4311 Finance Lab

Project 1

Time Series Sales Forecast

**Comment:** Project overviews are meant to layout the minimum requirements for a given project and to explain the motivation for a given project. Meeting the minimum requirements does not guarantee an A or even a passing grade. These projects are very rich, with many possible extensions to the analysis, various interpretations and recommendations from the results, and alternative methods of analysis that can be applied or discussed relative to the primary method introduced in the project. The finance faculty wishes to give students a chance to differentiate themselves to potential employers in the interview process and have left “meat on the bone” for the students to explore.

In industry, project overviews are rarely, if ever, created. Your boss will simply say “do this” and expect you to formulate the required aspects of the project. In addition, detailed written reports, as are required for this class, are also rarely done in industry. However, employers want to know that potential employees are not only technically capable, but also can communicate their findings effectively in written form. Proof read your papers. DO NOT write sentences that you do not understand but think that the professor will. Use proper grammar, spelling, and effective organization of the material presented. Do not think “what does the professor want”, rather think “what would impress my boss” or “what would get the customer to choose my company”. Bosses and customers are busy. They hate too much information more than to little information. Be clear and to the point. Look for ways to table or plot critical information so that readers can understand the results at a glance. Good Luck.

**Motivation:** Finance is about the future while accounting is about the past. For finance, predicting the future consists of two parts; the estimate and the standard error of the estimate. The estimate represents the value you expect to occur in the future. The standard error of the estimate represents the accuracy or confidence you have in this prediction. In general, the smaller the standard error of the estimate, the better the model is considered to be.

The first project for the 4310 lab is to create a forecast model for sales. Forecasting sales is a natural starting point for companies. Sales drives labor requirements, material requirements, short term and long term financing requirements, and just about every other aspect of a company. Sales can be forecast on a short term basis, next week, next month, next year, or on a long term basis over many years. We adopt a long term sales forecast method because future projects in the 4310 lab on capital budgeting will be based on the long term sales forecast. While long term sales forecast models can be very complex, we selected a simple time series approach that is often the starting point for more complex modeling methods.

The goal of forecasting is to create an accurate forecast, not to ‘fit’ the historic data used to generate the forecast. Typically the most recent several data points are not used in forming the base model, but used to validate the out of sample predicting power of the model. While small standard errors of the estimate is considered a better model, a model with a slightly higher standard error but a better error structure to the out of sample data points is considered the better forecast model. After a model is selected, it is updated with the out of sample data points to create the final forecast model.

This project will give the student practical skills in forecasting. The forecast model created by the student will then be used in the balance of the projects, as is typical of a sales forecast in industry. Various Excel skills will be acquired in this project.

**Basic requirements of the report:**

1) A short description of the company assigned to the student is required. The description should be no longer that one page, double spaced, 11 point type, Garamond font. Give the reader key details of what the company does and how it performs, without boring them with details about the founding date, the address, and other needless information that can be quickly referenced but has no bearing on the sales forecast. Know your company!

2) Plot of sales relative to year with a linear fit line. This plot will be used to explain any key changes in the sales values. You will need to identify and explain major changes in the sales values. This will require research into the company and past economic conditions that might impact the company. Less time, if any, should be spent on older data. Know your data and what is driving the changes in the data!

3) Three regressions are required: a straight time series regression, a change of intercept regression, and a change of slope regression. You will select the points where change of slope and change of intercept are included. The selection of these points must be clearly explained and justified.

For each regression an error plot must be generated and analyzed in the report. These error plots should include the out of sample points.

A table must be created for each of the base regression showing the relevant information. An overlay plot showing the raw sales information, the change of intercept forecast, the change of slope forecast, and the linear fit line must be created and discussed. A discussion is required comparing the regression methods and justifying the selection of one of the forecast models. The selected model should be updated using the out of sample points and the final confidents and other relevant information must be tabled.

4) All tables and plots, except the working tables, must be integrated in the text and labeled as Table 1, Table 2, or Figure 1, Figure 2 ect.

5) Working tables should be labeled and included in the appendix as indicated in the videos.

**Remember, you are building a portfolio of projects and work examples that can be used in the interview process, not just creating a report for a grade. While the projects will give you many marketable skills in Excel, the ability to clearly communicate your findings is another marketable skill that can only be demonstrated through the writing of your report.**

**UTEP has support for writing. Proof read your papers and have someone else proof read your papers. Points will be deducted if your writing is poor or cannot be understood.**