



CHAPTER 6

MARKETING: SALES FORECASTING

The volume of new orders placed with your firm will depend upon a number of factors. Among the more important are:

Factors related to the economic environment

1. the trend of economic activity in your market areas
2. the season of the year

Factors related to your marketing activities and those of your competitors

1. the wholesale prices charged by your firm and by competitors
2. the level and mix of marketing expenditures
3. the product introduction decisions
4. the marketability of the models being sold.

In short, the number of new orders that will be generated for your firm's product in a quarter will be a result of the total effect of the economic environments, your marketing activities and the marketing activities of your competitors.

Economic Environment

Sales Levels and Gross Domestic Product

Econometric studies have shown a significant correlation between the level of demand for consumer durable goods and the level of economic activity as represented by real gross domestic product (real GDP). Nominal GDP, indexed in current dollars (or pesos, in Sereno), is unadjusted for price level changes. Nominal GDP and the Consumer Price Index (CPI) are reported for each country in the Quarterly Industry Report, together with other economic indicators. The GDP and the CPI indexes are indexed to equal 100 in Year 2, Quarter 4. Past levels of nominal GDP and CPI are shown in Appendix C.

FINANCIAL MARKET DATA						
	Merica	Sereno		---Credit Rating---		
			Interest Rates:	No. 1	No. 2	No. 3
GDP Index (Nominal)	100.00	100.00	Long-Term	8.40	9.10	10.60
Consumer Price Index	100.00	100.00	Short-Term	11.00	11.20	12.30
Stock Market Index	100.00					
3-Month Time CD Rate	9.50					

An index of real GDP, adjusted for the impact of inflation, can be calculated by dividing the nominal GDP by the CPI, as follows:

$$\text{Real GDP Index} = \frac{\text{GDP}}{\text{CPI}} \times 100$$

In order to forecast demand effectively, your firm should become familiar with the historical GDP and CPI data for the simulation, as well as the available real GDP forecasts.

Your firm subscribes to ACCUDAT, a statistical service which provides forecasts of real GDP and exchange rates each quarter for the following four quarters. At the same time, they report actual values for the most recent four quarters. The ACCUDAT forecast is found on the first page of the Quarterly Industry Report (see Appendix C).

REAL GROSS DOMESTIC PRODUCT FORECAST								
	Actual Values, Last 4 Quarters				Forecast Values, Next 4 Quarters			
	Qtr 5	Qtr 6	Qtr 7	Qtr 8	Qtr 9	Qtr 10	Qtr 11	Qtr 12
Merica	102.17	102.66	100.93	99.90	99.57	97.94	98.79	94.46
Sereno	94.87	97.05	98.20	100.00	104.76	107.08	109.14	115.87

EXCHANGE RATE FORECAST								
Sereno	5.99	5.97	5.97	6.00	6.09	6.02	6.08	6.18

This forecast may be used, reliably, for near-term economic forecasts. However, you are cautioned that while the historical data are accurate, the forecasted values are estimates obtained by pooling the results of a survey of leading economists. The forecast tends to be more accurate

for the first quarter immediately ahead, with the accuracy decreasing with each subsequent quarter. The reported values represent the mean values for the next four quarters obtained from the survey of the group of economists.

Projecting the Trend of Growth

Changes in a country's overall level of economic activity from quarter to quarter may be separated for analytical purposes into three distinct types of effects: the overall trend, the cyclical effect and the seasonal effect. In preparing a forecast, we suggest that you separate the problem of forecasting economic growth from the problem of forecasting cyclical and seasonal fluctuations. A good first step is to project the average rate of growth in real GDP which has occurred in the country over the past eight quarters. The values that are shown below provide an example for Merica.

