PA 5031 – EMPIRICAL ANALYSIS I
(Statistics)

PA 5031, Lecture section 001 – Fall Semester 2017 – 4 credits
Tuesdays and Thursdays 11:15-12:30 p.m., CSOM 1-132
You must attend the lab for which you have registered:
  Lab 003 – Fridays 9:45-11:00 a.m. in HHH 85 (attendance required)
  Lab 002 – Fridays 11:15-12:30 in HHH 85 (attendance required)

Final Exam: Saturday, December 16th, 8-10 A.M. … DON’T leave town early!

Professor Deborah Levison
Office hours: Wed 9:45-11 & Thurs 9-10:15 a.m.
You are welcome to request an appointment to see me at other times; I will do my
best to find a meeting time that will work for both of us.
Office: 266 Humphrey Center, phone 612-624-3540, e-mail DLevison@umn.edu

Teaching Assistants:
  Nathaniel Dempsey – demps065@umn.edu
  Erin Ntalo – ntalo002@umn.edu
Office hours (mostly in cubicle by office HHH 266): announced on Moodle

Course Objectives:

This course is intended • to provide familiarity with statistical terminology used on
an everyday basis in the policy arena as well as the popular media; • to provide an
understanding of the methodology behind the numbers; • to enable students to use
basic statistical techniques in the course of research or policy analysis; • to teach
students to critically interpret statistical results; and • to encourage students to
think about implicit assumptions about numbers that affect our work, public policy
decisions, and our lives. In particular, I want students to think about how statistics
can be used to shed light on – or hide and even enhance – positions of power and
privilege in societies.
Expectations:

This class is demanding. It covers a lot of material at a pace that students describe as “relentless” or “frantic” or (more positively) “high energy.” It requires considerable effort and outside-of-class time. UM policy states that for each credit hour of a class, graduate students are expected to work more than three hours—counting class time, lab time, and study time. If we apply that policy to this class, that means a work load of more than 12 hours per week for this class—at a minimum—implying at least 8 hours per week outside of class/lab. Count on it.

Students are expected to accomplish multiple assignments every week, including a considerable amount of reading. However, this means that no one assignment carries a very large weight in determining the final grade, and students are not given an opportunity to fall behind. In order to succeed in this class you will need to do the reading and other assignments, attend class and lab, and ask questions—in class and/or in office hours. The goal of the instructor and the teaching assistants is for every single student to succeed in this class. We expect you to work very hard on your own, with each other, and with us, to accomplish this goal.

Humphrey students are hard-working, intelligent, and dedicated students. Because of this, students will sometimes be frustrated in this class. For example, some students are uncomfortable with a quantitative approach. They may require more time, and more effort, to consolidate and integrate various statistics concepts into a coherent whole. I find that students who feel that they “haven’t quite got it” but are persistent often put these pieces together while studying for the final exam.

For another example, students want answers to their questions right away, because they are used to grasping complicated concepts without problem. However, many statistics topics build sequentially on prior topics, making it counterproductive in some cases to discuss concepts for which the building blocks are not in place.

Questions in class. I strongly encourage you to ask questions in class. Framing questions is part of the learning process. The following indicates how I will answer questions. Some questions I will answer right away, because it is important to clear up a confusing point that is critical to our topic. Some questions are ones to which I will be unable to give a clear answer immediately, without creating more confusion. I will think about those questions and postpone the answer to later in the course or ask you to save the question for a more advanced course. This has nothing to do with your intelligence or ability to grasp concepts; rather, it has to do with the sequential nature of statistical learning.

From year to year, thoughtful students come up with a wide range of questions that are beyond where we are in class. You are welcome to ask such questions, but I may then postpone the answer to later in the course or ask you to save the question for a more advanced course. This has nothing to do with your intelligence or ability to grasp concepts; rather, it has to do with the sequential nature of statistical learning.

