

EXERCISE 9
KEY

Purpose: To use a **SAS program** that will fit an appropriate **exponential smoothing model** to the Plano Sales Tax Revenue data and use it to **forecast** the growth in sales tax revenue for Plano from 2005 to 2006. You are to hand in this exercise in class on **Tuesday, November 15.**

Download the program Smooth_Plano_Forecast.sas from the class website. You are to use it to answer the following parts of this exercise. Note that you will have to fill in some crucial blanks in the program before you can get the desired answers. To understand what you need to fill in, you should read carefully my pdf file “SMOOTHING MODELS_V6.pdf”.

a) Given the forecasts from your preferred exponential smoothing model of the Plano Sales Tax Revenue data, I want you to fill in the following blanks:

Total Tax Revenue for Plano in 2005 (including the December 2005 forecast) = \$52,694,643.60.

Total Forecasted Tax Revenue for Plano in 2006 = \$55,752,062.69.

The percentage increase in Tax Revenue that is forecasted for 2006 as compared to 2005 = 5.802% %.

The forecasts that Smooth_Plano_Forecast.sas produced with the options “method = addwinters”, “seasons=12”, and “trend=2” are

Months	Monthly Forecast
Dec. '05	3756519.60
Jan. '06	4031666.11
Feb.	6443738.67
Mar.	3993022.40
Apr.	3780119.96
May	5473080.31
June	4258830.36
July	4127269.01
Aug.	5531792.38
Sep.	4222187.17

Oct.	4216839.10
Nov.	5635095.12
Dec.	4038422.10

b) Now let us compare the results we obtained for the forecasted percentage increase in Tax Revenue for 2006 as compared to 2005 for the following models. Fill in the blanks.

The SSP model = **4.8436217** %.

The DTDS model = **5.494** %

The UCM model = **4.87830** %

The Multiplicative Seasonal Box-Jenkins model = **5.55** %.

c) In the absence of knowing the relative out-of-sample forecasting accuracies of these competing methods one can be eclectic and form a simple average forecast of the percentage change. It is **5.314** %. Maybe this is what should be reported to the Plano City Manager as the best forecast for the growth in revenues from 2005 to 2006.

Answer:

Average Percentage Change across the 5 competing models is

$$(4.8436217 + 5.494 + 4.87830 + 5.55 + 5.802)/5 = \mathbf{5.314\%}$$