter planned and required external financing to avoid large and expensive penalty loans. In a real business this would represent gross negligence.

- Chapters 1 through 4 *must* be read before a decision on the first quarter of management operation should be entered. *The first management decisions are required for quarter 2.* The company is created in quarter 1 and the starting financial statements are generated at the *end* of quarter 1.
- Some instructors may require students to prepare their own sets of budgeted, or pro forma, statements for the first quarter or few quarters of the game. The first set would be for quarter 2. Students would then be "locked out" from using the FG-generated pro forma statements. If student preparation of statements is required, a downloadable pdf file is available from the registered FG main menu page through a "Supplemental Materials" option called "Financial Statement Construction." This will need to be read before pro forma statements are prepared.
- The company's first set of financial statements for quarter 1 includes the quarterly Performance Report shown in Exhibit 4.1, the Position Statement in Exhibit 4.2, and the Summary Sheet of Exhibit 4.3. The instructor will notify FG managers if their companies have a different set of quarter 1 statements. If so, the starting statements will be generated by printing the modified quarter 1 statements after running the simulation for quarter 1, as noted in Chapter 2.

Note: Minor differences in numbers throughout Exhibits 4.1, 4.2, and 4.3 may be found with the actual quarter 1 simulation. Very material differences can occur when the instructor changes environmental conditions, such as the tax rate. Additionally, many of the forecasts in the Summary Sheet are estimates of what will occur during the actual quarter simulation. Differences between pro forma statement numbers and the actual statement numbers will represent these forecast errors. Commission and omission errors can also cause additional differences between pro forma statement numbers and the actual quarterly statements. For example, a failure to adjust interest rates appropriately for large debt offerings would represent a financial planning omission error.

- Unless stated otherwise by the instructor, the manager has control of all the decision variables available to the firm.

To prepare and use this game, the following five steps are required.

Step 1. The instructor will indicate which, if any, variables the manager will not control. The instructor will indicate the value for any decision not controlled by the participant.

Step 2. With the set of financial statements and the information in Chapters 3 and 4, the manager will come to a decision on all the controlled company decision variables.

Step 3. For example, in quarter 1, the controlled decisions for quarter 2 will be entered in the appropriate location of a **Pro Forma Decision Sheet for Quarter 2** (see Screen 3, Chapter 2) and simulated with the "Run Pro Forma Simulation" option if managers have the ability to use the FG pro forma statement generator. If the generator is not available, the manager must use the "Financial Statement Construction" pdf, available on the FG web site, as a guide in preparing pro forma statements by hand.

Step 4. The pro forma statements, viewable with the "View Pro Forma Results" option, need to be analyzed to see if common stockholders' objective of wealth maximization (see Chapter 3) is being achieved. If the objective is not being achieved, steps 3 and 4 will have to be redone with a new set of decisions.

Example. If the pro forma statements contain a sizable cash deficit represented by a large penalty loan, the manager has not secured sufficient external funds for the current quarter's planned expenditures. The plan has to be revised by increasing external funds and/or reducing investment from the original plan. A new set of pro forma statements from step 3 is then needed to see if the desired liquidity position has been achieved with the revised set of decisions.

Step 5. The actual quarterly decisions are entered (see Chapter 2) and the *irreversible* simulation of the next quarter is completed. A new set of financial reports and summary information, similar to Exhibits 4.1, 4.2, and 4.3, will be generated for the quarter just completed. Steps 1 through 5 are repeated for each period of play.

Company Operating Rules

The external environment in which the firm operates, along with the rules and conditions that form the internal company environment, is presented in this section. An explanation is given for each item in the set of financial statements (Exhibits 4.1, 4.2, and 4.3). Rules governing each possible management decision are also provided in detail.

The Industry Environment

The following characteristics hold for all FG companies:

- The firm produces and sells one undifferentiated and undefined product.
- All firms start the game with the same asset mix, financial structure, and potential for success.
- The firms in the game do not interact; that is, the decisions and the performance position of any one firm do not affect any other firm. This condition is consistent with the efficient markets hypothesis and competitive finance markets where one company's actions do not affect material changes over the entire financial market.
- A quarter of a year is the time increment for each period of play. This enables the possible inclusion of seasonal, cyclical, and secular trends in the demand for the company's output.
- Demand, product price, interest rates, and plant and machine costs are all affected by the general business conditions represented in the game by an economic indicator. Managers must determine the economic indicator's effect on the different variables. This knowledge needs to be incorporated into the firm's planning and decisions.
- Decisions are made in a condition of uncertainty. For example, the forecasts of demand and price are randomly distributed about the actual value. The player will not know the actual values; thus, a strategy for estimating the values is needed.

EXHIBIT 4.1

Company Name
Quarterly Performance Report
Quarter 1

Sales Revenue (97,383 units at 100.00)			$9,738,300	
Income from Securities			2,725	$9,741,025
Cost of Goods Sold:				
Beginning Inventory: (9,809 at $74.79)			$ 733,567	
Materials	$1,500,000			
Direct Labor	3,500,000			
Total Direct Costs		$ 5,000,000		
Warehousing Costs	$ 60,408			
Depreciation: Mach. and Equip.	478,125			
Plant	1,300,000			
Other Overhead Costs	200,000			
Total Indirect Costs		2,038,533		
Production Costs (100,000 *at* $70.39)			7,038,533	
Goods Available for Sale (70.78 *per unit*)			7,772,100	
Less: Ending Inventory (12,426 *units*)			879,492	
Cost of Goods Sold				6,892,608
Gross Profit				$2,848,417
Selling and Administrative Expenses			$1,486,915	
Financial Expenses:				
Short-Term Bank Interest		$ 0		
Penalty-Loan Interest		0		
Intermediate-Term Loan Interest		92,749		
Bond Interest		33,600		
Bond Redemption Costs		0		
Total Financial Charges			126,349	1,613,264
Operating Income before Extraordinary Items				$1,235,153
Extraordinary Items				0
Income before Taxes				$1,235,153
Income Tax (*rate is* 40%)				494,060
Income after Taxes				$ 741,093
Preferred Stock Dividend				0
Earnings to Common Stockholders				$ 741,093
Common Stock Dividends ($0.10 *per share*)				100,000
Net Income Transferred to Retained Earnings				$ 641,093

Operation of the Company

In this subsection, the rules covering revenues are provided first, followed by the rules affecting costs. The order of presentation of the rules is consistent with the process used to generate budgeted or pro forma financial statements. Each period, the managers are provided with the following:

1. A Performance Report (or income statement) following the format of Exhibit 4.1.
2. A Position Statement (or balance sheet) similar to Exhibit 4.2.
3. A Summary Sheet structured like Exhibit 4.3.

Information concerning past performance and the current position of the firm is given along with forecast information for future quarters. Exhibits 4.1, 4.2, and

EXHIBIT 4.2

Company Name
Position Statement
Quarter 1

Assets		
Current Assets		
Cash	$ 120,636	
Marketable Securities	200,000	
Accounts Receivable	6,524,661	
Inventory (12,426 *units at* $70.78/*Unit*)	879,492	
Total Current Assets		$ 7,724,789
Fixed Assets (*net of depreciation*)		
Machinery and Equipment	$ 2,008,125	
Plant	$ 7,165,250	
Total Fixed Assets		$ 9,173,375
Total Assets		$16,898,164
Liabilities and Owner Equity		
Current Liabilities		
Accounts Payable	$ 520,000	
Short-Term Loans Payable	0	
Short-Term Penalty Loan	0	
Intermediate-Term Debt Maturing	1,850,000	
Bonds Maturing	$ 1,200,000	
Total Current Liabilities		$ 3,570,000
Long-Term Liabilities		
Intermediate Loans: 2 years	$ 937,500	
3 years	0	
Bonds	1,200,000	
Total Long-Term Liabilities		2,137,500
Total Liabilities		$5,707,500
Owners' Equity		
Preferred Stock (0 *shares*)	$ 0	
Common Stock (1,000,000 *shares*)	$8,000,000	
Retained Earnings	$3,190,664	
Total Equity		11,190,664
Total Liabilities and Equity		$16,898,164

4.3 indicate the firm's starting position at quarter 1 (unless modified by the instructor).

Revenues

Income is generated from both sales of the product and revenues from short-term investments. Sales of the product provide the major source of revenue. Short-term investments are most often used for temporary investment of excess cash.

Product Sales Estimation

Estimates of both the market's demand for the company's product and the price the market will pay per-unit demanded for each of the next four quarters are provided in the Summary Sheet. (See Exhibit 4.3 for estimates for quarters 2 through 5.)

EXHIBIT 4.3

Company Name
Summary Data—Quarter 1

Historical Information:

Common share price	$35.57	Accumulated wealth	$35.67
Quarterly EPS	0.74	Dividend yield	1.10%
Price-earnings ratio	12.00	Marketable security yield	1.362%
Actual unit price	100.00	Actual unit demand	97,383
Preferred stock price	32.15	Preferred dividend yield	3.11
Return on investment	17.54	Return on equity	26.49
Call premium: preferred	8.00%	Bond call premium	8.00%
Common tender or sell/sh	$0.00	Unpaid preferred dividend/share	$0.00

Outstanding debt yields:

Short-term	*2-year loan*	*3-year loan*	*Bonds*	*Penalty loan*
2.980%	3.110%	2.500%	1.400%	8.000%

Information for Future Quarters:

Quarter	*2*	*3*	*4*	*5*
Units forecast	105,721	103,295	123,736	117,871
Price per unit forecast	$ 99.81	$ 103.73	$ 103.03	$ 102.85
Units of plant capacity	100,000	100,000	100,000	80,000
Units of machine capacity	100,000	100,000	75,000	60,000
Other overhead	200,000	200,000	200,000	200,000
Depreciation:				
Machinery	478,125	478,125	384,375	311,250
Projects	0	0	0	0
Plant	1,300,000	1,300,000	1,300,000	989,000
Principal repayment on debt:				
Short-term	0	0	0	
2-year	312,500	312,500	312,500	312,500
3-year	300,000	300,000	0	0
Bonds	300,000	300,000	300,000	300,000
Warehouse fees:				
Units		First 2000	Next 5000	Over 7000
Cost/Unit		$ 1.00	$ 3.00	$ 8.00

Production costs per unit next quarter:

Materials	$15.00 Machinery	$47.00	Plant	$321.00
Units	First 60,000	Next 40,000	Next 20,000	Over 120,000
Labor cost	$39.00	$29.00	$25.00	$33.00

Rates on funding in quarter 2

Short-term	*2-year loan*	*3-year loan*	*Bond*	*Preferred*
1.981%	1.915%	1.854%	1.754%	2.620%

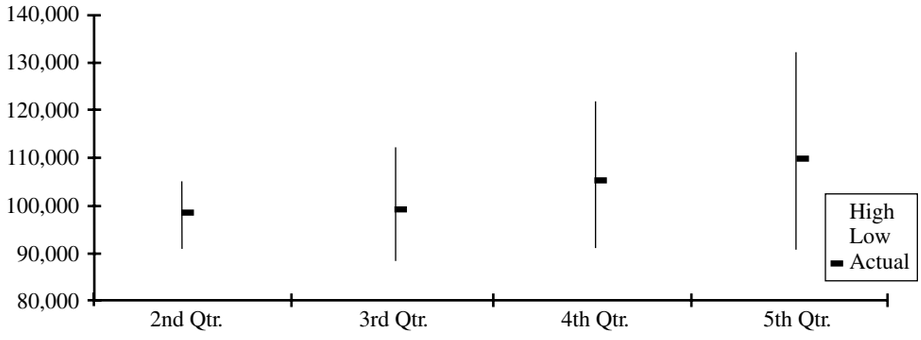
Interest due next quarter:

Short-term	$ 0
Intermediate	$83,030
Bonds	$33,600

Capital budgeting projects for next quarter:

	Life	*Cost*	*Unit Capacity*	*Overhead Saving*	*Unit Labor Sav., Qtr. 2*	*Change/Qtr. Labor Sav.*
A	2-yr	$659,280	100,000	$15,340	$0.82	$0.03
B	3-yr	$513,432	120,000	–$8,102	$0.85	–$0.01

EXHIBIT 4.4 Generation of Demand Estimates



Estimates for more recent quarters are more accurate than estimates for more distant quarters. In Exhibit 4.4, the vertical lines provide a hypothetical range of the possible forecasts of quarterly demand. The estimates are uniformly distributed along the hypothetical range lines. An independent new set of estimates is generated each quarter. Thus, by the end of quarter 4, there will be a total of four estimates for quarter 5 demand (and price), one from each quarter's output 1 through 4.

More recent demand and sales price estimates are most accurate.

Manager Objective. The manager has little information at the start of the game and must develop a strategy for both securing and evaluating information. The accuracy of the price and demand estimates can be evaluated only after several periods of play by comparing previous estimates with actual outcomes. As the game progresses, greater reliance can be placed on the accuracy of the estimates. The forecast demand and price estimates are needed to make decisions on production levels, needed machine and plant capacity, and funding requirements.

Purchase of Demand and Price Forecast

High-priced forecasts are generally more accurate than less-expensive forecasts.