Unfortunately the amount of material we are required to cover in this class leaves little time for full-class discussions.
Getting your attention. My teaching style includes having breaks from lecture in class, during which students talk in pairs or in small groups. At these times the noise level rises substantially. I will signal the end of the “break” by clapping or ringing a bell. Students have complained about this, writing that it implies disrespect for them – “treating them like first-graders” – but I have not yet found a good alternative. I have a small voice, and if I strain my voice in class this often results in laryngitis. Suggestions welcome.

Teaching philosophy. Research shows that students learn more and remember what they learn much longer when they are active participants in the learning process. I use “active learning” methods in my teaching. Active learning is an approach to instruction in which students engage the material they study through writing, reading, talking, listening, and reflecting.

Electronics in class. You may use your laptop computer in class for note-taking or (rarely) looking up answers to questions that come up in class. You may not use it for checking email or Facebook or anything else. It’s very tempting – and also very rude, not to mention detrimental to your education. First offenders are asked to turn off the computer for the class. Second offenders are required to keep computers put away for the rest of the semester. Similarly, mobile phones and the like may be kept on and visible by people with small children or similar responsibilities (but tell the instructors); everyone else is expected to keep their electronics out of sight and out of hearing.

Recording lecture and/or lab. Recordings may not be taken without permission. Even if permission to make recordings for personal use has been granted, students are forbidden from distributing recordings to others or posting them to the web.

Posting to the web. In the past, I have never posted my notes to the web. Occasionally I am willing to post what I wrote in class – maybe a few times per semester. Please share notes with your classmates, and be aware that TAs will also be taking notes, which you may look at during TA office hours. I am willing to post hand-outs; if I forget, feel free to remind me.

Instructor limitations. I have irreparable nerve damage in my arms/shoulders, apparently due to “overuse”: many years of long hours in bad computer workstations or hand-writing. I welcome assistance in lifting, carrying, and door-opening. It is not possible to teach stats without writing, so I write on a tablet where a pen creates minimal friction. Sometimes my chronic pain means that I am unable to grade assignments as quickly as I would prefer, but know that I am doing my best. I am one of many people with invisible limitations and disabilities; if you are another, please feel free to let me know.
Course Requirements:

**Attendance** at lecture, lab, and group meetings is required. We aim to start each class/lab on time, and we need your cooperation to achieve this goal. It is better to be late than miss a class, but chronic lateness or multiple absences will reduce your grade. If you are late or miss class, it is your responsibility to find out what you missed.

Students are expected to complete the **assigned reading** and to work the assigned exercises before the class or lab for which they are assigned. The primary textbook is by Freedman, Pisani and Purves (sometimes called FPP). Other readings are used to provide examples and to remind you why it is important for people working on public policy to learn statistics.

**Problems in FPP.** Students are expected and required to work the “Exercise Sets” in Freedman et al as they read the text; answers are given in the back of the book, and these problems will not be collected or graded. Additional problems will be assigned or suggested from the “Review Exercises” at the end of each chapter; some of these will be collected.

**Reports and other assignments** may require calculations by hand or using a calculator, computations using Stata statistical software on a computer, and/or written analyses. Reports will involve using Stata to manipulate data about Brazilian youth or rural Tanzanians and interpret results; technical expertise is essential for good grades, although creativity in thinking about how to use statistics plus Stata to answer questions is encouraged and rewarded.

*Students have complained that I do not tell them exactly what I want them to do in their Reports.* Many of you want step-by-step instructions so you can get the “right” answer the first time. However, in statistical analysis, while there is correct/incorrect usage of statistical language and techniques, often there is no one correct answer. Different answers emerge from different ways of examining the data. If I give too many instructions, then I am not doing my job – teaching you how to think for yourselves using Stata. You are welcome to come to my office hours to ask for advice or suggestions about Reports, but some ambiguity will always exist.

I don’t expect you to turn in perfect Reports. Learning by doing always involves making mistakes, and learning from them. Don’t expect to get an A on Reports, although it is a worthy goal.

