BUSINESS STATISTICS 41000-81/82
SPRING QUARTER 2013
BOOTH SCHOOL OF BUSINESS
THE UNIVERSITY OF CHICAGO

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COURSE WEBPAGE

I maintain a course webpage with all lecture notes, homework assignments, useful links, old midterm and final exams, miscellaneous information. The web address is

http://faculty.chicagobooth.edu/hedibert.lopes/teaching/41000-Spring2013

COURSE DESCRIPTION (summary)

I. UNIVARIATE EXPLORATORY DATA ANALYSIS

II. MULTIVARIATE EXPLORATORY DATA ANALYSIS

III. BASIC PROBABILITY

IV. MORE ON PROBABILITY

V. STATISTICAL INFERENCE

VI. HYPOTHESIS TESTING

VII. SIMPLE LINEAR REGRESSION

VIII. MULTIPLE LINEAR REGRESSION

IX. TOPICS IN REGRESSION

TEXTBOOK

Lind, Marchal and Wathen’s “Statistical Techniques in Business & Economics (12th, 13th or 14th editions)” plays a supporting role in this class, particularly for students who find handouts either too superficial or need additional examples/explanations to any given subject. The book contains several examples and solved problems.

COURSE DESCRIPTION (detailed)
I. UNIVARIATE EXPLORATORY DATA ANALYSIS
1) Graphical summaries of the data; 2) Numerical descriptive measures; 3) Boxplot.

II. MULTIVARIATE EXPLORATORY DATA ANALYSIS
1) How to relate two things; 2) Correlations and covariances; 3) Linearly related variables; 4) Portfolio example; 5) Simple linear regression.

III. BASIC PROBABILITY
1) Probability and random variables; 2) Bivariate random variables; 3) Marginal distribution; 4) Conditional distribution; 5) Independence; 6) Computing joint distributions from conditional distributions and marginal distributions.

IV. MORE ON PROBABILITY
1) Continuous distributions; 2) Normal distribution; 3) Cumulative distribution function; 4) Expectation as a long run average; 5) Expected value and variance of continuous random variables; 6) Random variables and formulas; 7) Covariance and correlation for pairs of random variables; 8) Independence and correlation.

V. STATISTICAL INFERENCE
0) I.I.D. draws from the normal distribution; 1) Binomial Distribution; 2) The Central Limit Theorem; 3) Estimating $p$, population and sample values; 4) Sampling distribution of the estimator; 5) Confidence interval for $p$.

VI. HYPOTHESIS TESTING
1) Hypothesis testing; 2) P-values; 3) Confidence intervals, tests, and p-values in general.

VII. SIMPLE LINEAR REGRESSION
1) Simple linear regression model; 2) Estimates and plug-in prediction; 3) Confidence intervals and hypothesis testing; 4) Fits, residuals, and R-squared.

VIII. MULTIPLE LINEAR REGRESSION
1) Multiple linear regression model; 2) Estimates and plug-in prediction; 3) Confidence intervals and hypothesis testing; 4) Fits, residuals, R-squared, and the overall F-test; 5) Categorical explanatory variables: dummy variables.

IX. TOPICS IN REGRESSION
1) Residuals as diagnostics; 2) Transformations as cures; 3) Logistic regression; 4) Understanding multicolinearity; 5) Autoregressive models; 6) Financial time series.
STATISTICAL PACKAGES

Most of the computations in the classroom examples are simple enough to be performed by a scientific calculator and/or Excel. Several of the computation and plots that appear in the lecture notes were obtained from MINITAB, R, Excel or MegaStat for Excel. MegaStat for Excel is a set of routines that can be easily “added-in” by Microsoft Excel. It comes with Lind, Marchal and Wathen’s textbook. However, Excel by itself will be enough for most of our computations.

HOMEWORK ASSIGNMENTS

From 4 to 6 homework sets will be assigned, each one of which is invariably due one week after it has been handed out.

GRADE POINT AVERAGE, FINAL NUMBER GRADE and LETTER GRADE

The University of Chicago Graduate School of Business mandates a maximum (not minimum!) class grade point average (GPA) of 3.33. The overall class scores will be used to rank the class and grade cutoffs are chosen so that the highest class GPA is less than (or equal to) 3.33.

The final number grade (FNG) will be the weighted average of i) homework assignments average (HWA), ii) the midterm exam (MT) and iii) the final exam (FI). The weights are 20%, 30% and 50%, respectively. For example, suppose that your grades on HW1, HW2, HW3, HW4, MT and FI are 7.0, 8.0, 9.0, 10.0, 9.0 and 8.0, respectively, then the homework assignments average (HWA) is the average of HW1, HW2, HW3 and HW4, i.e. HWA=8.5. Therefore, your final number grade will be FNG = 0.2*HWA+0.3*MT+0.5*FI = 0.2*8.5+0.3*9.0+0.5*8.0 = 8.4.

The letter grades I use are A, A-, B+, B, B-, C, D (lowest grading pass) and F (fail).

CALCULATOR AND CHEAT SHEET

Bring a calculator to all exams. For the midterm, a two-page (one sheet) "cheat sheet" is allowed. For the final, a four-page (two sheets) "cheat sheet" is allowed.

REQUESTS FOR RE-GRADING

All requests for re-grading of exams must be made in writing and must clearly state the basis of the request.