Demand and price forecasts of varying accuracy can be purchased. There are three possible choices:

1. The least accurate set of four quarterly forecasts are automatically generated each quarter on the Summary Sheet. There is no cost for this set of forecasts.
2. An additional, more accurate set of four quarterly forecasts of both demand and price can be obtained for $30,000. When purchased, this forecast will be shown as the second set of forecasts on the Summary Sheet, after the free forecast.
3. The most accurate set of four quarterly forecasts costs $75,000. When this set is purchased, all three forecast sets are provided on the Summary Sheet with the most accurate set coming last.

Accounting Impacts

Performance Report—selling and administrative expenses	$0 or $30,000 or $75,000
Cash Budget—outflows	$0 or $30,000 or $75,000

Manager Objective. The degree of accuracy of the forecasts is not given; this must be determined by the firm's manager. Continued purchase of more accurate forecasts depends on how much the manager thinks the extra information is worth.

Decision: Purchase of Demand and Price Forecast. The decision is selected by the appropriate option on the Pro Forma Decision Sheet input form (see Chapter 2).

Product Demanded and Sold

Price and sales demand for units produced are identical for all the firms playing the game for each period of play unless unit price of product or advertising differs among the companies. The actual demand for the past quarter is included on the Summary Sheet (97,383 in Exhibit 4.1 for quarter 1). The per-unit sales price, $100.00 for quarter 1, is given on the sales revenue line of the Performance Report (Exhibit 4.1).

Large opportunity losses result from lost sales.

Rules for Product Demanded and Sold. There are eight rules:

- Units of product available for sale are always used to meet demand. The units available include beginning inventory plus the units produced during the period.
- All units started in production are finished; there are no raw materials or partially completed units.
- If the unit demand exceeds the amount of goods available, all units are sold and there is a zero ending inventory.
- The unfilled sales demand is lost; it is not added to the company's demand for the following periods. Thus, no back ordering is available in the game.
- The ending inventory is composed of the excess of units available for sale compared to the units demanded.
- *Cash inflows* are obtained on 33 percent of the current quarter's total dollar sales. On sales of $9,738,300 in quarter 1, $3,213,639 resulted in a cash inflow during quarter 1.
- The ending accounts receivable balance contains 67 percent of the current quarter's sales—$6,524,661 in Exhibit 4.2.
- The entire balance in accounts receivable is a *cash inflow* in the following quarter. Thus, $6,524,661 on the quarter 1 statement is collected in quarter 2, together with 33 percent of quarter 2 sales revenue.

Accounting Impacts

Performance Report—sales revenue (97,383 × $100.00)	$9,738,300
Cash Budget—inflows (33% × 97,383 × $100.00)	3,213,639
Position Statement—accounts receivable (67% × 97,383 × $100.00)	6,524,661

Manager Objective. Profits forgone on sales lost due to inadequate inventory and productive capacity need to be compared to the extra carrying costs of inventory, machine capacity, and plant capacity (including depreciation and the cost of funds invested in these assets). Managers have an optimal investment in productive assets when the profit gained from the expected additional unit sales

generated by the additional money invested to produce the extra unit equals the carrying cost of the additional investment. See Chapter 3 for more discussion on strategy formation.

Decision: Unit Production. The number of units of product to produce is a management decision entered on the Pro Forma Decision Sheet input form (see Chapter 2).

Manager Control of Product Pricing

When price is a management-controlled variable, the unit market demand for the product is variable. The product demand is lower for higher prices, and demand is higher for lower prices. If the unit price decision is not controlled by the manager, an input frame will not be available on the Pro Forma Decision Sheet input form. Instead, an "At market value" message will be provided.

Manager Objective. The price that maximizes the common shareholders' accumulated wealth is desired. The elasticity of demand to price changes is required before a policy on increasing or decreasing prices can be determined. The requirements for an optimal pricing strategy are covered in Chapter 3 and managerial economics texts.

Decision: Unit Price of Product. The product price decision is entered as the per-unit price on the Pro Forma Decision Sheet input form (see Chapter 2). If the per-unit price is left blank (value equals zero), the product will automatically be sold at the market price and market demand level that would occur if the price were not controlled. These are the values printed as the actual demand and unit price on the Summary Sheet. If a price is entered, units will be sold at the manager's entered price.

Note: An expected unit price is a required input for pro forma statements. If no unit price is entered, units will be sold at a price of $0 per unit.

Sales Discounts

Managers have an option to select no discount, a 1 percent discount, or a 2 percent discount.

- When no discount is offered, 33 percent of the current quarter's total dollar sales are collected during the sales quarter and 67 percent are collected in the quarter following the sale.
- There are no bad debts and all sales dollars are collected by the quarter after sale.
- The discount policy affects only receivable collections; there are no effects on product sales demand.
- If a discount is offered, more cash is collected from quarterly sales and the investment in accounts receivable is reduced. The collection rate is highest with a 2 percent discount rate.
- The change in receivables for the different discount rates is not provided directly in the game. However, if pro forma statements can be generated in the game, the use of a discount will affect the cash and receivables balances correctly based on the forecasted units demanded and unit price of product.

- With both the 1 and 2 percent discount policies, the receivables that are discounted are all collected in the current period. Two-thirds of all sales that are not discounted are collected in the following period.

The discount policy has no impact on sales demand in the game.

The sales discount is found by subtracting the dollar sales revenue on the Performance Report—$9,738,300 in quarter 1—from the total of units sold times the sales price per unit—$9,738,300 (97,383 × 100.00). In this case, there is no difference in the two numbers in quarter 1 since a zero discount policy was used by the company. The total sales revenue will always be less than the quantity sold times the sales price per unit by the amount of the discount.

Manager Objective. The next higher discount rate should be adopted if the marginal discount paid to move to this next discount rate divided by the amount of accounts receivable freed from the discount policy is less than the cost of short-term loans.

Decision: Sales Discount on Receivables. The sales discount policy is selected on the Pro Forma Decision Sheet input form (see Chapter 2).

Cash Management

Short-Term Investments

Short-term investments provide the only other source of company revenue besides product sales.

Short-term investments should be used only for temporary investment of excess funds.

- Excess cash can be invested temporarily until needed in operations or distributed to security holders.
- Managers have control over the risk level of their short-term investments. The safest temporary investment has the lowest expected yield. More risky short-term investments have a higher expected yield. This potential reward is offset by having some outcomes in which investors' return is lower than with a safe or low-risk security. Commonly, negative return outcomes occur with longer-maturity or higher-credit-risk securities.
- The percent quarterly yield on the safest marketable securities held in the just-completed quarter is given on the Summary Sheet as the marketable securities yield. This is 1.362 percent in Exhibit 4.3. The rounding to 1/1000th of 1 percent can cause revenue calculations to diverge slightly from the actual revenue earned.
- The yield on marketable securities in future periods depends mainly on general business conditions and is not forecast in the Summary Sheet.

Example. In Exhibit 4.2, $200,000 was outstanding at the end of quarter 1. If $500,000 was added for quarter 2, the marketable securities balance would increase to a total of $700,000 and this amount would earn interest for quarter 2. Assuming this to be the case and the quarter 2 interest rate to be 1.350 percent, the following impacts and positions would be on the quarter 2 financial statements.

Accounting Impacts

Performance Report—income from securities	$9,450
Cash Budget—inflows (1.350% × $700,000)	9,450

Cash Budget—outflows—purchase of marketable securities	500,000
Position Statement—marketable securities ($200,000 + $500,000)	700,000

Manager Objective. The game participant can *form a strategy for estimating the safest marketable security yield* by using other forecast information available on the Summary Sheet. Marketable securities investments are appropriate for the *temporary* investment of surplus funds that will be needed in operations in the next one to two quarters. See Chapter 3 for more details.

Decision: Short-Term Investment. This decision is entered on the Pro Forma Decision Sheet input form (see Chapter 2). Marketable securities may be purchased and, if they are owned, they may be sold. A minus sign is entered just before the number if a sale is desired. The decision changes the amount of investment in marketable securities. *The balance in marketable securities remains unchanged from the previous quarter if no decision is entered and a forced liquidation of marketable securities does not take place (to be described later).*

Risk Level of Short-Term Investments

- Managers are responsible for determining the risk level they desire. Caution should be exercised in committing large amounts of funds to higher-risk investments until the manager knows the possible downside risk of the decision.
- An increase in risk of short-term investments is achieved in the game by selecting a risk level from 0 (zero) for no risk through 9 for the highest risk level.
- A 0 (zero) is used to invest in the safest marketable securities, the equivalent of 90-day Treasury bills. No default or interest rate risk exists with the safest possible short-term investment. The investor will earn the economy-wide, equilibrium, 90-day (one quarter), short-term interest rate.
- The highest-risk investment (having an entry of 9) is a perpetual security that can either lose up to 40 percent of its ending period value from an increase in credit risk or gain up to 45 percent of its value from a decrease in credit risk in one quarter.
- All short-term investments outstanding (not just new additions to short-term investments) have the risk category selected.

Decision: Risk of Short-Term Investment. Risk of short-term investment (0 to 9) is entered on the Pro Forma Decision Sheet input form (see Chapter 2). The risk (0 to 9) can be changed each quarter.

Cash Shortages and Marketable Securities Liquidation

In the case of a cash shortage at the end of a period, the marketable securities are automatically retired with a penalty charge of 3 percent of the cash shortage. If c is the cash shortage, the marketable securities retired, S_m, would be:

$$S_m = 1.03c$$

The penalty is imposed to encourage careful, accurate cash management.

Example. Assume a company has a cash shortage of $200,000 at the end of quarter 2 and a quarter 1 marketable securities balance of $1,000,000. The marketable securities balance would automatically be reduced to $794,000 (or $1,000,000 – [$200,000 × 1.03]). The marketable securities balance on the quarter 2 Position Statement would be $794,000, and the account penalty loan interest on the Performance Report would be $6,000 (or 3% × $200,000). Note that the company still earned the quarterly marketable security yield (1.35%) on the $200,000 in liquidated securities since they were liquidated at the end of the quarter. An additional tax reduction of $2,400 (0.4 × $6,000) with a tax rate of 40 percent results from the decision, leading to a final cash balance of $2,400, even though there was an initial cash shortage.

The inclusion of the 3 percent liquidation fee under the penalty loan interest account is a nonstandard accounting treatment. It is used in the game so that the manager can easily check for liquidity shortages during the quarter by examining for a balance in the penalty loan interest account in the income statement.

When cash is short, the game automatically liquidates marketable securities with a penalty.

Warning. Since final positive cash balances exist even though an FG company has cash shortages, forced liquidated marketable securities, and penalty loans, managers would be in error to look at their cash balance to detect cash shortages and cash stock-outs. The Penalty-Loan Interest line on the Quarterly Performance Report (Exhibit 4.1) needs to be checked to see if a cash shortage occurred. The extent of the cash stock-out is then found by determining the forced reduction in the Marketable Securities account and the size of the Short-Term Penalty Loan, both shown on the Position Statement (Exhibit 4.2).

Accounting Impacts

Performance Report—income from securities	$ 13,500
Cash Budget—inflows (1.35% × $1,000,000)	13,500
Cash Budget—outflow (3% × $200,000)	6,000
Performance Report—penalty loan interest	6,000
Cash Budget—inflow ($200,000 × 1.03)	206,000
Position Statement—marketable securities ($1,000,000 – $206,000)	794,000
Performance Report—Taxes decrease by (0.4 × 6,000)	2,400
Position Statement—Cash balance increases from 0 to 2,400	

Manager Objective. The long-term objective is to minimize the combination of carrying costs for maintaining cash balances and stock-out costs from having insufficient cash balances. This is achieved by setting cash balances so that the expected per period carrying cost for the last dollar added to the safety-stock of cash is equal to the expected per period stock-out cost from this same last dollar being added to cash. See Chapter 3 for further discussion.

Decision. The decision is automatically performed by FG.

Cash Shortages and Short-Term Penalty Loans

Penalty loans are automatically issued for end-of-quarter cash shortages.

- If the marketable securities balance is insufficient to cover the cash shortage, a penalty loan equal to the remaining cash shortage is automatically advanced.
- An 8 percent quarterly rate of interest is charged on the loan.
- The penalty debt is automatically retired in the following period with no additional interest charged.

An example will indicate how penalty loan balance, taxes, and new cash balance are determined.

Example. Assume there is a cash deficit of $210,000, a marketable securities balance of $103,000 that earned 1.35% or $1,390.50, and a 40 percent tax rate. First, the decrease in the deficit, *c,* resulting from the liquidation of securities, S_m, at a discount rate of 3 percent is calculated. Solving for *c,* $100,000 of the deficit is eliminated:

$$1.03c = S_m$$
$$1.03c = \$103{,}000$$
$$c = \$100{,}000$$

This leaves a $110,000 deficit and a $3,000 interest charge for liquidating securities. The penalty loan balance must cover both the revised shortage, $110,000, and the current-period penalty-loan interest. Combining terms, calculate the loan, *L*, to be equal to the cash shortage plus 8% times the cash shortage not covered with securities.

$$L = \$110{,}000 + [\$110{,}000 \times 0.08]$$
$$L = \$118{,}800.$$

This temporarily leaves the firm with a cash balance of zero. The additional interest charge, $11,800 (or $3,000 + [$110,000 × 0.08]), is an additional current-period tax deductible expense. All other-quarter cash transactions (including the cash flow from taxes on income) are recorded before the penalty balance is determined. Therefore, there is an additional $11,800 of deductible expense. This reduces the tax and current-period cash payment for taxes that had already been paid by $4,720 (or 40% × $11,800). This $4,720 is the new and final cash balance.