Here are some general tips about what I want: It is important that you learn how to communicate empirical analyses and their meaning clearly. Therefore, the presentation of your discussion—content, structure (including brief introductions and conclusions), grammar, and spelling of written answers—is taken into account in the grading of reports. How to use statistical language to correctly present your results is part of what you will learn-by-doing; this is my main goal for you,
although thinking creatively using Stata will be rewarded. Statistical output should be edited to eliminate all unnecessary information, and the output (tables, figures, etc.) should then be incorporated into the written answers to the reports.

Because of my hand/arm injuries, I may speak the kinds of comments that I used to write, then upload the comments to the web.

**Keep a back-up** (2nd) copy of each file on the HHH network. An assignment lost due to a technological problem will be given a zero.

Short **quizzes** will be given almost every week, beginning with Week 2, in class and/or lab. Quizzes are cumulative: topics covered before the class in which the quiz occurs may be included. Bring a calculator on quiz days. Using your mobile phone’s calculator is **not** allowed. After you complete your individual quiz, you will take the same quiz again, with your group. This is a good opportunity to learn from your group’s members. Occasionally the group quiz takes place immediately after the individual quiz. When it doesn’t, you will have time to consult your notes, the text, and other class members about any questions you may have. The TAs and I, however, will not answer questions about material on the quiz between the individual and group quizzes. Your final grade for the quiz will be based on both your individual quiz (75%) and the group quiz (25%).

The lowest quiz grade for each student will be dropped before the final grade is calculated. (Only the Stata quiz grade is excepted: that one cannot be dropped.) Therefore, I am very reluctant to give make-up quizzes for students who miss a quiz, even for legitimate reasons.

While many students find frequent quizzes helpful, other students find weekly quizzes very stressful. If you think that a weekly quiz will impede rather than support your learning, you should consider taking another section of PA 5031.

There will not be a midterm exam, but there will be a **final examination**.

**Base groups.** Students are expected to work cooperatively in groups assigned by the instructor. This is a required part of the course. Each student will be assigned to a base group that will exist throughout the course. Base groups are expected to meet outside of class on a regular basis, for 1-3 hours most weeks. Research indicates that this is a particularly effective way of learning in general, and it is even more useful in a course like statistics where student anxiety is often high. In addition, knowing how to be an effective group member is an important skill for anyone in the public policy arena. Students will grade each other on group preparation and participation. I suggest that each group set its own group norms at the beginning of the semester.

If your group is not working well for you, come talk to me as soon as possible. Personalities or schedules occasionally cause conflict that is no one’s fault. I am
usually able to re-arrange group membership in a way that leaves everyone better off. In general, I reserve the right to move students from one group to another in an effort to improve individuals’ learning.

**Mental health.** As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student’s ability to participate in daily activities. University of Minnesota services are available to assist you with addressing these and other concerns you may be experiencing. You can learn more about the broad range of confidential mental health services available on campus via the Student Mental Health Website at http://www.mentalhealth.umn.edu.

**Disabilities.** It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructor early in the semester to discuss their individual needs for accommodations. Accommodations must be arranged in advance. Further information is available from Disabilities Services (230 McNamara).

**Academic integrity.** Academic integrity is essential for a positive teaching and learning environment. All students enrolled in this course are expected to complete course-related responsibilities with fairness and honesty. Failure to do so by seeking unfair advantage over others, by misrepresenting someone else’s work as your own, or by another kind of scholastic dishonesty can result in disciplinary action, including receiving an F or an N for the course. **Scholastic misconduct** is broadly defined as any act that violates the right of another student in academic work or that involves misrepresentation of your own work. Scholastic dishonesty includes, (but is not necessarily limited to): cheating on assignments or examinations; plagiarizing, which means misrepresenting as your own work any part of work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of all instructors concerned; depriving another student of necessary course materials; or interfering with another student’s work.

University policy prohibits **sexual harassment** as defined in the December 1998 policy statement, available at the Office of Equal Opportunity and Affirmative Action. Questions or concerns about sexual harassment should be directed to this office, located in 419 Morrill Hall.

