

ECONOMICS 321(002)
INTRODUCTION TO STATISTICS

SPRING SEMESTER 2008
BILGER 150
TR 12:00-1:15

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OFFICE HOURS: TR 11:00 - 12:00
AND BY APPOINTMENT

Text: **Triola, Mario F., 2007. *Elementary Statistics Using Excel* (3rd ed.)** Boston: Pearson/Addison-Wesley. Make sure your copy of the text has the CD included with the package. The CD includes several supplementary resources, including data sets for homework assignments.

We will also make extensive use of *Excel*, the spreadsheet program from Microsoft. If you do not have a copy, it is available on most computers around campus. The textbook describes the 2003 version of Excel. Most UH campus computers, and some of you, have the newer 2007 version, in which many menus have been replaced by icons. However, the same functionality is available.

My office hours and location are noted above. You are welcome to contact me at other times (phone numbers and email address noted above). As I am often in another office on campus, please call before dropping in outside of office hours.

The great 19th century British politician Benjamin Disraeli once claimed that "There are three kinds of lies: lies, damned lies and statistics." This course aims to inform you somewhat on the latter, without reference to the former ¹ (despite the cartoon at the bottom of page 2, below.)

You may or may not come away from the course with a love of statistics and may or may not wish to make statistics a central part of your professional life. But you can hardly avoid some contact with the subject. Managers and consultants encounter statistical procedures daily, and recent emphases on quality control have even brought statistics to the production line. As consumers, you may have occasion to look up a *Consumer's Report* evaluation of a major purchase--and to wonder about the validity of their ratings. And as citizens, we face a daily barrage of polls, politicians, bureaucrats and other nonsense deserving healthy skepticism.

Most of you will come to agree that statistics is not the easiest subject to learn. To help you gain an intuitive understanding of the subject, a computer is almost indispensable. Although many assignments can be done with a moderately sophisticated calculator, some will require you to use a spreadsheet such as Excel or Quattro Pro or Lotus 1-2-3. You should have a pocket calculator for exams and homework. A calculator with "two-variable" capability--i.e., one that does simple linear regression and correlation coefficients--will suffice. These are available in the Bookstore for less than \$20. Whether you use a spreadsheet, a calculator, or pencil, however, I expect anything submitted to explain how you got the final numerical result; this is more important than the numerical result itself. *Computer output without narrative description will be discounted heavily.*

Two strong "requests:" (1) Turn off your cell phones during class; (2) Please, no major dining in class.

GRADING

Your grade for this course will depend on homework exercises, two mid-term exams (100 points each) and a comprehensive final (200 points). Problem sets will be assigned each day, and will be due at the beginning of class on the due date. We will collect and grade six of these homework assignments, chosen arbitrarily and not announced beforehand. At a maximum of 20 points each, the best five of the six graded papers will constitute 100 points in your semester grade. In order to

¹Disraeli also demonstrated his shortsightedness in an exchange with Michael Faraday, the 19th century physicist and discoverer of many principles of electricity. Disraeli was shown a demonstration of Faraday's latest discovery, electromagnetic induction (the basis of electricity generators). Afterward, Disraeli asked, "What use is all this?" Faraday replied, "Someday, sir, you will find a way to tax it."

be fair to all class members, **I will not accept papers submitted after class time on the due date.** This policy will be strictly enforced, with exceptions only for *documented* illness and *documented* University functions such as athletic travel.

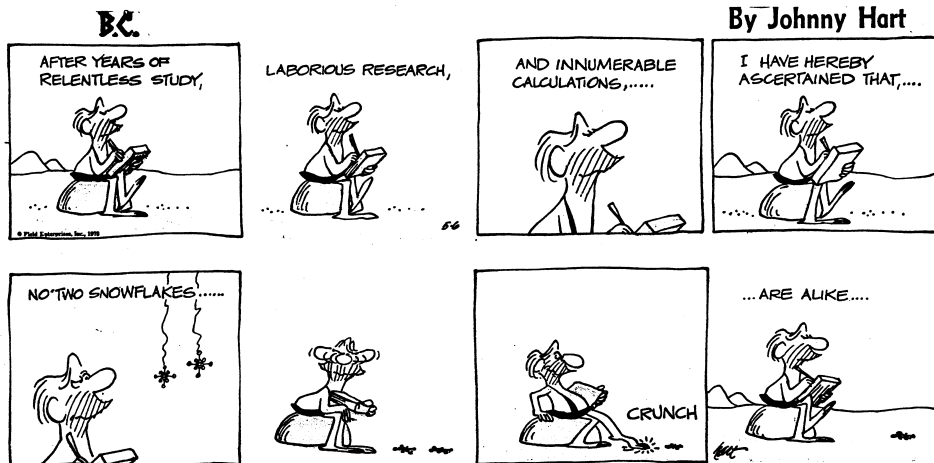
Your final grade will thus be based on a potential 500 points.