Accounting Impacts

Performance Report—income from securities	$ 1,390
Cash Budget—inflows (1.35% × $103,000)	1,390
Cash Budget—outflow (3% × $100,000 + 8% × $110,000) × (1 – .40)	7,080
Performance Report—penalty-loan interest	11,800
Performance Report—income tax (.40 × $11,800) reduction in tax of	–4,720
Cash Budget—inflow ($100,000 + 110,000)	210,000
Position Statement—marketable securities ($103,000 – $103,000)	0
Position Statement—short-term penalty loan ($110,000 × 1.08)	118,800
Position Statement—final cash balance	4,720

Manager Objective. The long-term objective is to minimize the combination of carrying costs coming from maintaining expected cash balances when a positive cash balance is generated and facing expected stock-out costs when cash shortages occur. This is achieved by setting cash balances so that the expected per period carrying cost for the last dollar added to the safety-stock of cash is equal to the expected per period stock-out cost from this same last dollar being added to cash. See Chapter 3 for further discussion.

Decision. The decision is automatically performed by FG.

Production Costs

The manufacturing cost components of the firm are materials, direct labor, warehouse fees, plant, machinery, capital budgeting projects, other overhead, and both plant and equipment depreciation.

Materials

The company's product is fabricated from raw materials. The following conditions apply to the input materials required to make a unit of final product:

- One unit of material is required to produce one unit of finished product.
- The cost per unit of material is $15.00, unless changed by the instructor or in case of inflation. The cost of a unit of material is given on the Summary Sheet each quarter. (See Exhibit 4.3.)
- The quantity required for actual unit production is automatically purchased within the game. Thus, a specific decision on materials is not required.
- There are no material or work-in-progress inventories at the end of a period.
- The period's material cost is a current-period cost of goods produced and appears in the Performance Report within the cost of goods sold section.
- A cash *outflow* for 90 percent of the quarterly material cost occurs in the current period. The remaining 10 percent is part of the accounts payable balance (Exhibit 4.2) and is a cash outflow in the following quarter.

For example, assume 100,000 units will be produced in quarter 2.

Accounting Impacts

Performance Report—materials (100,000 × $15.00)	$1,500,000
Cash Budget—outflows	1,350,000
Position Statement—accounts payable	150,000

Decision. The decision is automatically performed by FG.

Direct Labor

Required materials, labor, and warehouse costs are automatically purchased and paid within the game.

Direct labor costs are incurred in producing the product.

- The direct labor cost required to produce one unit varies for different unit volume production levels. Exhibit 4.5 is taken from the Summary Sheet (Exhibit 4.3). The exhibit indicates the four different possible initial per-unit labor costs for quarter 2.
- The per-unit labor costs for different levels of production can change over time depending on the capital budgeting projects adopted and expired and the level of inflation. The impact from the "Capital Budgeting Projects" section is described later in this chapter.
- The labor costs required to complete the actual units produced in quarter 1 of $3,500,000 (or [60,000 × $39.00] + [40,000 × $29.00]) are automatically recorded in the game. No decision is required by the manager to secure or pay the labor costs.

EXHIBIT 4.5 Direct Labor Costs

	Units			
	First 60,000	*Next 40,000*	*Next 20,000*	*Over 120,000*
Labor cost	$39.00	$29.00	$25.00	$33.00

- The quarter's total direct labor costs are presented on the Performance Report in the cost of goods sold section.
- A *cash outflow* equal to 90 percent of the direct labor costs occurs in the current quarter; the other 10 percent becomes part of the accounts payable balance (Exhibit 4.2). The accounts payable balance is paid in the next quarter.

Accounting Impacts

Performance Report—direct labor (60,000 × $39.00 + 40,000 × $29.00)	$3,500,000
Cash Budget—outflows	3,150,000
Position Statement—accounts payable	350,000

Decision. The decision is automatically performed by FG.

Warehouse Fees

- Warehouse fees are charged on ending inventories on a per-unit basis.
- There are three different per-unit charges: $1.00 on the first 2,000 units, $3.00 on the next 5,000 units, and $8.00 per unit thereafter.
- The Performance Report's stated warehouse fees of $60,408 are derived from the ending inventory balance of 12,426 units and the warehouse fee schedule—[2,000 × $1.00] + [5,000 × $3.00] + [5,426 × $8.00] = $60,408.
- The warehouse fee schedule remains the same throughout the game.
- Warehouse fees are a current quarterly *cash outflow*.

Accounting Impacts

Performance Report—warehousing costs (see above)	$60,408
Cash Budget—outflows	60,408

Decision. The decision is automatically performed by FG.

Plant

The fixed plant order cost of $250,000 is often overlooked when preparing the cash budget by hand.

Plant capacity is required, in addition to machine capacity, to produce the product. New plant capacity has to be purchased as product demand increases and/or old plant expires.

- Actual unit production in a given quarter cannot exceed the operating plant capacity for that quarter.
- Plant capacity levels for the next four quarters are given on the Summary Sheet each quarter in the section "Information for Future Quarters." The plant capacity and depreciation charges, which are not given on the Summary Sheet for the remaining periods beyond quarter 5, are provided in Exhibit 4.6.
- The plant capacity information on the Summary Sheet is automatically adjusted for expirations or new additions.
- **It takes two quarters to build a new plant.** For example, a plant ordered in quarter 2 is not usable until quarter 4.
- A plant has a life of 20 quarters. For each unit of plant, one unit of product can be produced in each of its 20 periods, starting with the quarter when the capacity comes on line. This would be in quarter 4 in the example just provided.

- The plant capacity expires whether or not it is used.
- There is no end-of-life salvage value or removal cost for expired plant.
- Plant per-unit purchase price is listed in the Summary Sheet ($321 for quarter 2). The general level of business activity and inflation affect the unit price of plant capacity.
- There is also a fixed $250,000 order cost every time plant capacity is purchased.
- The total plant cost is a *cash outflow* in the period it is ordered.
- Plant is depreciated on a straight-line basis. One-twentieth of the original cost is depreciated each quarter. Depreciation starts two quarters after purchase, when the added plant capacity becomes operational.
- The current plant depreciation is included in the cost of goods sold section of the Performance Report. The depreciation on the plant in each of the next four quarters, assuming that there are no new plant additions, is included in the Summary Sheet.
- The original cost of all past plants purchased less accumulated depreciation is presented in the fixed assets section of the Position Statement every quarter.

Accounting Impacts. Plant purchases of 20,000 units at $321 per unit:

Position Statement—plant	$6,670,000
Cash Budget—outflows (20,000 × $321 + $250,000)	6,670,000

Accounting Impacts. Depreciation for quarter 2:

Performance Report—depreciation: plant (from Exhibit 4.3)	$1,300,000
Position Statement—plant (quarter 1 balance of $7,165,250 – $1,300,000)	5,865,250

Note: In the above example with a purchase of 20,000 units of plant, the quarter 2 Position Statement—plant account would be $12,535,250 ($5,865,250 + $6,670,000).

Managers often overlook the two-period delay that occurs when purchasing plant capacity.

Decision: Units of Plant Capacity Purchased. Units of plant capacity purchased for a quarter are entered on the Pro Forma Decision Sheet input form (see Chapter 2). The number of units ordered is automatically reset to zero on the next actual decision form.

Machinery

Machinery is needed to produce units. The following conditions apply to machinery:

- A unit of machine capacity can produce one unit.
- The actual units produced in a given quarter cannot exceed the company's operating machine capacity for that quarter.

EXHIBIT 4.6 Plant Capacity and Depreciation beyond Quarter 5

	Period					
	6	*7*	*8*	*9*	*10*	*After 10*
Capacity	50,000	50,000	25,000	25,000	25,000	0
Depreciation	$667,500	$667,500	$313,750	$313,750	$313,750	0

EXHIBIT 4.7 Machinery Capacity and Depreciation beyond Quarter 5

	Period			
	6	*7*	*8*	*After 8*
Capacity	60,000	5,000	5,000	0
Depreciation	$311,250	$22,500	$22,500	0

- Information on the machine capacity and depreciation for each of the next four quarters is provided on the Summary Sheet each quarter. The depreciation and capacity levels of machinery in future quarters beyond 5 are listed in Exhibit 4.7.
- Machinery capacity and depreciation information on the Summary Sheet is automatically adjusted for expirations and new additions.
- A unit of machine capacity purchased in one period becomes operational in the next period. For example, machine capacity added in quarter 2 is not available for producing units until quarter 3.

Production is limited to the lesser of plant or machine capacity.

- Machinery is depreciated on a straight-line basis. The depreciation rate is equal to one-eighth of the original cost each period. Depreciation starts in the quarter after acquisition, when the machinery becomes operational. The machine depreciation for the current period is included with the depreciation of capital budgeting projects on the Performance Report.
- The purchase of machinery results in a *cash outflow* in the quarter of purchase. *The cost of a single unit of capacity for the coming quarter is given on the Summary Sheet*. The machinery cost varies from quarter to quarter and is related to the general level of business activity and inflation the firm will face.
- Excess machinery can be stored at no additional cost. Therefore, the unit machine capacity can exceed the unit plant capacity. Production is limited to the lesser of plant or machine capacity.
- Machinery has an eight-quarter useful life.[1] At the end of its last period, it is removed with no additional costs or cash flows.
- Machinery expires whether or not it is used. Nonuse, including storage, does not postpone the expiration of machine potential.
- Machine capacity can only be purchased. Sale, abandonment, and removal are not available options in the game.

The one-period delay in use of added machine capacity must be considered.

- The machinery and equipment account of the Position Statement includes the original cost of both machinery and capital budgeting projects less accumulated depreciation.

Accounting Impacts. Machine purchases total 15,000 units at $47 per unit.

Cash Budget—outflows (15,000 × $47)	$705,000
Position Statement—machinery and equipment	705,000

[1]A special option violates this condition. See the extraordinary item, "fire eliminates inventory and machine capacity."

Accounting Impacts. Depreciation for quarter 2 totals

Performance Report—depreciation: mach. and equip. (from Exhibit 4.3)	$478,125
Position Statement—mach. and equip. (quarter 1 of $2,008,125 – $478,125)	1,530,000

Manager Objective. Profits forgone on sales lost due to inadequate inventory and productive capacity need to be compared to the extra carrying costs of inventory, machine capacity, and plant capacity (including depreciation and the cost of funds invested in these assets). Managers have an optimal investment in productive assets when the profit gained from the expected additional unit sales generated by the additional funds invested to produce the extra unit equals the carrying cost of the additional investment. See Chapter 3 for more on strategy formation.

Decision: Units of Machine Capacity Purchased. Units of machinery purchased for a quarter are entered on the Pro Forma Decision Sheet input form (see Chapter 2). The number of units ordered is automatically reset to zero on the next actual decision form.

Capital Budgeting Projects

The following rules apply to the capital budgeting projects:

- Two new possible capital budgeting projects are available for purchase *each quarter*. The manager has the option of accepting both projects, rejecting both projects, or selecting either A or B while rejecting the other.
- A new A and B are offered each period and the above selection options are again available. For example, the acceptance of A in quarter 2 does not limit the further acceptance of another A in any future quarter.
- The basic information on each quarter's two projects, A and B, is presented in the capital budgeting projects for next quarter section of the Summary Sheet (Exhibit 4.8). Exhibit 4.8 contains this information for quarter 2 projects.
- Project A always has an 8-quarter life and a capacity of 100,000 units, while B has a 12-quarter life and a capacity of 120,000 units.
- The project cost is a current-period *cash outflow* at the date of purchase. Project A would cost $659,280 in Exhibit 4.8.
- A project affects changes in the other overhead account for each quarter of its life. Project A above reduces other overhead charges by $15,340 in each quarter 2 through 9.
- Projects also affect changes in the per-unit labor costs covered in the "Direct Labor" section of this chapter. When adopted, the projects reduce labor costs in their first quarter of use by the amount listed under the

EXHIBIT 4.8 Capital Budgeting Alternatives for Next Quarter

	Life	*Cost*	*Unit Capacity*	*Overhead Saving*	*Unit Labor Sav. Qtr. 2*	*Change/Qtr. Labor Sav.*
A	2 yrs.	$659,280	100,000	$15,340	$0.82	$0.03
B	3 yrs.	$513,342	120,000	–$8,102	$0.85	–$0.01

heading "Unit labor sav., Qt. *x,*" an abbreviation for "Unit labor savings in quarter *x.*" Referring to Exhibit 4.8, this is 82 cents per-unit for project A.

- This per-unit savings applies for up to 100,000 units produced for project A and up to 120,000 for project B.
- The capital budgeting projects become operational immediately and generate savings and cost changes in the period purchased. Therefore, the projected per-unit labor costs and total dollar overhead costs on the current-period Summary Sheet need to be changed to reflect the impact of the new project(s) acquired.