**Humphrey Grade Requirements.** Students must earn a grade of C- or better for a Humphrey School required course to be counted towards their degree. Those with less than a C- will need to re-take PA 5031.
**Incompletes.** This course follows the Humphrey School policy regarding incompletes. An incomplete will only be granted after the Professor and the student have mutually agreed upon a timetable (written contract) for completion of coursework. An incomplete must be requested in advance, and the Humphrey Institute incompletes form must be filled out. A link to the form is provided on the web.

**Blind Grading.** The instructor and teaching assistants use “blind grading” strategies. We do this because humans are very vulnerable to bias. Unconsciously, we may be more lenient (or more stringent) in our grading towards students we feel have worked hard (or not), for example. We will ask you to put your name on the back of all your quizzes and reports, on an otherwise blank page. (Please write your name at the top of the page; this will help us as we return graded papers to everyone.)

**Final grades.** These weights in percentages are approximate since your final grade will depend in part upon your performance relative to an absolute standard, as discussed in class. Your performance relative to other students in the class will also be used, as an indicator of your relative understanding of statistics.

*Approximate grade breakdown:*

- 5% Class, lab, and Moodle preparation and participation
- 5% Group preparation and participation
- 25% Problem sets and Reports
- 50% Quizzes
- 15% Final exam

**Required books:**


There will not be a coursepack for this class. Instead, required readings that are not in Freedman et al will be available via our class web site.
Class website:

Some class materials will be available on a class website, using the University’s Moodle software. Moodle is designed to work with the Firefox browser; if you use another browser, part of the page may be invisible to you. To access the class Moodle site:

1. Go to https://ay17.moodle.umn.edu and click on the login button.
2. Log in with your University of Minnesota Internet ID (X.500 username) and password.
3. Scroll down to find “PA 5031 Empirical Analysis 1 (sec 001, 002, 003) Fall 2017”
4. Click on the course name link and you will be sent directly to the class website.

Information on Stata software:

The Humphrey Institute has Stata 15 in its labs. Therefore, you do not need to buy Stata. However, if you want to have it at home, the Office of Information Technology (OIT) has a link that sends you directly to a reduced Direct-Ship GradPlan pricing website. Don’t buy the Small Stata version as it can only be used with data with 1200 or fewer observations, which is too few. The Stata IC version is sufficient, though you may consider spending more for a perpetual license rather than a single-year or six-month license. The Stata IC with a perpetual license costs about $200. This is a great deal considering that commercial pricing through the Stata website is usually more than three times that amount.

The OIT link (also on our class web site) is http://it.umn.edu/obtain-software/ – then click on Mathematics & Statistics, and scroll down to find Stata GradPlan (Method Number 3).

Other Stata resources:

Students are not required to buy a Stata book. A number of books about how to do statistics with Stata are available; you are welcome to buy one of them. However, all required Stata skills are taught in lab and most are included on lab hand-outs. Moreover, there are free Stata tutorials available via the internet (see the class web site), including the following from Princeton and UCLA at:

https://stats.idre.ucla.edu/stata/modules/
http://data.princeton.edu/stata/

It is now possible for most people to access files and software on UM servers using VPN software (see Moodle). There is also a remote desktop method of accessing Stata (ask the TAs!).
Other Resources for Success:

Center for Writing’s Student Writing Support. Student Writing Support provides free writing instruction for all University of Minnesota students - graduate and undergraduate - at all stages of the writing process. They help students develop productive writing habits and revision strategies via in-person consultations. See writing.umn.edu.

Other statistics-related references:


Kennedy, Peter *A Guide to Econometrics*, latest edition, Cambridge, MA: MIT Press. This paperback is well-known by students of econometrics for its intuitive explanations. It may be of use to you during and after Empirical Analysis II.
WEEK 1, September 5: Introduction
Introduction to course. Read pages 1-10 of this syllabus.
Take short online quiz about the syllabus.
Survey of students.

