Statistics 435, Statistics 711

Spring 2012

Instructor

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Class Hours and Location

TuTh 3–4:20, JMHH 360

Office Hours

MTuTh 4:30–6, and by appointment

Teaching Assistant

Pengyuan Wang, pengyuan@wharton.upenn.edu

Course Materials

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

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

JMP 9 statistical software. I *highly recommend* you buy the software so that you have it on your own computer. We will use it extensively in class, and you will need to know how to read its output and use it for assignments and for reading class notes. When you install the software on your computer you will also have installed seven manuals and two cards for quick reference, all in pdf format.

A three-year JMP 9 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 be sufficient.

JMP 9 software is installed in the Wharton computer labs, all in Huntsman: F75 (60 seats), F80 (29 seats), 375 (80 seats) and 380 (80 seats).

Course website

Statistics 435/711 will use Canvas. You can gain access by going to https://wharton.instructure.com/courses/215702. All notes, homework assignments and data sets for the course will be distributed and managed via the website.

Note for non-Wharton students: If you do not have a Wharton computing account, you will need to establish one to access the website. The account also provides access to the computing labs in Wharton and to the intranet. To get an account, go to

http://apps.wharton.upenn.edu/accounts/class

After you have requested your account, allow some time for activation.

Wharton students and students who have recently taken a Wharton course have existing accounts.

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. JMP software will be used extensively in classroom presentations and will be incorporated into the class notes. The software offers excellent graphics which will be useful for picturing data and illustrating methodology.

For methods not covered by JMP we will employ R, time permitting. R will not be required for the homework assignments.

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. You must submit your own writeup. 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 Thursday, 12 January.

The drop period ends 17 February.

There are no classes 6 March and 8 March (Spring break).

The last class is Tuesday, 24 April.

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.

Review of Multiple Regression

Decomposition Models

ARIMA Models

Spectral Methods

Exponential Smoothing

ARCH and GARCH Models

Nonlinear Models

Combination of Forecasts