Example. When A is accepted, the other overhead charge for period 2 would have to be revised downward by $15,340, to $184,660. The labor costs for period 2 would become $38.18 (or $39.00 – $0.82) for the first 60,000 units and $28.18 (or $29.00 – $0.82) for the next 40,000 units. These changes would have to be used if pro forma statements are being prepared by hand. Corrections will automatically be incorporated into pro forma statements generated on the computer.

- The quarterly per-unit labor savings of a project can change throughout the life of the project. The amount of this change is presented in the Summary Sheet under the title "Change/Qtr. Labor Sav.," an abbreviation of "the change per quarter in per-unit labor savings." With the example in Exhibit 4.8, the quarterly change in labor savings for A is 0.03. For example, the labor savings per unit for A and B over the life of the two projects are given in Exhibit 4.9.
- The Summary Sheet in future quarters will automatically include the effects of the accepted capital budgeting project on both the other overhead and the labor cost sections of the Summary Sheet over the life of the accepted projects.

Example. If project A were accepted, the quarter 2 output statements would list quarter 3 labor costs as $38.15 (or $39.00 – .85) for the first 60,000 units, and $28.15 (or $29.00 – .85) for the next 40,000 units. Since A's capacity is only 100,000 units, the labor cost rates on the next 20,000 units and those over 120,000 would remain unchanged at $25.00 and $33.00, respectively.

- The capital budgeting projects are production line improvements that reduce labor costs, power consumption, and other overhead items. **They do not increase or affect in any manner the machine or plant capacity required to produce units.**
- The capacity potential of the capital budgeting projects remains at 100,000 for A and 120,000 for B even if plant or machine capacity falls below this level. For example, assume that in quarters 2 through 5 the machine capacity is 80,000 units and A is purchased in quarter 2. In quarter 6 and

EXHIBIT 4.9 Quarter 2 Projects' per-unit Labor Cost Savings

		Period											
		2	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
	A	82	85	88	91	94	97	100	103	—	—	—	—
Savings (cents)	B	85	84	83	82	81	80	79	78	77	76	75	74

on, machine capacity increases to 100,000 units and savings in labor costs can now be generated on 100,000 units for A and the first 100,000 of the then existing project B's capacity of 120,000.

- Depreciation is straight-line, equal to 1/8th of A's or 1/12th of B's initial project cost each quarter.
- Depreciation on capital budgeting projects is included with depreciation on machinery in the Performance Report. Depreciation charges for each of the next four quarters on all past accepted capital budgeting projects is included on the Summary Sheet in the section "Depreciation: Projects."
- The original cost less accumulated depreciation of the capital budgeting projects is included with the net machinery in the machinery and equipment account of the Position Statement.

Accounting Impacts. Project A is acquired in quarter 2.

Cash Budget—outflows	$659,280
Position Statement—machinery and equipment ($659,280 – $82,410)	576,870
Performance Report—depreciation: mach. and equip. ($659,280 /8)	82,410

Additional marginal effects assuming production in quarter 2 of 100,000 include:

Cash Budget—inflows (reduction in outflows)	$97,000
Performance Report—direct labor (reduction)	82,000
Performance Report—other overhead costs (reduction)	15,000

Manager Objective. Net present value analysis or the internal rate of return procedure should be used to evaluate projects. The cost of capital needs to be derived quarterly and used as the discount or hurdle rate for the projects. Positive net present value projects or projects with an internal rate of return greater than the cost of capital should be accepted. If the projects are acceptable, external funds should be sought, if necessary, to finance the projects.

Decisions: Capital Budgeting Projects A and B. Capital budgeting projects are acquired by selecting the "Yes" option for a project on the Pro Forma Decision Sheet input form (see Chapter 2). The items are left blank if no purchase is desired.

Other Overhead

The other overhead costs account includes fixed production expenses except depreciation.

This includes items like fixed lease and rent commitments, property taxes and assessments, the minimum fixed utility costs, and minimum indirect labor costs for plant maintenance.

- The current period's other overhead costs are included in the Performance Report in the cost of goods sold section. The other overhead costs for the next four quarters are included in the Summary Sheet.
- Adjustments to the other overhead costs account through the acquisition and expiration of capital budgeting projects were covered earlier. Except for these adjustments, the other overhead costs remain at a constant $200,000 throughout the game.
- Ninety percent of the period's other overhead charges are a *cash outflow* in the period they occur. Ten percent are deferred and become part of the

accounts payable on the position statement together with 10 percent of both the total materials and labor costs. The adjustments are automatic and not manager-controlled.

- If the plant and machine unit operating capacities are both at zero units, the production segment of the firm is considered liquidated and the other overhead charges are zero.

Accounting Impacts. Projects A and B are not acquired in quarter 2.

Cash Budget—outflows	$180,000
Position Statement—accounts payable	20,000
Performance Report—other overhead costs	200,000

Decision. The decision is automatically performed by FG.

Summary on Production Costs

The Performance Report includes all the quarterly cost effects covered in this subsection. The sum of the period materials, direct labor, warehousing fees, depreciation, and other overhead costs is the total production costs.

The *average unit production cost*—$70.39 in quarter 1—is found by dividing the actual unit production (100,000) into the total production costs ($7,038,533). This information is provided on the Performance Report on the production costs line.

Note: The per-unit cost of $70.39 contains rounding error since the cost is actually $70.38533 per unit. The per-unit costs or prices throughout the set of financial statements times the number of units will often not equal the actual account balance. Goods available for sale include the beginning inventory and period production costs. *Average costing* is used in the game. An average cost of a unit sold is the sum of the beginning inventory balance ($733,567) and production costs ($7,038,533) divided by the sum of beginning inventory units (9,809) and units produced (100,000). As Exhibit 4.1 shows, this is $70.78 (or $7,772,100/109,809) per unit. *Ending inventory* is also valued on the average cost basis—$879,492 for quarter 1.

Selling and Administrative Expenses

Selling and administrative expenses include executive salaries, central office administrative costs, advertising expense, the costs of additional price and demand forecasts, and costs of sales and distribution systems.

The following conditions apply to the selling and administrative expenses account:

- There is a fixed cost component of $1,000,000 each quarter.
- This fixed cost component is not charged in any period when operating plant capacity is zero units.
- There is a variable cost component equal to 5 percent of the quarterly sales revenue listed on the Performance Report.
- Advertising (described next) is a current-period expense included in selling and administrative expenses.
- Costs of additional price and demand forecasts of $30,000 or $75,000 are part of selling and administrative expenses.

- The selling and administrative expenses quarterly charge is a *cash outflow* in the period it occurs. Thus, from Exhibit 4.1, the account balance, $1,486,915, calculated for quarter 1 was paid in cash in quarter 1.
- The selling and administrative expenses are automatically calculated within the simulation and charged to expense and credited to cash each quarter.

Accounting Impacts. Additional forecasts and advertising are not used in quarter 2.

Cash Budget—outflows ($1,000,000 + [.05 × $9,738,300])	$1,486,915
Performance Report—selling and administrative expenses	1,486,915

Manager Objective. The fixed quarterly and variable administrative and selling costs are operating costs that must be covered before a company achieves profitability and sufficient return to cover the cost of capital. If this objective is not expected to be achieved in the long run, the company should be closed or liquidated. Objectives with forecast costs and advertising are in their respective subsections.

Decision. The decision is automatically performed by FG.

Advertising Costs

Advertising costs can be incurred to increase product demand. The relative shift in demand caused by advertising is impacted by both the general economic level of activity and the company's adopted pricing policy.

Advertising is reported as part of the selling and administrative expenses on the Performance Report; it is a *cash outflow* in the quarter of entry.

Manager Objective. The manager needs to determine an optimal advertising expense that should be paid each quarter. Advertising should be added if the marginal dollar of expense returns at least the dollar cost plus the cost of capital at the end of the quarter. See the discussion of advertising in Chapter 3.

Decision: Advertising. The total dollar amount of quarterly advertising costs is entered on the Pro Forma Decision Sheet input form (see Chapter 2). The impact of advertising in a given quarter is not dependent on prior levels of advertising.

Extraordinary Items

Unexpected one-shot events that require additional management planning and often a revision in the company strategy can be initiated by the instructor. The labor strike, extraordinary loss or gain, and fire options that follow can occur at any time at the instructor's discretion.

Labor Strike

- The labor strike is a special option initiated by the instructor.
- Managers first receive a statement about an impending strike. The announcement appears after the Summary Sheet on the firm's output. It states, "Bargaining with the labor union is continuing and in the next period the firm

must either meet the union's demands or face a possible one-period strike." For example, if this were quarter 10, the strike could take place in quarter 12. The instructor also can initiate a wildcat strike without any warning given.

- The strike possibility occurs for all firms playing the game.

Three options are available to the manager:

1. All union demands can be refused, with an instructor set percent chance for a strike lasting only one quarter. If the strike occurs, production is halted for one quarter.
2. With a $6.00 increase in labor cost per unit, the probability of a one-period strike would be one-half of the instructor's probability of having a strike.
3. The strike can be averted with a $15.00 increase in labor cost per unit. Labor cost increases are initiated for all levels of production starting with the period of the possible strike. The settlement choice can allow some firms to produce, while others are idle for the period. The instructor has the ability to have more than one possible strike during the game.

Manager Objective. The manager should examine the trade-off between losses from missed production versus increased labor costs throughout the game. The production and inventory levels before the strike might also require changes depending on the modified production costs and strategy of the firm.

Decision: Labor Strike. The *strike settlement decision* is selected with a decision option available on the Pro Forma Decision Sheet input form (see Chapter 2) when an impending possible strike is coming. The option is shown on the screen only if there is a forthcoming strike possibility that is not a wildcat strike.

Extraordinary Loss or Gain

- An instructor-initiated option causes a large cash outflow or inflow and an extraordinary loss or gain.
- There is no warning of an impending problem unless the instructor wishes to provide the information in advance.
- In the period of occurrence, the Performance Report account titled "extraordinary items" will indicate the dollar amount of the extraordinary item.

Manager Objective. The manager must assess the new position of the firm after this event and adjust the future policies to reflect the current performance and position of the company.

Decision. No active decision is made by the manager.

Fire

A fire can eliminate inventory and machine capacity.

- Initiated by the instructor, this option eliminates all ending inventories and an instructor-specified percentage of machine capacity.

- No warning is given that the fire will occur; the statement "YOUR FIRM HAS HAD A FIRE" is provided if one occurs.
- Unlike the real world, the fires are systematic, occurring to all firms in the game at the same time. The option is applied to a firm at the end of the quarter after all the period's production and sales have taken place.
- Inventory is insured and cash is received for the dollar cost of the ending inventory balance.
- No cash is received for lost machine capacity. The event is extraordinary in nature and the lost machine value is charged to the extraordinary items account.
- The machine capacity in all future periods is cut by a specific percentage. The machine capacity figures on the previous and current Summary Sheets can be compared to determine the percentage of capacity lost.

Manager Objective. This option requires extra management planning with both acquisition of funds and a reformulating of a production strategy. The lost production capacity that will exist until the lost machine capacity is replaced will also negatively affect short-run future performance. Managers need to consider possible adjustments in the capital structure due to this increased company risk. The cost of capital will have to be monitored to determine changes that affect all future company investment decisions.

Decision. No active decision is made by the manager.

Loans and Debt Costs

Both company performance and level of financial leverage affect interest rates.

Debt costs or expenses arise from the use of short-term loans, the two intermediate-term loans, bonds, and the penalty loan. In the game, the interest rate charged on debt, excluding the penalty loan (described earlier), is determined by five items:

1. An ***underlying yield curve*** provides the relationship between interest rates for debt with different maturities. The yield curve in the game can have a constant, positive, or negative slope. Examination of the yields on debt of different maturities can help in isolating the company's yield curve. Instructors can change the slope of the yield curve during the game.
2. ***Economic conditions*** affect the yields on debt. In an expanding economy, demand for funds is high and the interest rate structure on all debt and securities is higher. The reverse holds with an expected downturn.
3. ***Inflation*** increases the interest rates for all types of debt issues other than the penalty loan with a greater impact on longer maturity debt.
4. ***Risk of insolvency*** is related to the firm's long-run ability to meet debt payments. This, in turn, is a function of the profitability, variability in profitability, and debt-equity structure of the firm. As the likelihood of insolvency increases, all debt costs increase, and the longer-term obligations become relatively more expensive than the shorter-term obligations.
5. A ***temporary size of offering premium*** adjusts for intra-period debt changes. The premium serves as a constraint against massive single-period debt offerings. The premium represents a concession needed to

increase demand for the debt sufficiently to sell all the debt offered to the market for companies with greater amounts of financial leverage. In the game, **cost increases of 0.125 percent per million dollars** of quarterly debt offered in a given quarter are imposed.

Example. The rate for bonds for quarter 2 from Exhibit 4.3 is 1.754 percent. Assume that a total $6.5 million of two-year debt, three-year debt, and bonds are to be issued. The specific offering of bonds would have a required yield of 2.504 percent (or 1.754% + [0.125% × 6]). Likewise, the two-year debt would have a yield of 2.665 percent, and three-year loans' yield would be 2.604 percent since the 0.75 percent premium (0.125% × 6) would be added to the Exhibit 4.3 rates.