WEEK 1, September 7: Experiments & observational studies
Read Freedman et al, Preface (pp. xiii–xiv); Chapter 1 (pp. 3–11); Chapter 2 (pp. 12–24).
Watch DL video: Introduction to instructor’s teaching philosophy and group work (9:30 minutes).
Take short online quiz following video.
Report 7 assignment discussed. (Due date depends on group assignment.)

WEEK 1 LAB, September 8): Introduction to Stata and Brazil data
Information on data and codebook handed out.
Stata basics: units of observation, mean, median, mode
Tour of Moodle web site.

WEEK 2, September 12: Histograms
Read Freedman et al, Chapter 3, sections 1–3 (pp. 31–42).
Listen to a 14-minute podcast on “bad apples” in group work. It’s on the class web site under Required Readings.
Watch DL video: The process of taking weekly individual & group quizzes (4 minutes)
Reading on inequality measures will be handed out.
Problem Set 1 (individual) due: FPP Ch.2 Review Exercises #1, 2, 3, 4, 9, 10, 11.
These are the problems at the END of the chapter, pp. 24-27
Answers to FPP Chapter 2 review exercises made available.
Base group assigned.
**WEEK 2, September 14: Types of variables, crosstabulations**

Read Freedman et al, the rest of Chapter 3 (pp. 42–49).
Seife, pp. 40-44 and 54-56. Optional: listen to an interview of Charles Seife (podcast).
Problem Set 2 (individual) due: FPP Ch.3 review exercises #1-8 and 12 (pp. 50-55).
Quiz – individual.

**WEEK 2 LAB, September 15: Introduction to Stata**

Base group quiz. Stata basics: reading data, selecting a sub-sample, descriptive statistics, saving output, creating variables, using labels, using Stata output in Word.

**WEEK 3, September 19: Crosstabs, average, r.m.s., standard deviation**

Read Freedman et al, Chapter 4 (pp. 57–74, 76–77).
Individual/base group recommended FPP review exercises: Ch.4 #1, 2, 4, 6, 7, 12.
Watch DL video: Calculating a standard deviation (7.5 minutes).
Problem Set 2 (base group) due: FPP Ch.3 review exercises #1-8 and 12.
Answers to FPP Chapter 3+ review exercises made available.
Report 1 assignment (base group, using Stata) handed out.

**WEEK 3, September 21: Brazil/Tanzania data, uses of the normal curve**

Read Freedman et al Chapter 5 (pp. 78–93, 96).
Individual/base group recommended FPP review problems: Ch.5 #1, 4, 7, 8, 9, 11
Watch video: DL comments on Yanow reading (2 minutes).
Be sure to bring your data codebook to class. Do you understand what each variable tries to capture?
Quiz – individual only.

**WEEK 3 LAB, September 22: Descriptive statistics**

Before lab, watch video: Amrita & Diego’s data collection experience in Nepal (26.5 minutes).
Base group quiz.
Stata: creating & recoding variables, histograms, 2- and 3-way crosstabulations.
WEEK 4, September 26: Percentiles, inequality measures, chance errors, outliers, bias

Read hand-out on inequality measures.
After reading inequality hand-out, watch DL video on inequality measures (15.5 minutes).
Read Freedman et al, Chapter 6 (pp. 97–104, 108–109). I will be assuming that you already know the content of Chapter 7 (pp. 110–116); review it on your own if necessary.
Individual/base group recommended FPP problems (pp. 104-108): Review Exercises #4; Special Review Exercises #3, 4, 6, 7, 10, 12, 13.

WEEK 4, September 28: Scatter diagrams, the correlation coefficient

Read Freedman et al, Chapter 8 (pp. 119–134, 139–140) and Chapter 9 (pp. 141–153, 157).
Individual/base group recommended FPP review problems: Ch.8 #1, 2, 3, 7, 8, 9a, 9c; and Ch.9 #1, 2, 4, 6, 7, 8, 12.
Watch DL video: Calculating a correlation coefficient (8.5 minutes).
Reading on probability handed out.
Quiz—individual only.