<u>Quarter</u>	<u>GDP Index</u>	<u>CPI Index</u>	<u>Real GDP</u>
1	84.0	85.8	98.0
2	86.3	86.5	99.8
3	89.7	88.2	101.7
4	91.9	90.0	102.1
5	94.1	92.1	102.2
6	96.6	94.1	102.7
7	98.1	97.2	100.9
8	100.0	100.0	100.0
			<u>Forecast</u>
			<u>Real GDP</u>
9			99.7
10			98.0
11			98.7
12			94.5

As you can see, the economy seems to have peaked out and may begin to slide in the coming year. Time will tell whether the forecasted decline will materialize. Even though the eight quarters of historical data, together with a four-quarter forecast, provide a relatively small base upon which to make a statistical projection, it still may be done. You probably will wish, however, to revise such a projection as additional data become available during the course of the simulation. Two relatively easy types of projections will be suggested, although you may wish to use other methods.

The first and simplest method, though not necessarily the most accurate, is to plot the observed data on a chart and connect the points of observed data. Then "eye-ball" the resulting chart and use a ruler to extend the general trend of the plotted line across the rest of the chart. A more sophisticated and, we might say, more statistically reliable method of projecting a trend is to compute a least-squares trend line based upon the observed historical values of GDP. This may

easily be done using a spreadsheet package such as Excel, Lotus 1-2-3 or Quattro. The simple plot described above also may be done quickly with a spreadsheet program's graphing feature.

Projecting Economic Fluctuations

After estimating the overall trend of the GDP, the next step is to estimate how the GDP will fluctuate over the course of the business cycle. During periods of economic upturn, the GDP is very likely to grow at a rate faster than the overall trend; and during periods of economic recession, it is very likely to grow at a slower rate or even decline.

Durable goods demand has more pronounced cycles with greater fluctuations than the GDP. It also tends to have somewhat longer downswings and shorter upswings. Your biggest problem, as with forecasting in the business world, will probably be to correctly identify, in advance, the turning point in the business cycle. This involves prior identification of the exact quarter in which the GDP will change direction and move from a period of recession to one of economic upturn or vice versa. Your knowledge of the characteristics of economic fluctuations should help in estimating the likely length of any particular business cycle in your simulated world.

Leading Indicators

Forecasting accuracy may be improved by using economic time series data which forecasting experts consider to be "leading indicators." A leading indicator is a data series that has historically tended to change direction earlier than the change in the general level of economic activity. However, even though certain series tend to lead changes in the GDP most of the time, they do not always do so. Sometimes they change direction when the GDP does not follow suit. Thus, it is possible for leading indicators to signal "false starts." Other times they have been known to change direction after the GDP changes.

Data on several economic indicators are provided to you in *The Business Policy Game*. Appendix C includes historical information about the level of stock market prices and the behavior of interest rates. Current data on these variables will be reported each quarter throughout the course of the simulation.

If interest rates and the stock market index both turn downward, the possibility of an early downturn in the level of GDP should be considered. Such a signal by leading indicators, however, should not be considered in isolation. It will provide a clue, along with other data, about the possible future behavior of economic fluctuations in your simulated world. You probably will want to update your GDP forecast as additional information becomes available during the course of playing the simulation.

Forecasting Sales

Using the Sales Forecast Work Sheets

One sales forecasting approach is to view sales in a future quarter as being equal to the previous quarter's sales plus an incremental change in the number of units sold. Changes in the various individual factors that influence the level of sales will affect the level of total sales. This relationship might be expressed as follows:

$$\text{Future sales} = \text{Previous sales} + \text{Incremental sales}$$

where incremental sales are determined by changes in real GDP, seasonal factors, price, advertising expenditures, distribution, sales force activity, new model introduction and competitors' activities. Incremental sales may be either positive or negative. Mathematically,

$$\text{Incremental sales} = f(\text{GDP}, S, M1, M2, \dots, Mn)$$

where GDP stands for real gross domestic product, S represents seasonal factors and M1, M2, ..., Mn represent the various marketing factors that affect the sales of a firm and its competitors.