Manager Objective. Managers must estimate the percent cost of any new financing using step 5 above and "Rates on funding in quarter *x*" of the Summary Sheet in deriving estimates of the actual quarterly rates on debt. These estimates are required as input information in generating pro forma statements both in FG and by hand.

Short-Term Loans

Temporary funds can be obtained through short-term loans. The following rules apply:

- An immediate *cash inflow* equals the size of the issued short-term loan.
- A short-term loan is issued for four quarters and is repaid in equal installments.
- A *cash outflow* is equal to
  a. Twenty-five percent of the current quarter's short-term loan just issued, plus
  b. The installments due on the previous quarters' short-term loans, presented on the Summary Sheet, plus
  c. The interest on all outstanding short-term loan balances for the quarter.
- Retirement is automatic.
- Retirement before maturity is not possible.
- The interest rate is included in the "Rates on funding in quarter x" section of the Summary Sheet. This new rate must be adjusted upward for the size of new issues premium just covered. The adjusted rate is applied to all short-term loans.

Example. The rate for the company for quarter 2 is 1.981 percent from Exhibit 4.3. If no new short-term loans are issued, the 1.981 percent rate applies to all outstanding short-term loans for quarter 2. If new short-term loans are issued in quarter 2, the manager will have to estimate the effect of the new issue on the rate. Assume the prior example with a premium of 0.75 percent. The revised rate of 2.731 percent (1.981% + 0.750%) would be applied to the entire outstanding short-term loan's balance.

Accounting Impacts. The company issues $800,000 of short-term debt and no other debt.

Cash Budget—inflow (issuance)	$800,000
Cash Budget—outflow (first repayment installment + interest)	215,848
Position Statement—short-term loans payable	600,000
Performance Report—short-term bank interest (1.981% × $800,000)	15,848

Decision: Short-Term Loans. The short-term loans issuance decision is on the decision form (see Chapter 2). All financing decisions are automatically reset to zero for each new set of quarterly decisions. The status quo is to have no financing; an active decision is required by managers to issue any new financing by entering the amount desired each quarter.

Short-Term Penalty Loans

See the "Cash Shortages and Short-Term Penalty Loans" subsection in the "Cash Management" section.

Intermediate-Term Loans

Two- or three-year intermediate-term loans can be issued. Here are the rules that apply to intermediate-term loans:

- Intermediate-term loans are issued for 8 or 12 quarters and are repaid in equal installments.
- The loan is taken out at the beginning of the quarter with a resultant *cash inflow* equal to the total loan issued.
- Repayment of the first installment starts at the end of the quarter of issue.
- Retirement is automatic.
- The cost rates on the new intermediate loans, before the size of offering risk premium, are given on the Summary Sheet in the section on "Rates on funding in quarter *x*."
- The outstanding debt yields given on the Summary Sheet are weighted average costs of all debt issued of a given class, either the two- or three-year loan or bonds.
- A standard accounting procedure is used in reporting debt balances. Debt retired within one year (four quarters) is listed as current liabilities on the Position Statement (Exhibit 4.2). All debt maturing after four quarters is listed in the long-term liabilities section.
- The repayment in each of the next four quarters for each class of debt is given in the Summary Sheet under principal repayment on debt.
- The size of all the installments for the two-year loan installments in quarters beyond those shown on the Summary Sheet is $312,500 in each of quarters 6 through 8.
- Retirement before maturity is allowed without penalty or extra cost. The most recent quarterly installments are retired first. The outstanding debt yields from the Summary Sheet are unaffected by retirement. A loan with a weighted average yield derived from combining all of the prior issues' balances still outstanding is retired. A specific previous issue cannot be retired. The currently due quarterly installment is paid at the end of the quarter and cannot be retired in advance.
- The interest payable in the coming quarter is presented on the Summary Sheet each period. Additional interest from new issues would be calculated using the size of offering premium and the appropriate (two- or three-year) rate for the coming period, listed on the summary sheet under "Rates on funding in quarter *x*."

- The decrease in interest coming from a retirement is calculated by applying the appropriate debt rate from the yields of outstanding debt section of the Summary Sheet to the amount being retired. For interest calculation purposes, a retirement is viewed as taking place at the beginning of the quarter.
- A *cash outflow* occurs each quarter. It is composed of
  a. The interest on the intermediate-term debt, plus
  b. The principal repayment on intermediate-term debt listed on the Summary Sheet, plus
  c. The first quarterly installment on any new intermediate debt offered in the current quarter, plus
  d. The dollar amount of prepayment of intermediate-term debt.

Accounting Impacts. The company issues $2,400,000 of three-year debt for quarter 2 and no other debt. The impact of already outstanding intermediate-term debt is also included.

Cash Budget—inflow (issuance)		$2,400,000
Cash Budget—outflows:		
Prior 2-year loan installment		312,500
New 3-year loan installment		200,000
Prior 3-year loan installment		300,000
Intermediate interest (on prior debt from Exhibit 4.3)		83,031
Interest on new 3-year loan ([1.854% + 2 × 0.125%] × $2,400,000)		50,496
Performance Report—intermediate-term loan interest ($83,031 + $50,496)		133,527
Position Statement—intermediate-term debt maturing:		
2-year debt ($312,500 × 4)	$1,250,000	
Prior 3-year loan ($300,000 [qtr. 3 installment])	300,000	
New 3-year loan (4 × $200,000)	$ 800,000	2,350,000
Position Statement—long-term liabilities		
2-year loans (2 × $312,500 [qtrs. 7 and 8])	$ 625,000	
3-year loans (7 × $200,000 [qtrs. 7–13])	1,400,000	2,025,000

Warning: Participants often have difficulty in determining the outstanding balance of a given type of debt and in projecting the consequence on the Position Statement of a newly issued debt. This arises from the standard accounting convention of showing the debt coming due in one year (four quarters hence) in the current portion of the liabilities while including the remainder in a long-term liability account. Managers in the game often erroneously disregard or overlook the current liability component. This leads to errors if a pro forma is being estimated by hand and when debt balances are used in making company decisions, like determining the company's weighted average cost of capital.

Decision: Intermediate-Term Debt. The decision is entered on the Pro Forma Decision Sheet input form (see Chapter 2). A given type of loan can be either issued or retired in each period. *A minus sign immediately in front of the number indicates a retirement decision.* All financing decisions are automatically reset to zero for each new set of quarterly decisions. The "status quo" is to have no financing; an active decision is required by managers to issue any new financing by entering the amount of additional financing to issue or retire each quarter.

Long-Term Bonds

Bonds have the longest maturity of the available debt instruments and are often used as a source of permanent funds in obtaining financial leverage. The following rules apply:

The $50,000 flotation cost of a new issue is often overlooked. Errors in available funds and interest expense result.

- Long-term bonds are issued for 10 years (40 quarters). A bond issued at the beginning of the quarter generates a current quarterly cash inflow.
- Bonds are repayable in 40 equal quarterly principal installments starting at the end of the issuance quarter. Retirement is automatic. A decision input is not required by the manager.
- Yield on a new long-term bond to be issued, before adjustment for the size of offering risk premium, is indicated on the Summary Sheet in the section on "Rates on funding in quarter *x*."
- The yield on outstanding bonds, given on the Summary Sheet, is a weighted cost of all debt issued. Interest due in the coming period on the current outstanding bonds is presented on the Summary Sheet. The interest charges for the previous period are on the Performance Report in the financial expenses section.
- There is a fixed $50,000 flotation cost every time new bonds are issued that is a current-period *cash outflow.* Considered immaterial, this cost is charged off in the period of issue as a bond interest expense and is not amortized over the life of the loan. The fixed fee is not incorporated into the estimated yield on bonds found in the Summary Sheet's section on "Rates on funding in quarter *x*."
- Bonds can be retired before maturity. They are callable at the bond call premium rate of 8 percent specified on the Summary Sheet. The call premium is treated as a current-period financial expense and is listed on the Performance Report under the line item "bond redemption costs." The most distant bond payment installments are retired first. As with the intermediate debt, the quarterly payments of different original bond issues coming due in a given quarter are aggregated. Thus, there is no way to retire a particular issue, and a part of the entire portfolio of bonds is called when a retirement occurs.

Example. If $1,000,000 of bonds were to be redeemed by the company before maturity, the *cash outflow* would be the principal repayment of $1,000,000 plus the call premium of $80,000 (or $1,000,000 × 0.08).

- The *cash outflow* from bonds includes
  a. The quarterly interest, plus
  b. The principal repayment installment listed on the Summary Sheet, plus
  c. The first quarterly installment of a new issue of long-term debt or
  d. The dollar amount of prepayment on bonds plus the redemption cost of the payment.
- The four nearest quarterly installments on bonds are listed on the Summary Sheet and are considered a current liability on the Position Statement. Installments in the more distant future are aggregated in the bonds account. (See Exhibit 4.10.) The size and date of all the installments for the bonds due in periods beyond those shown on the Summary Sheet are $300,000 for quarters 5 through 9.

EXHIBIT 4.10 Bond Retirement Schedule

	Period					
	5	*6*	*7*	*8*	*9*	*After 9*
Payment (000)	$300	$300	$300	$300	$300	$0

Accounting Impacts. The company issues $2,400,000 of bonds and $2,000,000 of two-year debt for quarter 2. The impact on all bond-related activities is included.

Cash Budget—inflow (issuance)		$2,400,000
Cash Budget—outflows:		
Flotation cost		50,000
New bond installment ($2,400,000/40)	60,000	
Prior bond installment	300,000	
Bond interest (on prior bonds from Exhibit 4.3)		33,600
Interest on new bond ([1.754% + 4 × 0.125%] × $2,400,000)		54,096
Performance Report—bond interest ($33,600 + $54,096 + 50,000)		137,696
Position Statement—bonds maturing:		
Prior bonds ($300,000 × 4)	$1,200,000	
New bonds (4 × $60,000)	240,000	1,440,000
Position Statement—long-term liabilities:		
Old bonds (3 × $300,000 [qtrs. 7–9])		$ 900,000
New bonds (35 × $60,000 [qtrs. 7–41])	$2,100,000	3,000,000

Decision: Long-Term Loan. The long-term bond decision is entered on the Pro Forma Decision Sheet input form (see Chapter 2). Bonds can be either issued or retired before maturity each quarter. *A minus sign immediately preceding the dollar size indicates a call on the bonds before maturity*. All financing decisions are automatically reset to zero for each new set of quarterly decisions. The status quo is to have no financing; an active decision is required by managers to issue any new financing by entering the amount of financing desired each quarter.

Taxes

- The tax rate is constant throughout the game unless changed by the instructor.
- The percent rate is given in the Performance Report on the income tax line.
- The items that affect changes in taxable income are given in the Performance Report.
- Taxes are a *cash outflow* in the quarter they accrue and are automatically paid.
- It is assumed that there is always enough income earned in previous periods to utilize the benefits of any income loss carrybacks. A current-period negative figure for income before taxes will automatically generate a tax rebate equal to the tax rate times the loss. This is a current-quarter *cash inflow*.

Example. Assume the firm represented in Exhibits 4.1, 4.2, and 4.3 had an income-before-taxes loss of $1,000,000 for the quarter. The tax rebate would be $400,000 (or 0.4 × $1,000,000).

Decision. No active decision is required by the manager.

Equities

Common stock and preferred stock provide equity capital in the game. Here are the rules and conditions applying to outstanding equities and both the repurchase and issuance of equities.

Preferred Stock

Preferred stock is a fixed-cost, permanent-equity security. The preferred stock in the game has many conditions found with actual preferred stocks.

- The preferred stock required yield is derived in much the same manner as debt costs. The economic condition and the risk of nonpayment of preferred dividends enter into the determination of yield.
- Preferred stock is perpetual; once issued, it remains outstanding until repurchased. The dividend on the preferred is at a constant rate of $1.00 per quarter.
- The market price of a preferred stock is found by capitalizing the dividend by the required return rate on preferred stock.

Example. The preferred stock price for quarter 1 would be $32.15 (or $1.00/.03110). The price for quarter 2 will be $38.17 (or $1.00/.0262). The yield rates are both presented on the Summary Sheet.

- Preferred dividends are automatically paid every quarter. The manager does not need to enter a decision for preferred dividends.
- Preferred stock issues or repurchases occur at the beginning of the quarter, and dividends are paid on the shares outstanding at the end of the period.

Accounting Impacts. The company has 200,000 shares of preferred stock outstanding.

Cash Budget—outflow	$200,000
Performance Report—preferred stock dividend ($1.00 × 200,000)	200,000
Position Statement—preferred stock is the same as in the prior quarter	

Decision. Preferred dividends are automatically paid subject to the restrictions covered next.

Preferred Stock—Dividend Payment Restrictions. Preferred dividends are cumulative. If the firm's profitability deteriorates too far, preferred dividends will not be paid. This occurs only if the next two conditions both apply:

- The total of operating income before extraordinary items plus penalty interest is not sufficient to meet the before-tax cost of preferred dividends.

Example. Assume that in quarter 2, the company had operating income before extraordinary items of $36,000 and a penalty interest charge of $83,000. The operating income before extraordinary items and penalty interest would be $119,000. If the company had 30,000 shares of preferred outstanding, the before-tax cost of the preferred dividends at a 40 percent tax rate would be $50,000 [or $30,000/(1 – 0.4)]. Since this is less than the adjusted operating income of $119,000, the dividends would be paid. Alternatively, if 90,000 shares were outstanding, the before-tax cost of dividends of $150,000 exceeds the $119,000 limit and no preferred dividend would be paid in quarter 2.