AN OUTLINE OF THE SEMESTER'S WORK

There are two branches of statistics: descriptive and inferential. We begin with *descriptive statistics*, concerned with summarizing the information contained in a body of data. Data can be described with graphs and tables, or in numerical form—for example, the mean $\bar{X} = \sum X_i/n$ measures the *central tendency* of the individual X_i values. In addition, we consider measures of variability and other properties of the data. This material, covered in chapters 1 - 3 of our text, can be messy but is conceptually straight forward. Next we consider concepts of probability (chapters 4 - 7) as represented by the normal, binomial and several other specific distributions, and we segue into *sampling distributions*, which form a bridge between descriptive and inferential statistics. Whereas the initial study of probability distributions refers to individual variables, sampling distributions refer to the probability distribution of statistics such as the sample mean \bar{X} .

Inferential statistics makes up most of the remainder of the course, chapters 8 - 12. The point of inferential statistics is, of course, to infer something about a population on the basis of a sample. For example, one can infer the population mean μ (which we rarely if ever know) from information contained in the sample mean \bar{X} . We would like to be able to say that a sample statistic, such as the sample mean, is defined in such a way as to give us confidence that it accurately estimates the corresponding population parameter, and to derive some information as to the degree of precision with which the sample statistic estimates the population parameter. We will apply the basic concept to estimates of the mean, variance, differences between means and variances, and to regression parameters.

For economics, and many other disciplines as well, the highlight of the course is the material on regression. Regression is the standard instrument in economists' toolkits, as it allows us to estimate, for example, demand curves or production functions or myriad other relationships between variables. Using these concepts, we arrive at inferences concerning the truth or falsity of propositions derived from economic theory or from past history or conventional wisdom or wherever.



Schedule of Topics

Dates below may be adjusted from time to time depending on our rate of progress and individual interests. Announcements will be made in class.

Read each day's assignment before class and be prepared with questions and discussion.

Class Hour	Date	Text Sections	Topic
1	15-Jan	1-1, 1-2, 1-3	Overview; Nature of Data; Critical Thinking
2	17-Jan	1-4	Design of Experiments
		(1/21/2008	Holiday: Martin Luther King Day)
3	22-Jan	2-1, 2-2, 2-3	Frequency Distributions and histograms
4	24-Jan	3-2, 3-3	Measures of Center & Variation
5	29-Jan	3-5	Exploratory Data Analysis
6	31-Jan	10-1, 10-2	Correlation (Part 1: Basics)
7	5-Feb	10-3	Regression (Part 1: Basics)
8	7-Feb	10-3	Regression (Part 1: Basics)
9	12-Feb	4-1, 4-2, 4-3	Fundamentals of Probability; Addition Rule
10	14-Feb	4-4	Multiplication Rule: Basics
		(2/18/2008	Holiday: Presidents' Day)
11	19-Feb	5-1, 5-2	Random Variables
12	21-Feb	5-3	Binomial Probability Distributions
13	26-Feb	5-4	Mean, Variance & Standard Deviation for Binomial Distribution
14	28-Feb	Test 1	
15	4-Mar	6-1, 6-2	Normal Distributions
16	6-Mar	6-3	Applications of Normal Distributions
17	11-Mar	6-4	Sampling Distributions and Estimators
18	13-Mar	6-5, 6-6	Central Limit Theorem; Normal Approximation of Binomial
19	18-Mar	7-1, 7-2	Estimating a proportion
20	20-Mar	7-3	Estimating a Population Mean: F Known
		(3/21/2008	Holiday: Good Friday)
	25-Mar		Spring Recess
	27-Mar		Spring Recess
21	1-Apr	7-4	Estimating a Population Mean: F Not Known
22	3-Apr	Test 2	
23	8-Apr	7-5	Estimating a Population Variance
24	10-Apr	8-1, 8-2	Hypothesis Testing
25	15-Apr	8-2, 8-3	Testing a Claim about a Proportion
26	17-Apr	8-3	Testing a Claim about a Proportion
27	22-Apr	8-4	Testing a claim about a Mean: F Known
28	24-Apr	8-5	Testing a claim about a Mean: F Not Known
29	29-Apr	8-6	Testing a Claim about a Variance
30	1-May	10-5	Multiple Regression
31	6-May	Review	
		(5/7/2008	Last day of classes for the semester)
	15-May	Final Exam: Thursday, 12:00 - 2:00	