Statistics 435/711

Fall 2017

Instructor

Paul Shaman, xxx JMHH, shaman@wharton.upenn.edu, 215-898-8749

Class Hours and Location

TuTh 12–1:20, JMHH xxx

Office Hours

MTuTh 4:30–6, and by appointment

Teaching Assistant

Thomas Ippolito, t.ippolito5@gmail.com

Course Materials

Class notes. These are the main source material for the course. The notes will be posted throughout the semester on Canvas.

Tsay, R. S., *Analysis of Financial Time Series*, 3rd ed. Wiley, New York, 2010. Some supplementary reading will be assigned in Tsay's book, and the book will also provide data sets for discussion and for homework.

Software

I will be using both JMP 12 and R. There is no requirement that you master both—you may work exclusively in JMP, or exclusively in R, if that is what you prefer. As we proceed, I will discuss and illustrate the use of both JMP and R in lectures.

JMP 12 statistical software. If you choose to use JMP, I *highly recommend* you buy the software. When you install it on your computer, you will also have installed a number of manuals, several cards for quick reference, all in pdf format, and several tutorials.

A three-year JMP 12 license may be purchased for $59.95 at upenn.onthehub.com. Shorter term licenses are available from estore.e-academy.com. A six-month license costs $29.95 and a twelve-month license sells for $49.95. If you have an earlier version of JMP, it will suffice.

JMP 12 software is installed in the Wharton computer labs, all in Huntsman: F75 (60 seats), F80 (29 seats), 375 (80 seats) and 380 (80 seats).

The R package is free and open software and is available at www.r-project.org. Several items of R documentation have been posted on Canvas.

Course website

Statistics 435/711 is using Canvas. You can gain access by going to https://canvas.upenn.edu/. All notes, homework assignments and data sets for the course will be distributed and managed via the website.

Course Description

The aims of this course are to introduce basic time series and forecasting techniques. The emphasis will be upon the use of statistical methodology, and the written communication of statistical results. Considerable time will be devoted to understanding statistical and econometric problems in the contexts in which they arise, and to proper selection of statistical techniques and interpretation of the statistical output.

As noted above, the primary class materials will be instructor's notes; the text will be supplementary. Use of both JMP and R will be incorporated into the class notes.

There will be five homework assignments. Each will involve the analysis of data sets and interpretation of the findings, and the presentation of a clearly organized and presented written report. The homework is designed to teach and to give experience in the use of time series methodology. You are encouraged to consult with each other in doing the homework, and also to contact me for help. ***File sharing is not permitted, and YOU MUST SUBMIT YOUR OWN WRITEUP, WITH YOUR OWN CALCULATIONS***. Homework must be submitted by the due date specified for the assignment.

There are no examinations.

Calendar

There are 28 classes (Tuesday–Thursday schedule).

The first class is Tuesday, 29 August.

There is no class Thursday, 5 October (Fall break).

The drop period ends Monday, 9 October.

The withdrawal deadline is Friday, 10 November.

There is no class Thursday, 23 November (Thanksgiving).

The last class is Thursday, 7 December.

Topics

The primary goal is to present time series techniques. Basic multiple regression will be reviewed at the beginning, and additional regression topics will be presented as they are needed. For the most part, because of time limitations, attention will be focused on univariate series. Data sets studied will be primarily, but not exclusively, business and economic time series, including financial market data.

Multiple regression methods

Distributed lag models

ARIMA models

Spectral methods

Exponential smoothing

Combination of forecasts

ARCH and GARCH models