- The company has short-, intermediate-, or long-term debt outstanding during the quarter. The requirement that a firm not pay dividends in a poor profitability situation is often written into the debt contracts or indentures.

Disallowed current quarterly preferred dividends will be added to previous cumulative unpaid dividends. As soon as the dividend restriction conditions are withdrawn, all unpaid cumulative past dividends are paid. *Preferred stock can be neither issued nor repurchased if there are any outstanding unpaid preferred dividends*. Information on cumulative unpaid dividends is presented on the Summary Sheet account "Unpaid preferred dividend/share."

Accounting Impacts. The company has 200,000 shares of preferred stock outstanding and dividends on preferred stock are disallowed.

Cash Budget—outflow	$0
Performance Report—preferred stock dividend ($0.0 × 200,000)	0
Position Statement—preferred stock balance is the same as in the prior quarter	

Decision. Restrictions are automatically imposed when the appropriate conditions apply.

Issuance of Preferred Stock. Preferred stock can be issued in any quarter to provide new external funds unless issuance, indicated above, is denied.

- Preferred stock will be sold to the public at the next quarter's market value. Flotation costs would be incurred and the full market value per share would not be received by the firm. There are three components to preferred stock flotation costs:
  a. A fixed fee per offering of $50,000 is charged.
  b. Two percent of the market value of the shares offered is charged as an additional discount.
  c. The receipts per share are inversely related to the size of the offering.

Example. If the company issued 100,000 shares in period 2, its net receipts might be $3,537,980 [or ($38.17 × 100,000 × 0.94) – $50,000], where the size of offering premium is estimated to require an additional 4 percent discount over the standard 2 percent discount (and thereby a multiplier of 0.94). The $3,537,980 would be the amount added to the preferred stock account.

- The net receipts are added to the previous balance in the preferred stock account that appears on the Position Statement.

Accounting Impacts. The company issues 100,000 shares in the above example and there are no prior preferred stocks outstanding.

Cash Budget—inflow	$3,537,980
Cash Budget—outflow (dividend)	100,000
Performance Report—preferred stock dividend ($1.00 × 100,000)	100,000
Position Statement—preferred stock	3,537,980

Warning: Large issues of preferred stock can require very substantial offering premiums. Preferred stock should be considered as a source for only a small proportion

of needed external funds. It is not a reasonable substitute for primary permanent funds, which should come from common stock and long-term debt.

Decision: Shares of Preferred Stock. Preferred stock is issued on the Pro Forma Decision Sheet input form (see Chapter 2). The number of total shares to be sold is entered on the form.

Preferred Stock Repurchases. Preferred stock is repurchased either at a call price or at a current market price, whichever is lower. The call price per share is determined by multiplying the period's average book value per share times 1 plus a call premium. The call premium is constant throughout the game at 8 percent.

> **Examples.** In the first case, the preferred stock account has a balance of $1,000,000 and there are 20,000 shares outstanding. The stock's market price in the period when it is to be purchased is $49.38. The book value per share from preferred is $50.00 (or $1,000,000/20,000). After adjustment for a call premium of 8 percent, the call price is $54.00 (or 1.08 × $50.00) per share. Since the current market value is lower than the call price, the shares would be purchased in open-market transactions at a cost of $49.38 per share.
>
> In the second case, the market price is assumed to be $56.00 per share and all other information is the same. The market price exceeds the call price of $54.00 and the shares will be called at $54.00 rather than repurchased in open-market transactions at a cost of $56.00 per share.

The difference between the average book value per share and the repurchase price is transferred to the common stock account.

> **Examples.** In the first case above, $.62 (or $50.00 – $49.38) per share is credited to (or increases) the common stock account. In the second case, Times –$4.00 (or $50.00 – $54.00) per share is charged to (or decreases) the common stock account. In the game, the common stock account is used as a catchall for special owner equity accounts that affect common shareholder book value.

Accounting Impacts. The company retires the 20,000 shares in the above example and there are no other preferred stocks outstanding. The market price of the preferred stock is $56.00 per share and the shares are called at $54.00 per share.

Cash Budget—outflow ($54.00 × 20,000)	$1,080,000
Cash Budget—outflow (dividend)	0
Performance Report—preferred stock dividend	0
Position Statement—preferred stock (None now outstanding)	0
Position Statement—common stock ([$50.00 – $54.00] × 20,000)	decreases $80,000

A preferred stock repurchase will be disallowed if there are any cumulative unpaid preferred dividends outstanding or the debt to total equity ratio is greater than 4 to 1. Short-term loans, intermediate-term loans, long-term debt, and penalty loans are the liability items used in the calculation. Restrictions of this type are usually found in debt contracts, called indentures.

Decision: Shares of Preferred Stock. Preferred stock is repurchased and retired on the Pro Forma Decision Sheet input form (see Chapter 2). The number of total shares to be sold is entered on the form. A repurchase is distinguished from a sale by placing a minus sign before the number of shares if a repurchase is to occur. Therefore, a sale and repurchase cannot occur in the same period.

Common Stock

Valuation of Common Stock. Common stock value is affected by six items. The first two items are measures of company expected earnings while the remaining four factors affect the rate of return required by shareholders on earnings.

- The total common stock value of the company is positively related to the anticipated ***future level of earnings*** to common stockholders. The current earnings to common stockholders given in the Performance Report are used as a starting point. Models internal to the game adjust for anticipated changes in future earnings.

  Example. Excess inventories would lead to lower future earnings that may not yet be fully represented in current and historical earnings. Insufficient machine or plant capacity would also lead to anticipated future poorer performance, relative to firms with adequate capacities.

- The historical ***growth rate of earnings*** is also positively related to the firm value. A high-growth-oriented company has a higher stock value than a lower-growth company.
- The ***economic environment*** affects costs. In an expanding economy, both inflation and tightening by the Federal Reserve cause higher rates of return. The reverse condition holds with an expected downturn in the economy.
- Shareholders require a ***risk premium*** for operating and financial leverage. Within the firm, the probability of erosion of original investment increases as both forms of leverage increase. Outside the firm, the market price volatility of the shares would also increase. This would imply increased risk of losses to shareholders.
- The ***dividend payout rate*** affects common stock price. The optimal payout rate is inversely related to the earnings growth rate of the firm. A company with an increasing EPS should have a lower payout rate than one with a constant or declining EPS. In the game, the payout rate is calculated using the sum of the current and the last three quarters' dividends per share over the sum of the same quarter's earnings per share (EPS). The four-quarter average is used to decrease the effects of seasonal variations on the optimal payout policy.
- The ***stability of dividends*** also affects the shareholders' required rate of return. Stability, as defined in the game, exists when there are no decreases in the dollar dividends paid per share. Two items affect the importance of the stability policy.
  a. The further the firm's actual dividend payout policy is from its optimal level, the smaller the effect of stability on cost.
  b. As the EPS growth rate increases, the effect of dividend stability on cost decreases.

  The value of common stock is modified by the above items in each period.

Manager Objective. Managers should be able to minimize the overall cost of funds for their company. One of the manager's prime responsibilities is to form strategies that will lead the firm toward the objective of minimizing costs and maximizing the wealth of the common stock investors. See Chapter 3 for further discussion on strategy formation.

Issuance of Common Stock. New shares of common stock can be issued. They are offered through an investment banker. Three items affect the divergence between the current quarter's closing share price ($35.57 in quarter 1, for example) and the per-share receipts from a new offering:

- There is a $50,000 fixed cost per offering.
- Five percent of the current market value of the share offered is charged as a flotation cost.
- The amount of receipts per share is inversely related to the size of the offering while receipts are positively related to reduction in uncertainty that can come from a less financially leveraged company.

The model providing an estimate of the actual receipts per share, *R,* includes all three of the above effects:

$$R = \frac{P}{1.05 + .5S_n / S_o} - \frac{\$50,000}{S_n}$$

where

P = Current common stock price
S_n = Number of shares offered
S_o = Number of shares currently outstanding

The first component of the right side of the equation discounts the current common stock price by 5 percent to adjust for flotation costs. This component also includes a function, $0.5S_n/S_o$, that makes the receipts per share, *R,* inversely related to the size of the offering.

- The number of shares to be issued must also be determined.
- The firm receives a current period *cash inflow* equal to the number of new shares issued times the receipts per share price.
- Common stock is no par. The full value of any issue goes into the account labeled common stock.
- The receipts per share figure is listed on the Summary Sheet under the heading "Common tender of sell/share." The line item has a zero balance when neither an offering nor a repurchase is entered.

Example. In quarter 2, if the manager were to issue an offering of 100,000 shares, the receipts per share would be estimated to be

$$R = \frac{\$35.57}{1.05 + .5(100,000 / 1,000,000)} - \frac{\$50,000}{100,000}$$
$$= \$31.836$$

In the company's view, it could issue 100,000 shares with per-share proceeds of $31.836 and total proceeds to the company of $3,183,600 (or 100,000 × $31.836).

Accounting Impacts. For the issuance just covered and assuming a dividend of 10 cents,

Cash Budget—inflow	$ 3,183,600
Cash Budget—outflow ($0.10 × 1,100,000)	110,000
Performance Report—common stock dividend ($0.10 × 1,100,000)	110,000
Position Statement—common stock ($8,000,000 + $3,183,600)	11,183,600

Manager Objective. An optimal decision should be based on the firm's funding requirements, the capital structure, and the effect on proceeds of both the fixed cost and the size of offering. For more detail on optimal equity positions, see Chapter 3.

Decision: Shares of Common Stock Issuance. The number of shares to be issued is entered on the Pro Forma Decision Sheet input form (see Chapter 2). The sales per-unit price is required in the "common tender price" decision input only for pro forma statements.

Repurchase of Common Stock. Common stock repurchase is obtained through a tender offer. More information on the tender decision is covered in Chapter 5. The following conditions apply:

- The manager must establish the tender price per share that he or she is willing to offer for the repurchase of common stock. It is the manager's responsibility to determine the markup needed to successfully tender shares.
- The manager must specify the number of shares to be tendered. The repurchase price will be directly related to the size of the tender offer. The tender price is derived from the closing quarterly common stock price.
- The percent premium is also inversely related to the dollar value of a share, with a lower-price share having a higher-percent premium.
- The tender is exercised and the numbers of shares requested are repurchased if the tender price entered by the manager exceeds the demand-adjusted market price determined within the program.
- If the adjusted market price for the number of shares demanded exceeds the tender price, the shares that are offered by investors at the tender price are repurchased. This will be less than the number of shares requested. Managers do not have the real-world option of refusing the tender of any shares if the original number of shares requested is not forwarded by shareholders. Thus, an "all or none" option on the repurchase of common stock is not available.
- If the full tender is successful, the shares are repurchased at the manager's tender price, not at the internally computer-generated acceptable market price, which may be lower. Partially successful tender offers are also repurchased at the tender price, which is equal to the underlying computer-generated repurchase price.
- The total tender price of the shares actually repurchased is a *cash outflow* in the quarter that the tender is made.
- An after-tax cost of $1.00 is charged per share originally requested in the tender offer but not sold by investors to the company at the tender price. This charge is a *cash outflow* in the period the tender occurs. In a real situation, this would cover the advertising, legal, and other costs of a partially unsuccessful tender. This cost is charged against the after-tax income in the period of occurrence. The line item is given on the Performance Report only when the actual number of shares tendered is less than the original number sought.
- Repurchased shares can affect both the common stock and retained earnings accounts. The repurchase price is allocated to the accounts according to the weights in each of the accounts as a percentage of total common stock and retained earnings.

- A tender offer will be entirely disallowed for any one of three reasons:
  a. If there are any outstanding unpaid preferred dividends in the most recent closing quarterly statements, repurchase is not allowed.
  b. If the retirement would result in a negative equity balance in the previous period's common stock accounts, repurchase is disallowed.

Example. If a tender was made in quarter 2 and the tender price times the shares tendered equaled $12,000,000, this balance when netted from Period 1's retained earnings and common stock balance, $11,190,575 (or $8,000,000 + $3,190,575), would cause a negative common equity account balance. The entire tender offer would be rejected in this case.

  c. The book-value debt-to-common equity ratio must not deteriorate below 4 to 1. This condition does not apply to the issuance of debt; it applies only to common stock repurchase.

Common stock issuance and retirement only temporarily have a direct effect on the common stock price. The tender price or issuance price causes the market price to increase or decrease only in response to the specific tender or offer size. This market response does not directly affect further quarterly closing prices, including the quarter closing price in the period a tender or offer takes place. The tender or issuance of stock can indirectly affect end-of-current-quarter and future common stock prices through the six common stock valuation conditions given previously.

Example. If 100,000 shares were tendered at $40.00 per share in quarter 2, the $4,000,000 (or $40 × 100,000) would reduce the common stock account by $2,859,526 {or $4,000,000 × [$8,000,000/($8,000,000 + $3,190,664)]}, and the retained earnings account would be reduced by $1,140,474 {or $4,000,000 × [$3,190,664/($8,000,000 + $3,190,664)]}. Additionally, the number of shares outstanding would be reduced to 900,000 (or 1,000,000 – 100,000) in quarter 2. The repurchase is treated as a retirement of stock.

