Month	Actual Sales	Forecast Component	Trend Component	Adjusted Forecast
April	10	11.11	0.35	11.46
May	12	11.02	0.26	11.28
June	-	11.50	0.30	11.80

Therefore, the adjusted exponential smoothing forecast for June is 11.80.

Figure 15.3.4 contains the simple exponentially smoothed and the adjusted exponentially smoothed forecasts for the yearly Laredo truck crossings using $\alpha = 0.3$ and $\beta = 0.4$, respectively. Note that the forecast is very close to the actual data.

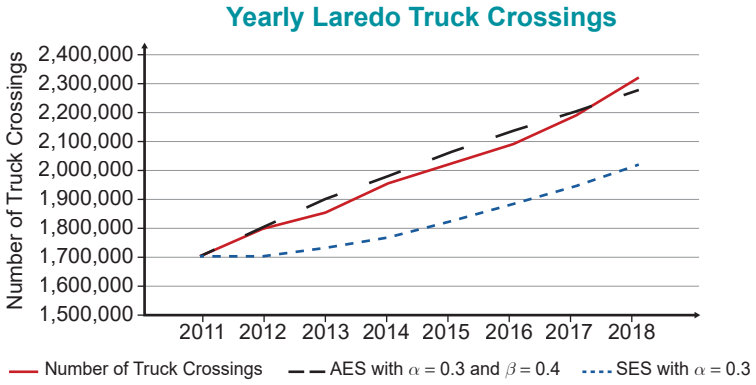

Figure 15.3.4

15.3 Exercises

Basic Concepts

1. What is a simple exponential smoothing?
2. How do different values of α react to changes in the data in simple exponential smoothing?
3. Describe the relationship between weight and period in simple exponential smoothing.
4. Give an advantage and a disadvantage of using simple exponential smoothing.
5. What do we adjust for in adjusted exponential smoothing?
6. For an upward trend, which forecast will be higher? The adjusted or the simple exponential smoothing? What about a downward trend?

Exercises

7. Use the Border Crossings data set. Using $\alpha = 0.3$, calculate the simple exponential smoothing yearly forecast of Detroit truck crossings for 2011–2019. Assume the forecast for the year 2011 to be the actual truck crossing value of year 2011.
8. Use the Border Crossings data set. Using $\alpha = 0.3$ and $\beta = 0.4$, calculate the adjusted exponential smoothing yearly forecast of Laredo truck crossings for 2011–2019. Assume the forecast component for the year 2011 to be the actual truck crossing value of year 2011 minus the initial trend. Let the initial trend be 100,000 trucks. (Note: One way to compute the initial trend is to determine the slope of a linear regression line fit to the data. In this case, if you fit a line to the Laredo yearly truck crossing data, you will get a slope of 84,220. This could be used as the initial trend.)

Data

The data set can be found by visiting stat.hawkeslearning.com and navigating to **Discovering Business Statistics, Second Edition > Data Sets > Border Crossings**.

Data

The data set can be found by visiting stat.hawkeslearning.com and navigating to **Discovering Business Statistics, Second Edition > Data Sets > Mortgage Rates**.

Data

The data set can be found by visiting stat.hawkeslearning.com and navigating to **Discovering Business Statistics, Second Edition > Data Sets > Monthly Average Retail Gas Prices**.

9. Use the Mortgage Rates data set, which contains the yearly mortgage rate in the U.S. since 1971.

a. Calculate the simple exponential smoothing forecast and the adjusted exponential smoothing forecast for the yearly mortgage rates for 2020. Assume $\alpha = 0.2$ and $\beta = 0.3$ for the respective methods.

b. Create a time series plot with both forecasts. What conclusions can you draw from it?

10. Use the Monthly Average Retail Gas Prices data set, which includes the average gas prices in the U.S. from April 1993 to July 2021.

a. Compare the simple exponential smoothing forecast and adjusted exponential smoothing forecast for the monthly gas price and their respective forecasts for August 2020. Assume $\alpha = 0.3$ and $\beta = 0$ for the respective methods and forecast the gasoline price for August 2021. Assume the first period forecasted gas price as the original gas price, and the initial trend is the slope of the linear regression line that fits the data.

b. Create a time series plot with both forecasts. What conclusions can you draw from it?