Sales Forecast Work Sheets have been developed to assist you in forecasting your firm's future sales (see Figure 6-1). The Sales Forecast Work Sheets utilize this incremental model. To forecast sales for the coming year, begin by forecasting sales for each of the four quarters. Use one work sheet for each quarter to forecast quarterly sales by market area. After completing the quarterly forecasts, sum the quarterly sales forecasts to arrive at an annual forecast. We suggest that you follow the procedure indicated on the work sheet to develop your sales forecast. Copies of the work sheet are provided in Appendix D. The FORECAST.WK1 file on the Player's Program Disk packaged with this manual contains a spreadsheet template of the Sales Forecast Work Sheet.

We will use Merica, Area 1 to provide an example of using the work sheet to forecast sales. The real GDP forecast serves as the basis for the first entry on the Sales Forecast Work Sheet. Enter your forecasted **change in GDP** for the quarter (-.03 percent in our example, calculated from the ACCUDAT forecast shown above).

Previous Sales

The next step is to enter the actual sales (in thousands of units) from the previous quarter on the Sales, Previous Quarter line of the work sheet. For your first forecast this will be the sales figure for Year 2, Quarter 4 from the historical data in Appendix C or from a computer printout provided by your administrator for that quarter. If you plan to forecast total sales of your firm in a country or market area, enter the number of units your firm sold in that country or area during

the previous quarter. For our example, shown in Figure 6-1, we will assume that sales in the previous quarter were 121,000 units.

GDP Changes

Sales of your simulated consumer durable product tend to be affected by changes in the level of economic activity in your simulated world. In an upturn, sales rise somewhat faster than the GDP; and in a downturn, they fall somewhat faster. You need to estimate the effect which changes in the level of economic activity will have upon your company's sales. Regression analysis of historical relationships between GDP and sales may give you some clues as to the amount of change to expect in your sales with a given change in GDP. If you undertake statistical analysis, remember that your price changes and other marketing activities, as well as the marketing activities of your competitors also will affect the level of sales. Allowance must be made for these factors in addition to the effect of changes in GDP. Alternatively, you may decide to make only rough estimates of the effect of GDP changes on the level of sales. All estimates should be refined as more data become available during the course of the simulation.

The ACCUDAT forecast of real GDP for Year 3, Quarter 1 indicates a decrease in the index from 100.0 to a mean value of 99.7 (about three-tenths of one percent). Suppose that you estimate that the sales of your durable good product will decrease by, perhaps, as much as twice the percentage decrease in real GDP. Your unit sales decrease, then, would be last quarter's sales times six-tenths of one percent, or

$$121,000 \times 0.006 = 726$$

This is rounded to 1,000 for our example and entered in the Sales Forecast Work Sheet (Figure 6-1) as -1.

Seasonal Factors

Next, an estimate should be made of the likely change in sales caused by seasonal factors. In *The Business Policy Game*, sales are highest during the second and fourth quarters of each year. During the first and third quarters, they are somewhat lower. ACCUDAT has developed a seasonal index for your world based upon an economic analysis of historical data. The index shows the following seasonal variation:

Quarter	Index
1	.92
2	1.01
3	.91
4	1.16

THE BUSINESS POLICY GAME SALES FORECAST WORK SHEET					
World <u>1</u> Company <u>1</u> Year <u>3</u> Quarter <u>1</u>	Consoli- dated	Merica Area 1	Merica Area 2	Merica Area 3	Sereno
Forecasted GDP Change (percent)	-----	-0.3 %	%	%	%
Sales, Previous Quarter, thousands of units		121			
Estimated Sales Increments (thousands of units)					
From GDP Change		-1			
Seasonal Factors		-24			
Price Change		+5			
Advertising Change		+4			
Sales Salary Change		0			
Sales Commission Change		0			
Number of Salespersons Change		0			
New Model Introduction		-0			
Competitors' Actions		-2			
Total Incremental Change		-18			
Total Sales Forecast (thousands of units)					
		103			
Expected Average Price (per unit)	\$.	\$ 9.80	\$.	\$.	Ps
Expected Sales Revenue (thousands of local currency)	\$	\$1,009	\$	\$	Ps

Figure 6-1
Illustration of the Sales Forecast Work Sheet

These index values indicate that with no change in any other factor affecting sales, first-quarter sales are expected to be about 92 percent of the quarterly average, second-quarter sales about 101 percent and so forth.