Accounting Impacts. The company retires the 100,000 shares in the above example and has a 10-cent dividend.

Cash Budget—outflow ($40.00 × 100,000)	$4,000,000
Cash Budget—outflow (dividend of $0.10 × 900,000)	90,000
Performance Report—common stock dividend ($0.10 × 900,000)	90,000
Position Statement—common stock ($8,000,000 – $2,859,526)	5,140,474
Position Statement—retained earnings	decreases 1,140,474

Decision: Common Stock Repurchases. The number of shares management desires to repurchase is entered on the Pro Forma Decision Sheet input form (see Chapter 2). To differentiate a purchase from an issue, a minus immediately precedes the number of shares the manager desires to repurchase. A common tender price is also entered on the Pro Forma Decision Sheet input form to indicate the manager's per share tender price.

Common Stock Dividends. Managers have the ability to issue dividends each quarter in the game. Any of the following conditions will result in an automatic decrease or elimination of dividends on common stock.

- If either loans or preferred stock is outstanding, the total common stock dividend of a given quarter will not be allowed to exceed the average quarterly earnings to common stockholders of the current and past three quarters.

Example. The average earnings per quarter will be $400,000 if in the past four quarters the company's common stockholders have earned $300,000, $350,000, $400,000, and $550,000, respectively. If either loans or preferred stock are also outstanding in the current quarter, the total common stock dividend cannot exceed $400,000. With 1,000,000 shares outstanding, a management-declared dividend of 50 cents would automatically be reduced to 40 cents (or $400,000/1,000,000).

- If loans and preferred stock are outstanding and dividends on preferred stock are disallowed, then dividends on common stock will be disallowed.
- Dividend payments to common stock cannot exceed the total available ending-period retained earnings and common stock balances. Alternatively stated, dividends cannot cause a negative common stockholder equity position in the company.

Explanations for the above rules are given in Chapter 5. Rules similar to these are often required by state law, corporate bylaws, and debt indentures.

Dividends are a *cash outflow* in the quarter they are declared.

Accounting Impacts. The company has a 10-cent dividend.

Cash Budget—outflow ($0.10 × 1,000,000)	$100,000
Performance Report—common stock dividend	100,000

Manager Objective. A dividend policy needs to be developed that considers both optimal dividend payment level and dividend stability. Optimal policies are covered in Chapter 3.

Decision: Cash Dividends on Common Stock. The dividends are declared quarterly on a per share basis in dollars and cents. The decision is entered on the Pro Forma Decision Sheet input form (see Chapter 2).

Performance Information

Performance information on the firm is available every period. In the game, as in the real world, the earnings information on the Performance Report gives one possible measure of the short-run success of the firm. In both the game and the real world, the measure is a relative one; it depends on the economic environment, the past asset and capital structure of the firm, the past earnings rate of the firm, and the relative performance of other companies.

To enable further comparisons, the following performance measures are reported in FG. More information on each item is presented in Chapter 5. All of the measures that follow are presented each quarter on the Summary Sheet.

Accumulated Wealth

Accumulated wealth is an overall performance measure for the firm. It includes:

1. The price of one common share.
2. The accumulated previously paid out dividends of one share of stock.
3. An external investment return on the previously paid dividends.

The assumption is adopted that common stockholders invest dividends they receive from the firm in other investments (external to the company) that return, on a quarterly basis, 1.5 percent plus the yield on risk-free marketable securities.

Example. From the yield rate in quarter 1, any previously paid out dividends would have earned a 2.862 percent (1.5% + 1.362%) return in quarter 1. This new balance, added to the dividend payments in quarter 1, would earn 2.862 percent in quarter 2, provided that the yield on marketable securities remained unchanged.

The accumulated wealth figure indicates better than any other single item the relative wealth position of the original stockholder. It is also the best single item for ranking the performance of the different firms playing the game. This holds since the price-per-share component is forward looking and incorporates expected future market conditions and company growth as in the real world. The other measures in FG are primarily historical performance measures; thereby, they are less informative.

Quarterly Earnings

The per share common stock earnings for the current quarter appear on the summary sheet under the title "Quarterly EPS." Income after taxes less preferred dividends and the stock tender costs is divided by the number of shares outstanding at the end of the quarter. The item can be used to estimate short-term relative performance by comparison either with the firm's previous quarters' EPS or with other firms' current quarterly earnings figures.

Dividend Yield

The dividend yield is an annualized yield based on the current quarter's dividend payment. This is derived by multiplying the current quarterly dividend per share by 4 and dividing the sum by the current price of the stock.

Investors tend to view the dividend yield as being important if the firm faces little growth potential. It also provides information for the dividend payout and stability decision. Normally, the dividend yield should not be used as a reliable measure of performance.

Price-Earnings Ratio

The price-earnings (P/E) ratio is calculated by dividing the common share price by four times the current quarter's earnings per share. "N/A" is shown in the P/E output field when earnings are negative.

Referred to as the *P/E multiple,* the price-earnings ratio is used by many investors as a rough indicator of investors' acceptance of the performance of the firm. A high multiple relative to other firms in the same industry indicates that the firm either is a relatively safe investment or faces better prospects for maintaining an earnings per share (EPS) growth rate greater than other related firms.

Although it is probably a better measure of performance than dividend yield, the P/E multiple is not without weakness as a performance measure. Chapter 5 evaluates this measure in more detail.

Return on Investment (ROI)

Return on investment (ROI) is a measure of return on total net assets. The current quarterly earnings after taxes from the Performance Report is annualized, by multiplying by 4, and divided by the total assets listed on the Position Statement.

The figure indicates the earning power of the dollar investment in the firm. The measure uses book values and thus fails to incorporate shareholders' views of the quality of the earnings. Thus, a firm with the highest ROI is not necessarily the best.

Return on Equity (ROE)

Return on equity (ROE) is an annualized measure of return on the total equity investment. The value of total equity from the position statement is divided into four times the current quarterly earnings after taxes. The earning power of a dollar of equity capital is thus obtained.

Many distortions that can occur with the use of either ROI or ROE in the real world are missing or limited in the game. Therefore, use of these items as short-term measures of relative historical performance is much more acceptable in the game than in a real situation. Chapter 5 gives reasons for the real-world distortions.

Conclusions

For each period of play, the game participant is provided with a starting set of information including the position, performance, and summary statements. With this, plus the information in this chapter and Chapter 3, the game player has all the rules and information necessary to formulate a set of decisions each period. The process is continuous, with the FG manager receiving feedback on previous decisions each quarter and formulating new sets of decisions for the next quarter that are based on both past performance and new forecasted information.

The chapter did not describe how proper or wealth-maximizing decisions should be made. As covered in Chapters 1 and 3, financial management texts should be continually used by the game's decision maker as a source of information on correct financial procedures and techniques. Applying correct procedures will better a company's performance in the game over what would be obtained when either planned or wealth-maximizing procedures are not utilized.

APPENDIX 1

QUICK REFERENCE SOURCE

Company and environment rules and the manager's decisions are listed in alphabetical order to create a quick reference source. Abbreviated descriptions plus page locations of more detailed descriptions are provided with each item. The nature of the information is based on the chapter location where:

- Chapter 2 contains the Decision Form where decisions are entered.
- Chapter 3 holds strategy formation information with respect to the decision or rule.
- Chapter 4 covers rules and conditions that affect the item and the item's impact on other company variables.
- Chapter 5 compares rules affecting the item contrasting the game and the actual environment.

Advertising

Advertising has a positive impact on quantity demanded. The cost is a current-period expense included in the selling and administrative expense account and is a current-period cash outflow.

DECISION SCREEN, page 15. The prior-quarter entry is retained for the next-quarter decision form. See Chapter 3, page 34; Chapter 4, page 64; Chapter 5, page 101.

Capital Budgeting Projects

Different new projects A and B are available for purchase each quarter. The projects are independent within and among quarters. Either or both can be accepted or rejected each quarter. Projects affect overhead costs and direct labor costs. The ***Summary Sheet*** indicates the exact effects of each project every quarter. The cost is a current quarterly cash outflow. Projects are depreciated straight-line and depreciate even if not fully utilized. Projects become operational in the quarter purchased and immediately affect overhead and direct labor costs. Projects *do not* change the machine or plant capacity.

DECISION SCREEN, page 15. A new entry is required separately for a project A and/or a project B on each quarter's decision form. See Chapter 3, page 24; Chapter 4, pages 60–62; Chapter 5, page 101.

Cash Flows from Product Sales

Cash inflows on 33 percent of current quarterly sales are obtained in the current quarter. Accounts receivable are equal to 67 percent of sales and are all a cash collection in the following quarter.

DECISION: Effects are automatically performed by the simulation. See "Sales Discount," page 51, for generation of larger cash flows on current quarterly cash sales. See Chapter 4, pages 50–51; Chapter 5, page 97.

Cash Shortages and Marketable Securities Liquidation

If c is the cash shortage, the forced liquidation of short-term investments is equal to $1.03c$. The 3 percent forced liquidation fee is listed as "Financial Expenses: Penalty Loan Interest" on the Performance Report. Gross cash receipts therefore equal (c 1.03).

DECISION: The liquidation of marketable securities is automatic when shortages occur. See Chapter 3, page 23; Chapter 4, page 53; and Chapter 5, pages 98 and 106.

Cash Shortages and Penalty Loans

See "Penalty Loan," page 54.

Common Stock

Value of common stock is affected by (1) earnings, (2) past and future estimated growth of earnings, (3) general level of business activity, (4) a risk premium on financial and operating leverage, (5) dividend payout, and (6) dividend stability.

New Issues. New shares are issued with a $50,000 fixed flotation fee, 5 percent of current market-value variable cost, change in a risk adjustment premium, and size of offering premium. The formula giving the proceeds is on page 76.

Repurchase or Tender Offer. Shares can also be repurchased through a tender offer. Managers must enter an estimate of the price required to repurchase the number of shares desired. The price required for a successful tender is based on the current market price on the most recent summary statement plus a premium that is directly related to the amount of stock being repurchased. If the tender price is insufficient for the number of shares desired, the shortage between the number of shares requested and the actual number tendered generates a $1.00 per-share tender cost, which is a current quarterly cash outflow. If the tender is successful, the shares actually tendered are retired following the rules on pages 77–79. See page 78 for reasons underlying the disavowal of a tender.

DECISION SCREEN, page 16. The number of shares is entered for an issue. The number of shares preceded by a negative number indicates a tender offer. The tender offer price is also entered on Screen 5. The values of both entries are reset to zero on the next actual quarterly Decision Form. See Chapter 3, pages 25–27; Chapter 4, pages 75–79; Chapter 5, pages 108–111.

Common Stock Dividends

Dividends are declared and paid quarterly on a per-share basis and require an active decision by managers each quarter. Dividends are disallowed if preferred dividends are in arrears. They are also limited or omitted if dividends either (1) exceed ending-period retained earnings and common stock balances, or (2) exceed the last four quarters' average earnings to common stockholders when either loans or preferred stock remain outstanding.

DECISION SCREEN, page 15. The dividends per share of common stock are entered in dollars and cents. The prior quarter entry is retained for the next quarter's Decision Form. See Chapter 3, page 27; Chapter 4, page 79; Chapter 5, page 108.

Debt Costs

Debt (percent) costs are determined by an underlying yield curve where rates are a function of the life of the obligation. The overall level of business activity is also positively related to interest rate levels, with a possible add-on premium for inflation. Company performance affects costs through risk premiums for the risk of insolvency. A temporary risk premium related to the size of the offering is also added to the rate. A premium is added equal to 0.125 percent per million dollars of total debt issued in a given quarter. See Chapter 3, page 25; Chapter 4, pages 66–70; Chapter 5, pages 102–107.

Direct Labor

The direct labor cost required to produce one unit of product varies for different unit volume production levels as indicated on the past quarterly ***Summary Sheet***. New capital budgeting projects will decrease the per-unit direct labor cost shown on the ***Summary Sheet*** and must be considered in accurately specifying direct labor costs. Cash outflows equal to 90 percent of labor costs are a current-period outflow, while 10 percent of labor costs are part of the quarterly ending accounts payable balance that are paid the following quarter.

DECISION: Direct labor costs are automatically recorded within the game; a specific management decision is not entered. See Chapter 3, page 24; Chapter 4, page 56.

Dividends

See "Preferred Stock," page 72; "Common Stock Dividends," page 78; and Chapter 5, page 108.

Extraordinary Loss or Gain

Initiated by the instructor, a cash flow equal to the extraordinary gain or loss occurs. The quarterly performance report contains the extraordinary effect. See Chapter 4, page 65; Chapter 5, page 117.

Fire

The fire eliminates a given percentage of the company's machine capacity and all ending inventory. Insurance is received on the value of the inventory. No insurance is received on the lost machinery. See Chapter 4, page 65; and Chapter 5, page 117.

Forced Liquidation of Marketable Securities or Short-Term Investments

See "Cash Shortages and Marketable Securities Liquidation," pages 54–55. See Chapter 3, page 23; Chapter 4, pages 53–55; and Chapter 5, pages 98–99.

