

Mid-Term Review
Eco 5375
Business and Economic Forecasting
Fall 2011

Our upcoming mid-term exam is on **Monday, October 24, 2010 at regular class time, 5:00 PM in 351 Maguire**. It will be 1 hour and 20 minutes in length. It is a closed notes test and thus you are not to have any notes in any form open during the test. Also you must check your phones with the exam proctor. You can use any calculators that do not have access to notes and the like. We will also provide you with a 4-function calculator if you should need one.

I recommend that you review your notes, your quick quizzes (QQ1 – QQ7), and your exercises (EX1 – EX7). Exercises 8 and 9 are due after the mid-term and are not a focus of the test. The Keys for the quick quizzes and exercises are posted on the course website. The major topics for the test are as follows:

- Time Series Decomposition
- SSP Model
- Testing for Seasonality (Friedman non-parametric test)
- Buys-Ballot Plots
- The Box-Jenkins Model and Identification methodology
- The infamous P-Q box
- Forecasting with Box-Jenkins Models
- Augmented Dickey-Fuller Unit Root tests
- The difference in the Prediction Confidence Intervals between Box-Jenkins models that assume a stochastic trend and Deterministic Time Series models that assume a deterministic trend.
- Typical seasonal time series transformations used in modeling seasonal time series
- The Airline Model

You should read the following important pdfs and/or SAS files that are contained either in the notes section of the course website or in a relevant subdirectory of the course website:

- **Review my PowerPoint Introduction to this course: Overview.ppt**
- **Review: Some Applications of Forecasting.pdf**
- **Some Definitions.pdf**
- **Forecasting Experiments.pdf**
- **Graphs for out-of-sample forecasting experiments.pdf**
- **SAS Lecture pg 1.pdf and SAS Lecture pg 2.pdf**
- **Decomposition.sas** (for understanding the basic additive decomposition of time series. The results of this program appear in **Overview.ppt**).

- **Stable Seasonal Pattern model.** See **Stable Seasonal Pattern Model_v2.pdf**
- **Buys-Ballot plots.** See the files **Buys Ballot Plots.pdf** and the SAS programs **Plano_Plot_Jacob_Williamson.sas** and **Airline_Jacob_Williamson.sas** (in the “Season” subdirectory).
- **BJ_Notation.pdf** (The beginning of the **Box-Jenkins Model** discussion)
- **Three Important Concepts.pdf** (Stationarity, White Noise, and Different Forms of Non-stationarity)
- **Stats.pdf** (PQ Box, Tests for White Noise Residuals, and Overfitting)
- **In the ACF_PACF subdirectory in the course website: Study ACF_PACF_Table.pdf** and the various graphs of the ACFs and PACFs of the non-seasonal Box-Jenkins models. You should be able to identify various Box-Jenkins models simply from these graphs.
- **Forecast Profiles.pdf** (the idea of minimum mean squared error forecasts and the role that the conditional mean plays in generating the formulas for such forecasts in the Box-Jenkins model)
- **You need to understand the outputs from EX4.sas and the EX5.sas program that you were supposed to create.** Essentially you need to understand the SAS output that generates the statistics needed to fill in the P-Q Box. Also you should be able to interpret the SAS output produced by Proc ARIMA so that you can write an estimated B-J model out in “conventional” form.
- **Augmented Dickey-Fuller Unit Root tests.** You need to be able to interpret output from SAS like in **Leadunit.sas** and **DOWlog.sas** and the **EIEWS** output as produced in **Lead_production.wf1** and **Dow Jones.wf1**. Know the different cases of the ADF test. See the pdf files **ADF Lecture Notes.pdf** and **ADF_Notes.pdf**. For some Monte Carlo data sets representing the various ADF cases see **Learn Unit Root.sas**.
- **I discussed the %logtest SAS macro in the SAS program DOWlog.sas.** Look at the output in that program and be able to use it to decide whether you should work with the data as is or log the data. Also you should know of the way to generate level forecasts given the log forecasts and how to create confidence levels of the level variable when given the confidence intervals of the log forecasts. See **Exercise 7** for more detail.

You are certainly welcome to go the sub-directory “Key to Mid-terms” on the classroom website and look at some of the previous mid-term exams in this course. You will notice that most of the tests are multiple choice, fill-in-the-blank, or short answer questions. Also note that many of the questions involve the interpretation of SAS output produced by using Proc ARIMA. However, you should know that some of the topics on these previous mid-term exams may not have been covered yet in class as my timing of the presentation of the topics is not always the same from year to year. Therefore, you should not spend a lot of time studying old questions whose topics have not yet been covered in class. Stick with the contents of this Review Sheet and you should be fine.