**Best Homes, Inc.: Forecasting**

**Teaching Note**

Synopsis and Purpose

Best Homes is one the largest builders of new residential homes in U.S. with 20,040 new homes built in 2015. The case presents monthly sales data from 2011 to 2015. This data is representative of home builders since we estimated the sales of Best Homes based on a 4% market share of the total sales of new homes in the U.S. from the U.S. Census web site. Thus the trend and seasonality are in line with U.S. home sales in total.

The case explains the problem facing Best Homes in terms of annual planning and the S&OP process. Forecasting is put in the context of how the forecast will be used. Also, sales projections are being gathered from the field, and the case asks students to reconcile those with the forecasts based on historical data.

Discussion Questions

1. What forecasting methods should the company consider? Please justify.
2. Use the classical decomposition method to forecast average demand for 2016 by month. What is your forecast of monthly average demand for 2016?
3. Best Homes is also collecting sales projections from each of its regions for 2016? What role should these additional sales projections play, along with the forecast from question 2 in determining the final national forecast?

Analysis

Question 1:

Because of the seasonality and trend in the data, first order smoothing or an ordinary moving average is not a good method for this case. Students could choose either Winter’s Method of Exponential Smoothing or the Classical Decomposition Method from the Supplement to Chapter 10 in order to forecast the trend and seasonal effects. We use the Classical Decomposition Method for the next question because we think it gives a better forecast and is more widely used in industry.

Question 2:

The data in the case is provided on the Instructor Resources Center in McGraw-Hill Connect for the textbook. Only the data is provided on the Excel template. The user must enter the formulas and analysis.

Sixty months of data are provided on the template, see Exhibit 1. The first step in classical decomposition is to develop a 12-month moving average which is done in the 3rd column on the worksheet. Then a 2-month moving average is developed in the 4th column which is centered on the original data. The 4th column contains data which is deseasonalized, since 12 months has been used as a base in the moving average. At this point the upward trend in the moving average in column 4 is apparent.

In column 5 seasonal ratios are computed by dividing the sales data for each month by the moving average in column 4. The data indicates seasonal fluctuations with April and May being high months and November and December low months. This is not unexpected in the home building industry for new home starts often follow this pattern. In column 6 average seasonal ratios are computed. These ratios are obtained by averaging the seasonal ratios from the same month in successive years. For example, the average July seasonal ratio is obtained by averaging the July 2011, July 2012, July 2013, and July 2014 seasonal ratios.

When the resulting twelve seasonal ratios in column 6 are added the total is 12.011. The sum of these ratios should be 12 in accordance with the 12-month seasonal period, because the seasonal ratio is the percentage that a particular month is above or below the average. In order to obtain a sum of 12, the seasonal ratios are normalized in column 7. This is done by dividing each ratio by the sum 12.011 and multiplying by 12.

A regression analysis is now run to fit a straight line through the moving average data in column 4. The purpose of this regression is to forecast the average level into 2016 on a trend basis. The seasonal ratios will then be applied to this trend to arrive at a forecast. In Excel a regression function is provided. In this case we have data from period 7 through period 54. The formulas and procedure for calculating the regression equation are given in the text. As a result of these calculations the following equation is obtained.

*Y* = 996.6 + 12.368 *t*

Where *Y* is the moving average and *t* is the time period.

To obtain the forecast of interest we calculate *Y* from the above equation for the twelve months of 2016, which is *t* = 61 through *t* = 72. The results are shown at the bottom of column 8. These *Y* values are multiplied by the monthly average seasonal ratios in column 9 (also transposed from Column 7) to arrive at the forecast for each month shown in Exhibit 1at the bottom of column 10. Note that the total of this forecast is 21,794 homes sold in 2016.

Question 3:

The forecast obtained is a bit concerning. Looking at the historical annual totals from the case we see.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 2011 | 2012 | 2013 | 2014 | 2015 |
| **Total** | **12200** | **14760** | **17160** | **17560** | **20040** |

Note, that the total sales leveled out in 2013 and 2014, but exhibited a substantial jump in 2015. The increase from 2014 to 2015 was 2,480 homes. But our forecast from the time series decomposition is only (21,794 – 20,040) = 1,754.

The question is why the large increase from 2014 to 2015? Can this be expected to continue, or will sales revert to the more normal increase of approximately 1754? This may be where the regional sales forecasts from the field might be helpful. What trends are they seeing and can we assume similar increases or more of the normal increase based on past data. The final forecast will probably be somewhat of a combination of what we obtained from the data and what the sales regions are seeing. This could lead to a lively discussion about whether sales people are overly optimistic in setting sales forecasts, assuming they are larger, or whether Best Homes should rely more on the data. Of course, this is also critical in setting the company’s overall sales, net income and earnings projections for the coming year. Forecasting will affect not only Operations, but Financial, Marketing, Sales and HR planning.