WEEK 4 LAB, September 29
Base group quiz.
Stata: scatterplots, correlation coefficients, crosstabs.

WEEK 5, October 3: Association vs. causation, bivariate regression & the method of Least Squares

Read Freedman et al, Chapter 10 (pp. 158–175, 178–179); Chapter 11, sections 1, 2, and 7 (#1–4) (pp. 180–187, 201).
Individual/base group recommended FPP review problems: Ch.10 #1, 4, 6, 7, 8; Ch.11 #1, 2, 3, 6, 8, 12.
Report 1 (base group, using Stata) due.
Report 2 assignment handed out.

WEEK 5, October 5: Finish simple regression

Individual/base group recommended FPP review problems: Ch.12 #1, 2, 3, 7.
Watch DL video: Your boss won’t give you a rubric (3 minutes).
Quiz, individual and maybe group.
WEEK 5 LAB, October 6
Base group quiz (maybe).
Watch video before reading: DL comments on Leonard & Masatu (3 minutes).
Read Leonard & Masatu (2010) “Using the Hawthorne Effect to Examine the Gap
Between a Doctor’s Best Possible Practice and Actual Performance,” *Journal
Resume reading under Table 4, at “Column 3 examines . . . ”
Stata: scatterplots, simple OLS (bivariate) regression.

WEEK 6, October 10: Probability, the law of averages, chance process,
box models
Read hand-out summarizing FPP Chapters 13, 14 and 15. Then read it again, and
study it!
Read Freedman et al, Chapter 16 (pp. 273–285, 287).
Indiv./base group recommended FPP review problems: Ch.16 #1, 2, 5, 6, 7, 8, 9.
Report 2 (base group, using Stata) due.
Report 3 assignment (individual) handed out.

WEEK 6, October 12: Expected value, standard error, normal curve
Read Freedman et al, Chapter 17 (pp. 288–304, 307).
Indiv/group recommended FPP review problems: Ch.17 #1, 2, 4, 9, 11, 12, 13.
Quiz – individual only.

WEEK 6 LAB, October 13
Base group quiz.
Stata: producing, interpreting, and reporting your results; xtiles. Evaluation of
group members (not counted in final grade).

WEEK 7, October 17: Normal approximation for probability histograms
(Central Limit Theorem)
Read Freedman et al, Chapter 18 (pp. 308–327; 329–330).
Individual/base group recommended FPP review problems: Ch 18 #1, 2, 3, 5, 6,
8, 12.
Statistics,” Chapter 8 in *Naked Statistics: Stripping the Dread from the Data*,
New York: W.W. Norton, pp. 127-142.
Watch DL video on converging histograms (19 minutes).
Watch DL video (required!) on endpoints & the continuity correction (9.5 minutes).
Reading on the chi-square test handed out.
Reading on opinion polls handed out.
WEEK 7, October 19: Sample surveys, parameters vs. statistics, bias, chance error

Read Freedman et al, Chapter 19 (pp. 333–351, 353–354).
Individual/base group recommended FPP review problems: Ch.19 #1, 2, 4, 5, 9.
Watch DL video: parameters vs. statistics (5 minutes).
Watch DL video: Causes of bias in samples (17.5 minutes).
Review Kelman reading from Week 1 - it may be useful for discussion.
Quiz – individual only.

WEEK 7 LAB, October 20

Base group quiz.
Stata: review of regression.

WEEK 8, October 24: Chance errors in sampling, standard error, accuracy of percentages, confidence intervals

Read Freedman et al, Chapter 20 (pp. 355–371, 373–374); Chapter 21 (pp. 375–391, 394).
Individual/base group recommended FPP review problems: Ch.20 #1, 3, 6, 11, 12; and Ch. 21 #2, 3, 5, 6, 7, 8, 12.
Report 3 (individual, using Stata) due.
Report 4 handed out.