Seasonal variations for Sereno are very similar to those for Merica.

Enter the expected incremental change due to seasonal factors on the next line of the work sheet. The decline from the fourth quarter (116 percent of average) to the first quarter of the next year (92 percent of average) might be expected to be quite large—about 20 percent:

$$(116,000 - 92,000) \div 116,000 = .207 \text{ percent}$$

If you estimate that seasonal factors would cause sales to decline by about 20 percent during the first quarter, other things being equal, multiply the previous quarter's sales of 121,000 units by 0.20 and enter -24

$$121,000 \times .20 = -24,200$$

Changes in the level of GDP and the seasonal factors that affect your sales level are beyond the control of your company's management. However, the following factors that affect your sales can readily be influenced by your own decisions.

Marketing Activities

Changes in the price of your product, advertising expenditures, sales salaries, commissions, number of salespeople and the introduction of new models all will influence your levels of sales. The likely effect of your decisions in regard to each of these factors should be estimated and entered on the appropriate line of the Sales Forecast Work Sheet.

1. Price Changes. Other things being equal, a decrease in a company's wholesale price from the initial \$10 (or Ps 75) will tend to result in the generation of sufficient additional sales to increase total sales revenue. Conversely, an increase in the price of the product will tend to cause a large enough reduction in the level of demand that total sales revenues will drop. It can be said, therefore, that the price elasticity of demand for your simulated consumer durable good is greater than one, or elastic. Product quality levels affect the degree of price elasticity. Higher quality products tend to be less sensitive to price changes than lower quality products. Deluxe quality (level number 1) is less price elastic than standard quality (level number 2) and economy quality (level number 3) is more price elastic than standard quality.

The level of demand for a company's product also will be affected by price changes of competitors. For example, if all companies in the industry were to reduce their prices from \$10 per unit to \$9.50 per unit, total industry sales would rise. The volume of sales for Company 1 would increase, but not by as great a factor as if Company 1 had been the only one to decrease its price. In other words, the average price charged by the firms in the industry will have an effect

upon the level of demand for all firms in the industry, in addition to the effect of a price change by an individual company.

Enter the expected change in sales due to price changes on the work sheet. Suppose that you intend to decrease your unit price by 2 percent. After analyzing the historical relationship between sales and price changes, you might believe that a 2 percent price cut would produce a sales increase of 4 percent. Continuing our example, with the previous quarter's sales at 121,000 units, you would estimate an increase of about 5,000 units in the coming quarter and enter +5 on the work sheet:

$$121,000 \times .04 = 4,840$$

2. Advertising. Increases in the level of advertising expenditures will tend to increase the level of demand for your company's product and decreases generally will tend to reduce the level of demand. We suggest that you avoid sharp fluctuations in advertising expenditures. Stick to a well-planned strategy of resource allocations.

If you expect to increase advertising expenditures by 5 percent next quarter, you might anticipate a sales increase of 3 percent, or about 4,000 units in our illustration:

$$121,000 \times .03 = 3,630$$

The amount, +4, has been entered on the work sheet in Figure 6-1 to represent an increase of 4,000 units.

3. Sales Force and Sales Compensation. In addition to advertising, a company's promotion effort includes the activities of its sales force. The impact of this effort on sales is determined both by the number of active salespeople in the field and by the enthusiasm and perseverance of the salespeople. Again, other things being equal, an increase in your sales effort will tend to increase your volume of sales.

We suggest that you estimate the incremental changes in sales that are likely to result from changes in sales compensation and from changes in the number of active salespeople. In our illustration, we assume no change in compensation levels for the coming quarter and no additions to the sales force. If you hire additional sales people this quarter, you would want to include their incremental effect for next quarter.