Intermediate-Term Loans

These loans have a life of 8 or 12 quarters and are repaid in equal installments, with the first installment due in the quarter of issue. The basic interest rates for issues are on the ***Summary Sheet***, with a premium required for the size of offering. (See "Loans and Debt Costs," page 66). A cash inflow equal to the issue size is received. An outflow equal to past issue installments (from the ***Summary Sheet***), plus the initial installment on new issues, and interest on all outstanding balances (see pages 67–70) are paid each quarter. Retirement of installments beyond the currently due installment is permitted and must be added to the current-period cash outflow.

DECISION SCREEN, page 16. The dollar amount of debt to be issued (or with a leading minus sign for extra debt to be retired) is entered. The values of both two- and three-year loan entries are reset to zero on the next actual quarterly Decision Form. See Chapter 3, pages 25–27; Chapter 4, pages 68–69; Chapter 5, page 104.

Labor Strike

Initiated by the instructor, a one-period strike may occur without warning. If the strike occurs, production is halted for one quarter. Lost sales cannot be made up. If a warning of an impending strike is given, managers have the choice of paying increased labor costs of $6.00 per unit for a 30 percent chance of a strike. The strike can be avoided with a $15.00 per-unit labor cost increase. If no concession is given, the likelihood of the strike is 60 percent. The labor cost increases are permanent.

DECISION SCREEN, page 15 when initiated. The options for no increase, a $6.00 increase, or a $15.00 increase only show on the screen if there is an impending strike. See Chapter 4, pages 64–65; and Chapter 5, page 117.

Long-Term Bonds

With a life of 10 years (40 quarters), long-term debt can be issued and will generate a current-period cash inflow equal to the issue size. The debt is retired in equal quarterly installments starting in the quarter of issue. The yield on new debt is on the ***Summary Sheet,*** and there must be a premium for total debt issues of $1,000,000 or more as indicated in "Loans and Debt Costs," page 66. A fixed flotation cost of $50,000 is also required on all issues and reduces cash proceeds from an issue by this amount. Bonds can be retired before maturity with an 8 percent call premium. See page 70. Cash outflows per quarter are equal to the quarterly interest, plus the principal repayment listed on the ***Summary Sheet,*** plus the first installment on a new issue or the prepayment (plus call premium) of an old issue retired before maturity.

DECISION SCREEN, page 16. New bonds are issued, or old bonds are retired with a leading minus sign with the "10-year bonds" Decision Form entry. The decision value is reset to zero on future quarterly Decision Forms (Screen 6). See Chapter 3, pages 25–27; Chapter 4, pages 70–71; Chapter 5, page 104.

Machinery

One unit of machinery is needed to produce one unit of product. Thus, actual production cannot exceed machinery capacity for the given quarter. One quarter is required before machinery can be used for production. Machinery has an eight-quarter life and is depreciated straight-line. Per-unit

machinery cost is on the ***Summary Sheet*** and is directly related to future product demand. A cash outflow occurs in the quarter of purchase. Machinery expires even if not used, and it cannot be resold.

DECISION SCREEN, page 15. Units of machine capacity to be purchased are entered on the Decision Form. The decision value is reset to zero on future quarterly Decision Forms. See Chapter 4, pages 58–59; Chapter 5, page 100.

Marketable Securities Investments

See "Short-Term Investments," pages 52–53.

Marketable Securities Liquidation

See "Cash Shortages and Marketable Securities Liquidation," pages 53–54.

Materials

One unit of material at a cost of $15 is required to produce one unit of product. Only materials needed for the actual-period production are purchased with 90 percent of the cost being a current quarterly cash outflow. Accounts payable contains 10 percent of current quarterly material purchases and is paid in the following quarter. Inflation will cause material price increases.

DECISION: Materials are automatically purchased. Units purchased are equal to units of product produced. See Chapter 4, page 56; Chapter 5, page 99.

Other Overhead

A basic other overhead charge of $200,000 is levied each quarter. The other overhead charge can be changed by capital budgeting projects. The other overhead charge for each of the next four quarters (with no new capital budgeting projects) is contained on the ***Summary Sheet***. A cash outflow of 90 percent of current charges occurs each period, with the remaining 10 percent being part of the ending accounts payable balance. This 10 percent is paid the following quarter. If plant and machine capacity are at zero units, no other overhead costs are charged.

DECISION: Overhead is automatically charged each quarter. See Chapter 4, page 62; Chapter 5, page 99.

Penalty Loan

A penalty loan is issued for end-of-quarter cash shortages that exist after the liquidation of short-term investments. The loan size is equal to the remaining cash shortage times 1.08. The .08 implies an 8 percent discounted note due in one quarter. Penalty debt is automatically retired in the following quarter with no additional interest charged.

DECISION: Automatic generation of the liquidation occurs when there is a cash shortage not covered by available marketable securities. See Chapter 3, page 23; Chapter 4, pages 54–55; and Chapter 5, page 106.

Plant

One unit of plant capacity is required to produce one unit of product. Thus, actual quarterly production cannot exceed plant capacity. Two quarters are required to build plant, which has a 20-quarter life and is depreciated straight-line once it is available for use. Plant expires whether or not it is used to produce units. The per-unit plant cost for the coming quarter is on the ***Summary Sheet*** and is directly related to future industry product demand. A fixed order cost of $250,000 is also added for each new plant capacity addition. A cash outflow equal to total plant cost occurs in the quarter of purchase. Plant cannot be resold or retired.

DECISION SCREEN, page 15. Units of plant production capacity to be purchased are entered on the Decision Form. The decision value is reset to zero on future quarterly Decision Forms. See Chapter 3, pages 29–33; Chapter 4, pages 57–58; Chapter 5, page 100.

Preferred Stock

Preferred stock is perpetual and requires a $1 quarterly dividend. New issues are at a price obtained by dividing the $1 dividend by the preferred stock rate on funding for the next quarter provided on the ***Summary Sheet***. A fixed $50,000 offering fee, a 2 percent of market value fee, and both a change in risk premium and a size of offering premium must be considered in deriving estimates of the cash proceeds to the company. Dividends are cumulative if they cannot be paid. (See page 72 for details on initiating nonpayment.) Stock is repurchased at either the call price or market price, whichever is lower. (See pages 74–78 for details of repurchase.)

DECISION SCREEN, page 16. The number of shares to be issued or (with a leading minus sign) the number of shares to be retired is entered as the decision. The decision value is reset to zero on future quarterly Decision Forms. See Chapter 3, pages 25–27; Chapter 4, pages 72–74; Chapter 5, page 108.

Product Demanded

The quantity of product demanded is directly related to the general underlying level of economic activity. If "Unit Price of Product" is controlled, a higher price leads to decreased demand and a lower price leads to increased unit demand. Additionally, increased advertising leads to an increase in units of product demanded. No control of price and no advertising lead to a demand controlled solely by the economic activity level.

For affecting decisions, see "Advertising Costs," page 64, and "Manager Control of Product Pricing," pages 30–33. See Chapter 3, pages 29–33; Chapter 4, pages 47–49; Chapter 5, page 92.

Product Price and Demand Estimates

Future estimates for both price and demand on the ***Summary Sheet*** are generated randomly about the actual price and demand. The actual price and demand are used as the expected outcome in generating the estimates. Closer estimates are expected to be more accurate. More expensive forecasts are expected to be more accurate.

See "Purchase of Demand and Price Forecast," page 49, for the purchase of more accurate forecasts. See Chapter 3, pages 30–33; Chapter 4, pages 47–48; Chapter 5, pages 92 and 97.

Product Selling Price per-unit: Manager-Controlled

A unit demand greater (less) than the industry underlying actual demand is generated by the manager pricing units below (above) the industry price level.

DECISION SCREEN, page 15. Enter desired sales price. See Chapter 3, pages 30–33; Chapter 4, page 51.

Product Sold (Cash Flows)

Cash inflows on 33 percent of current quarterly sales are obtained in the current quarter. Accounts receivable equal 67 percent of sales and are all a cash collection in the following quarter.

See "Sales Discount," pages 51–52, for generation of larger cash flows on current quarterly cash sales. See Chapter 4, pages 50–51.

Product Sold (Units and Sales Revenue)

If sufficient production and inventory units are available, the units demanded will be sold. The product will be sold at the actual industry price if "Unit Price of Product" is not entered. If production and inventory are less than unit demand, sales are lost; back-ordering is not allowed.

See "Product Demanded and Sold," page 50, for units demanded. See "Manager Control of Product Pricing," page 51, for the impact of manager pricing. See "Purchase of Demand and Price Forecast," page 49, to estimate product price. See Chapter 4, pages 47–49; Chapter 5, page 96.

Product Unit Production

Machine and plant unit production capacity must both be at least equal to the production decision. If either capacity is less, the smaller of plant or machine capacity indicates the maximum possible production.

DECISION SCREEN, page 15. Enter the number of units to produce. If your entry exceeds available plant and machine capacity your decision will be decreased based on available capacity. See Chapter 3, page 29; Chapter 4, pages 57–58; Chapter 5, pages 99–101.

Production Costs

See specific items: "Materials," page 56; "Direct Labor," page 56; "Warehouse Fee," page 57; "Plant," page 57; "Machinery," page 58; "Capital Budgeting Projects," page 60; and "Other Overhead," page 62.

Purchase of Demand and Price Forecast

One set of demand and price estimates is generated for each of the next four quarters at no cost to the company. A second set of estimates of both demand and price is generated for four quarters for an additional cash flow and selling and administrative cost of $30,000. A third set is generated for an additional $45,000. Thus, all three forecasts are obtained for $75,000. More expensive forecasts and more recent forecasts are expected to be more accurate.

DECISION SCREEN, page 15. Select the "free," $30,000, or $75,000 forecast. The decision remains in effect for future quarters unless changed by the manager. See Chapter 4, pages 49–50.

Sales Discount on Receivables

The amount of current-period sales that are a current-quarter cash collection increases with higher discount rates. The sales discounted and collected with each discount policy are inversely related to economy-wide interest rates. With all discount policies, 67 percent of sales not discounted are collected in the following period. Revenues are reduced by the discount taken on sales that are collected in advance.

DECISION SCREEN, page 15. The appropriate option is selected for "none," "1%," or "2%" discount policy. The decision selected remains in effect for future quarters unless changed by the manager. See Chapter 3, page 28; and Chapter 4, pages 51–52.

Selling and Administrative Costs

A fixed cost of $1,000,000 plus 5 percent of quarterly sales revenue is levied and is a current quarter cash outflow. No charge is made when operating plant capacity is zero units. The costs of purchased demand forecasts, advertising, and an instructor-imposed penalty also enter the selling and administrative expense account. See also "Purchase of Demand and Price Forecast," page 49; and "Advertising," page 64.

DECISION: The fixed and variable costs are automatically included by the game. See Chapter 4, pages 63–64; Chapter 5, page 101.

Short-Term Investments

Short-term investments are for one quarter. Interest, capital gains, and capital losses on quarterly holdings are recognized each quarter. Revenues and cash flow are increased by interest receipts. Revenues and asset revaluation occur with capital gains, whereas negative revenues and asset devaluation arise from capital losses. Higher-risk short-term investments have higher expected returns but larger possible capital losses.

DECISION SCREEN, page 15. The amount of additional or new investment is entered. A leading negative sign indicates that a decrease in investment is to occur. Risk of short-term investment is also entered on the Decision Form with a value of "0" through "9" to indicate level of investment risk. Higher risk level numbers are for more risky investments. See Chapter 4, pages 52–53; Chapter 5, page 98.

Short-Term Loans

Issued for four quarters, short-term debt is retired in four equal installments starting with the current quarter. Retirement before maturity is not permitted. A new short-term rate is calculated each quarter and applied to any outstanding loan balances. Cash inflows equal to new loan issues are received. Cash outflows occur that are equal to 25 percent of the currently issued loan plus installments due from prior issues (presented on the ***Summary Sheet***) and plus interest at the current prevailing rate on all outstanding loan balances.

DECISION SCREEN, page 16. A decision is entered only on new short-term loans to be issued. The decision entry is reset to zero on the next actual quarterly Decision Form. See Chapter 3, pages 25–27; Chapter 4, pages 67–68; Chapter 5, page 103.

Short-Term Penalty Loan

See "Cash Shortages and Short-Term Penalty Loans," pages 54–55.

DECISION: Automatic, no manager decision required. See Chapter 3, page 23; Chapter 4, pages 54–55; and Chapter 5, page 106.

Taxes

The income tax line of the Performance Report indicates the tax rate applicable to taxable income. Taxes are a cash outflow in the quarter accrued. If losses occur, there is a negative tax and a positive cash inflow equal to the negative tax.

DECISION: Taxes are automatically calculated and paid. See Chapter 4, page 71; Chapter 5, page 107.

Warehouse Fees

Warehouse fees are automatically recorded as a period expense and cash outflow each quarter. The fee is levied on the ending inventory at the rate of $1 per unit on the first 2,000 units, $3 on the next 4,000 units, and $8 per unit thereafter.

DECISION: Warehouse fees are automatically calculated and paid. See Chapter 4, page 57; Chapter 5, page 99.