

Using Software in Forecasting

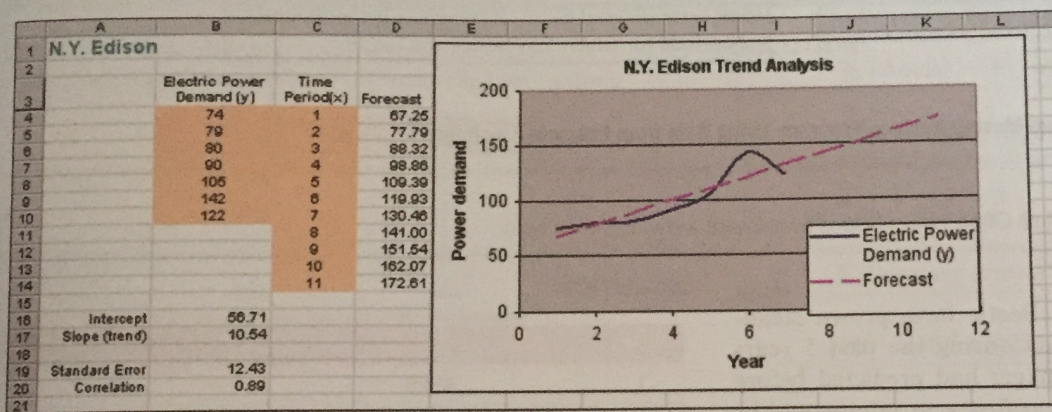
This section presents three ways to solve forecasting problems with computer software. First, you can create your own Excel spreadsheets to develop forecasts. Second, you can use the Excel OM software that comes with the text and is found on our text Web site. Third, POM for Windows is another program that is located on our Web site, at www.pearsonhighered.com/heizer.

CREATING YOUR OWN EXCEL SPREADSHEETS

Excel spreadsheets (and spreadsheets in general) are frequently used in forecasting. Exponential smoothing, trend analysis, and regression analysis (simple and multiple) are supported by built-in Excel functions.

Program 4.1 illustrates how to build an Excel forecast for the data in Example 8. The goal for N.Y. Edison is to create a trend analysis of the year 1 to year 7 data. Note that in cell D4 you can enter either $=\$B\$16 + \$B\$17 * C4$ or $=TREND(\$B\$4:\$B\$10, \$C\$4:\$C\$10, C4)$.

As an alternative, you may want to experiment with Excel's built-in regression analysis. To do so, under the **Data** menu bar selection choose **Data Analysis**, then **Regression**. Enter your *Y* and *X* data into two columns (say B and C). When the regression window appears, enter the *Y* and *X* ranges, then select **OK**. Excel offers several plots and tables to those interested in more rigorous analysis of regression problems.



Program 4.1

Using Excel to Develop Your Own Forecast, with Data from Example 8

COMPUTATIONS			
VALUE	CELL	EXCEL FORMULA	ACTION
Trend line column	D4	$=\$B\$16 + \$B\$17 * C4$ (or $=TREND(\$B\$4:\$B\$10, \$C\$4:\$C\$10, C4)$)	Copy to D5:D14
Intercept	B16	$=INTERCEPT(B4:B10, C4:C10)$	
Slope (trend)	B17	$=SLOPE(B4:B10, C4:C10)$	
Standard error	B19	$=STEYX(B4:B10, C4:C10)$	
Correlation	B20	$=CORREL(B4:B10, C4:C10)$	

X USING EXCEL OM

Excel OM's forecasting module has five components: (1) moving averages, (2) weighted moving averages, (3) exponential smoothing, (4) regression (with one variable only), and (5) decomposition. Excel OM's error analysis is much more complete than that available with the Excel add-in.

Program 4.2 illustrates Excel OM's input and output, using Example 2's weighted moving average data.

P USING POM FOR WINDOWS

POM for Windows can project moving averages (both simple and weighted), handle exponential smoothing (both simple and trend adjusted), forecast with least squares trend projection, and solve linear regression (associative) models. A summary screen of error analysis and a graph of the data can also be generated. As a special example of exponential smoothing adaptive forecasting, when using an α of 0, POM for Windows will find the α value that yields the minimum MAD.

Appendix IV provides further details.

Enter the weights to be placed on each of the last three periods at the top of column C. Weights must be entered from oldest to most recent.

	A	B	C	D	E
1	Donna's Garden Supply				
2					
3	Forecasting	Weighted moving averages - 3 period moving average			
4		Enter the data in the shaded area. Enter weights in INCREASING order from top to bottom			
5					
6	Data				
7	Period	Demand	Weights		
8	Jan	10	1		
9	Feb	12	2		
10	Mar	13	3		
11	Apr	16			
12	May	19			
13	June	23			
14	July	26			
15	Aug	30			
16	Sept	28			
17	Oct	18			
18	Nov	16			
19	Dec	14			
20					
21					
22					
23					
24	Next period	15.333333			
25					

Forecast is the weighted sum of past sales (SUMPRODUCT) divided by the sum of the weights (SUM) because weights do not sum to 1.

Error (B11 – E11) is the difference between the demand and the forecast.

Error analysis				
Forecast	Error	Absolute	Squared	Abs Pct Err
12.16667	3.833333	3.833333	14.69444	0.2395833
14.33333	4.666667	4.666667	21.77778	0.245614
17	6	6	36	0.2608696
20.5	5.5	5.5	30.25	0.2115385
23.83333	6.166667	6.166667	38.02778	0.2055556
27.5	0.5	0.5	0.25	0.0178571
28.33333	-10.3333	10.33333	106.7778	0.5740741
23.33333	-7.33333	7.333333	53.77778	0.4583333
18.66667	-4.66667	4.666667	21.77778	0.3333333
Total	4.333333	49	323.3333	2.5467588
Average	0.481481	5.444444	35.92593	0.2829732
	Bias	MAD	MSE	MAPE
			SE	6.796358

= AVERAGE(H11: H19)

= SUMPRODUCT(B17:B19, \$C\$8:\$C\$10)/SUM(\$C\$8:\$C\$10)

The standard error is given by the square root of the total error divided by $n - 2$, where n is the number of periods for which forecasts exist, i.e., 9.

Program 4.2

Analysis of Excel OM's Weighted Moving Average Program, Using Data from Example 2 as Input

Solved Problems

Virtual Office Hours help is available at www.myomlab.com.

SOLVED PROBLEM 4.1

Sales of Volkswagen's popular Beetle have grown stead-

SOLUTION