4. New Model Introduction. Enter the incremental change expected to result from the introduction of a new model. This estimate should include the effect of the quality level of the model. Remember that a new model will go on sale in all areas during the quarter following the quarter that production was begun. Our illustration assumes no new models because R & D has not released a new model for introduction.

Competitors' Actions

The last item listed in the incremental change section of the work sheet is Competitors' Actions, another factor beyond your control. In many instances, you will have no way of anticipating what the activities of your competitors will be. You may have reason to believe, though, that your competitors will match a cut in price that you may have made in a previous quarter. If so, you know that such an action will partially negate the increased sales that you otherwise could expect from your own price cut. Any incremental effect that you can foresee as a result of competitors' activities should be entered on the work sheet.

In our illustration, we assume that our intelligence reports indicate that competitors are likely to cut prices, too, partially negating the effects of our price cut. If we assume that their action would reduce our sales by 2,000 units below what they would otherwise be, -2 should be entered on the work sheet.

Completing the Forecast

Completing the remainder of the Sales Forecast Work Sheet is a matter of simple arithmetic. The sales from the previous quarter plus the estimated total incremental change equals the forecasted total sales for the quarter. Total sales are multiplied by the average price that you expect to charge. The result is your estimate of expected sales revenue for the quarter for Merica, Area 1. Similar forecasts should be made for all market areas in which your firm is operating.

Don't be surprised if your actual sales during the first quarter of Year 3 deviate somewhat from your forecasts. And remember that the values estimated in the example are for purposes of explanation. They are not really inside information regarding the relationships between product demand and the various marketing factors. You may find that the actual relationships are somewhat different, and you are encouraged to make your own estimates. As you gain additional experience in forecasting, your estimates are likely to improve considerably. You will learn more about your industry, your competitors and the impact and results of the decisions that you make. However, your forecasts will never be totally accurate. Your management, therefore, should allow for a margin of safety to protect against errors in your forecasts. Specific policies should be established regarding the minimum level of inventory to maintain in each area, over and above forecasted demand, as a safety stock. Also, a policy is needed to set the minimum amount of cash that you believe will enable your firm to meet financial obligations, should sales revenue fall below the amount that has been forecasted.

Look Ahead, Now

Don't stop with a sales forecast for Year 3, Quarter 1. In our example, it was shown that sales can be expected to grow in Quarter 2 because of the seasonal factor, but the growth will be tempered somewhat by the projected decrease in real GDP. That is going to happen even if you don't plan an aggressive marketing program. Work out the numbers for the rest of the year so

that your production department can plan to have enough production capacity on line to meet your needs. If an expansion in capacity will be required, the plans must be made right away because it takes time to expand (See Chapter 8).

Your company's production could be expanded quickly by about 20 percent if all production workers work overtime. Beyond that, even adding second-shift production requires a full quarter of production-worker training before anything can be produced. And investing in more capacity may take from one to three quarters of construction, depending on which investment alternative is chosen.

So plan ahead—now! Start by completing your sales forecast for each quarter of Year 3. Then make estimates of capacity requirements for the following year so that your operations department can get started.

Summary of Relationships

1. **Gross Domestic Product** in *The Business Policy Game* is patterned after actual indexes of economic growth. **Interest rates** and the **stock market index** usually are considered to be leading indicators related to changes in GDP.

2. **Future sales** may be forecast by use of a model that is illustrated with the sales forecast work sheets found in Appendix D. The work sheet also is available in a spreadsheet template on your Player's Program Disk in file FORECAST.WK1.

$$\text{Future sales} = \text{Previous sales} + \text{Incremental sales}$$

Incremental sales in this model can be described as a function of real gross domestic product (GDP), seasonal factors (S) and various marketing factors that have been described (M1, M2, ... Mn). These factors include price changes, advertising, sales salaries and commissions, number of salespeople and new model introductions of a firm and its competitors. Thus,

$$\text{Incremental sales} = f(\text{GDP}, S, M1, M2, \dots Mn)$$

3. **Sales forecasts** should be made separately for each market area.