WEEK 8, October 26: Current Population Survey, measures of employment, crosstabs and the chi-square test

Read Freedman et al, Chapter 22 (pp. 395–405, 407–408).
Watch Dana DeMaster video.
Read hand-out on the chi-square test.
Individual/base group recommended FPP review probs: Ch.22 #1, 5, 8, 9, 12.
Quiz, individual and maybe group.

WEEK 8 LAB, October 27

Group quiz?
Stata: 3-way crosstabs, chi-square test (ϕ).
WEEK 9, October 31: Accuracy of sample averages, statistical inference
Read Freedman et al, Chapter 23 (pp. 409–425, 436–437); and Chapter 24, section 4, paragraphs 2 and 3 only (pp. 454–455).
Individual/base group recommended FPP review problems: Ch.23 #1, 3, 4, 5, 7, 10, 12; and Ch.24: none.
Visiting instructor: TBA

WEEK 9, November 2: Begin tests of statistical significance
Hand-out: Thinking about 1-tailed Tests.
Quiz – individual only.

WEEK 9 LAB, November 3
Watch required video before lab: using weights (12 min).
Group quiz.
Stata: Using weights.

WEEK 10, November 7: Null & alternative hypotheses, Z- and t- Tests of significance
Read Freedman et al, Chapter 26 (pp. 475–495, 500).
Individual/base group recommended FPP review problems: Ch.26, #1, 6, 8, 10.
Report 4 (base group, using Stata) due.
Report 5 assignment handed out. This is an individual (not group) report on crosstabulations.

WEEK 10, November 9: Tests of significance
Read and study hand-out on 1-tailed tests.
Individual quiz.

WEEK 10 LAB, November 10
Group quiz.
Stata: 1-sample tests.
**WEEK 11, November 14: Significance tests for differences in averages**

Read Freedman et al, Chapter 27, sections 1, 2, 5 & 7 (pp. 501–508, 517, 521–522). Individual/base group recommended FPP review problems: Ch. 27 #1, 2, 3, 4, 10. After reading FPP, watch DL video: Significance tests for differences in averages and percentages (21 min.)

**WEEK 11, November 16: Significance tests for differences in percentages**

Continue examples of tests for statistically significant differences. Quiz.

**WEEK 11 LAB: November 17**

Group quiz (maybe). Stata: 2-sample tests, paired-sample tests and chi-square tests. Evaluation of group members (part of group participation grade); form also on web.

**WEEK 12, November 21: Chi-square test (again) , independence vs. association, data snooping, significance vs. importance**


*November 23 and 24 are the Thanksgiving holiday.*

**WEEK 13, November 28: Multivariate OLS regression, \( R^2 \)**


**WEEK 13, November 30: Interpreting multivariate OLS**

Report 6 (individual only, but can confer with group) handed out. Quiz – individual and group.

**WEEK 13 LAB, December 1**

Summary of Studenmund (Empirical Analysis II) notation handed out. Stata: multivariate OLS, including dummy variables.
WEEK 14, December 5: Multivariate OLS, F tests

Watch DL video: James Berry’s Rule (5 minutes).

WEEK 14, December 7: Multivariate OLS

Review Ritter reading, section 11, then watch DL video: Kahn regressions (7.5 min).
Report 6 (individual, using Stata) due. To be corrected in class.
Practice “test” – given OLS results, interpret them.
No quiz.

WEEK 14 LAB: December 8

Quiz, individual, on using Stata. Open notes. (No group quiz.)
Course evaluations.

WEEK 15, December 12: Ethics of statistics

Class discussion on the ethical use of statistics.
WEEK 15 LABS: none

Finals: December 15–21

The final exam will take place on Saturday, December 16, from 8:00 a.m. to 10:00 a.m. in Blegen 317. (I will request an additional hour, so our time or location may change slightly.) Everyone will have 3 hours to take a 2-hour exam.

— WARNING: Assignment dates are not carved in stone! Changes happen. —