Instructor: Dan Black  
Office: 111  
Email: danblack@uchicago.edu

TAs:  
Derek Wu, Head TA, email: derekwu@uchicago.edu  
Angela Wyse, email: awyse@uchicago.edu  
Claire Herdeman, email: cherdeman@uchicago.edu  
Darshan Sumant, email: darshansumant@uchicago.edu

Class Time: 8:00 – 9:20 T, Th  Large Lecture Hall  
9:30 – 10:50 T, Th  Large Lecture Hall

Course Objectives: To introduce students to statistics that are useful in the analysis of public policy data. To provide students with basic training in the necessary computation skills to analyze data. In terms of the specific skills,

Learning objectives:

1. Learn the basic properties of the basic functions of probabilities: cumulative distribution functions (cdf’s), probability mass functions (pmf’s), and probability density functions (pdf’s).
2. Learn the basic descriptive statistics: means, standard deviation (variance), skewness, kurtosis, covariances and correlation coefficients, and quantiles. Learn when these statistics are informative.
3. Learn how to calculate these basic statistics in both Stata and R.
4. Learn the basics of hypotheses testing. Learn how to construct both null and alternative hypotheses.
5. Learn to draw the distinctions between exact and asymptotic tests. Learn when asymptotic test will perform well and when they will not.
6. Learn how to use simulations to help understand complex statistical problems. Learn how to program estimates using simulations.
7. Learn how and when to use the bootstrap to improve on asymptotic test. Learn how to program bootstrap estimation.
8. Understand the basics of sample design including both stratification and clustering.
9. Understand the problems associated with both unit and item nonresponse and the assumptions behind the “correction” of these problems.
10. Understand the consequences of measurement error.
11. Understand how experiments allow you to draw causal inference.
Texts:


Optional: If you really want to make statisticians rich by buying standard textbook, past students have found this one handy: Wackerly, Mendenhal, and Scheafer *Mathematical Statistics with Applications*. Any edition will do.

Other Resources:


Nate Silver, *Signal and the Noise: Why So Many Predictions Fail – but Some Don’t* New York: Penguin Press, 2012. Less than $20 for the hardback, less than $12 for the Kindle. UC undergraduate and NY Times writer explains prediction, which is close related to statistics.

There a hundreds of statistics books. They seldom make the best seller lists, but they are often excellent. We will put some resources on

There are lots of very interesting online guides to the software used in this class. They include

R:

http://r4ds.had.co.nz/

https://www.statmethods.net/

https://www.rstudio.com/online-learning/

Stata:

http://data.princeton.edu/stata/

http://tutorials.iq.harvard.edu/Stata/StataIntro/StataIntro.html

http://web.mit.edu/14.31/www/stata.html

http://www.stata.com/links/video-tutorials/
Grades:

We will assign grades for this the course on the basis of homework assignments given through the term, a midterm, and final.

<table>
<thead>
<tr>
<th>Scheduled</th>
<th>Fraction of grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeworks</td>
<td>Various</td>
</tr>
<tr>
<td>Midterm</td>
<td>Monday October 8, 2018 in class</td>
</tr>
<tr>
<td>Quizzes</td>
<td>In discussion sections (throw out lowest two)</td>
</tr>
<tr>
<td>Final</td>
<td>Monday December 10, 2018 at 8:00-10:50 AM</td>
</tr>
</tbody>
</table>

If you believe that your grade on an assignment, quiz, or exam is incorrect or unfair, please submit your concerns in writing to your TA within a week of it being returned. Explain fully in writing why you believe what the problems are. The TA is responsible for the relevant question will respond in writing. If you still have concerns, you may submit them in writing to me.

Core courses at the Harris School are graded on a rough curve. The basic target distribution is

<table>
<thead>
<tr>
<th>Grade</th>
<th>Fraction of class</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1/8</td>
</tr>
<tr>
<td>A-</td>
<td>1/4</td>
</tr>
<tr>
<td>B+</td>
<td>1/4</td>
</tr>
<tr>
<td>B</td>
<td>1/4</td>
</tr>
<tr>
<td>B-</td>
<td>1/8</td>
</tr>
</tbody>
</table>

**Homework:** Homework will be done in groups that will assigned. Groups will change over the quarter. Each group should hand in one copy of their assignment, but each member of the group needs to execute the code on their own computers.

**Quizzes:** We will be giving quizzes in most discussion sections. We will throw out your two lowest scores. If you miss a quiz, that will count as one of the two lowest scores.