University at Albany
Rockefeller College of Public Affairs and Policy
RPAD 705, Advanced Quantitative Analysis
Fall 2017

Time and Place:
Mon 1:40PM-05:20PM  Husted 004 (we will only meet for 3 hours, we can talk about which 3 hours makes the most sense, in terms of schedules)
Thursday 10:00am-11:30am  Husted 004

Professor:
Shawn D. Bushway Ph.D.
324 Milne Hall
Wk (518) 591-8738
sbushway@albany.edu
The best way to contact me is via email. To ensure that I see your email, write “PAD 705” in the subject line, and sign your full name.

Teaching Assistant
Cesar Renteria
crenteria@albany.edu
Cesar is a third year PhD student in PAD who is developing an expertise in econometrics. He has taken 688, 705, 704, and 725 and has taught statistics before.

Office Hours:
Bushway
I have found that students don’t make use of regularly scheduled office hours. However, I am in the office most days and I am willing to do whatever is necessary to facilitate appointments.

Renteria
Wednesday 4pm-7pm PhD Student Lounge, Third Floor.

Course Goals:
1) Students will have a strong intuitive understanding of multivariate regression, and its various uses, including statistical inference and statistical forecasting/prediction.
2) Students will be able to perform sophisticated empirical analysis and interpret the results.
3) Students will be able to read and critique empirical analyses used in academic publications.

Prerequisites:
I am assuming basic familiarity with statistics and basic regression at the level taught by PAD 505, although POS 517 is perhaps a better preparation. Calculus is not required, but a conceptual understanding of calculus does make comprehension of the material easier. For PAD students, this course fulfills a core requirement, and, thus, your core GPA, which is evaluated as part of the Core Comprehensive review.
Expectations:
This is a 4 credit class. By university rules, that means that you are expected to spend 12 hours total on this class, 4 in class and 8 outside of class. I will not be surprised if you spend more than that, at least for some weeks. If you get above 15, let me or Cesar know. We might be able to help you study more efficiently.

I know of no one who has survived advance statistics without some help from a study group. Study together, but make sure you are doing your own work. In the end, your ability to understand the material will be evaluated on an individual basis.

The material in these books often includes equations. Many students are afraid of equations. Don’t be – equations are awesome. They are very precise and concise ways of communicating complicated concepts. Take your time, and don’t be surprised if it takes you an hour to read 5 pages. You are not stupid – you are normal. This is a different kind of reading, and it takes a little getting used to if you have never done it before. Don’t be afraid to start and stop, and bounce between books. Also, you are free to use outside resources – the web is full of material related to these topics, and you might be able to find things (including Wikipedia, believe it or not), which help you understand these ideas. Although we will necessarily have a theoretical focus, please always keep the applications in mind.

Book:
Required: Our book uses an interesting approach, and is consistent with the goals of our program. We believe that it should be an excellent entry point into the material and a good reference for you throughout your career as a graduate student. I have given the name of the book to the main bookstore. Mary Jane Books no longer does books for courses, but may have the book in stock.

Real Stats, Using Econometrics for Political Science and Public Policy.
Michael A. Bailey

Optional Texts
A Guide to Econometrics 6E by Peter Kennedy
The edition doesn’t actually matter, and people have posted pdf versions on the web. Kennedy is to be used as a resource when you didn’t understand. Not all the explanations will makes sense (he occasionally goes at a higher level than we will cover in the class, but the genius of Kennedy is that everything is explained in three different ways, ranging from really basic to more complicated.

Basic Econometrics by Damodar Gujarati is an undergraduate econometrics text book that many people have found helpful. If you find yourself lost, head for Gujarati, and then work yourself back to where you were lost.
https://docs.google.com/file/d/0B61K5jKBWI/cmdkSVF6V9OzvA/edit?pref=2&pli=1
A Full Course in Econometrics (on You Tube) by Ben Lambert
https://www.youtube.com/playlist?list=PLwJRxp3blEvZyQBTOMFRP_TDdly3gU

This is a nicely done lecture series on econometrics. Past students in 705 have found this very helpful. I do not lecture in class very much, so people who know they really like lectures might want to try these before class. They are also very good after you have been trying for a while – at that point his lectures can help lightbulbs go off.

A Gentle Introduction to Stata, Fourth or Fifth Edition by Alan Acock
If you are finding the Stata text too challenging, you can use this one as an intro. Not sure too many people will find it necessary. I also strongly encourage you to take Stephen Weinberg’s Stata class on Wed. mornings. Course Info: RPAD 688 Statistical Program Workshop
Meeting Info: W 10:00_AM-11:30_AM HS 004. (He requires the fifth edition). This is a required course for students in the Policy Concentration, and will have the biggest payoff if you take it early in your career.

Software:
The recommended software package for this course is Stata 13 (although older versions should be acceptable, and 14 will also work). You do not have to buy Stata -STATA is available on computers in the campus libraries and other laboratories throughout campus. These resources should be utilized to complete your assignments.

If you choose to buy Stata, you can purchase it directly at the following URL:
http://www.stata.com/order/new/edu/gradplans/student-pricing/

There are three versions of Stata:
1) Stata/SE or 2) Stata/MP – If you plan to do a lot of statistical analysis for your dissertation, I would suggest buying one of these versions of Stata, but only if you have a substantial amount of RAM You may also wish to buy the Base Reference Material and Stat Transfer.
3) Stata Intercooled (IC) – If you may do some analysis, but not with large datasets (ie. Not over 2047 variables) or your computer does not have much RAM, this version is the better choice. Buy a temporary (6 month) license if you never plan to do statistical analysis for your work or if you think your computer situation might changed.

I will not teach STATA explicitly, but will use STATA in the class. Cesar (the TA) is a very good Stata programmer, and will be able to help you. In the end, you need to figure it out.

Here are two STATA websites that Cesar has found very helpful.
http://www.ats.ucla.edu/stat/AnnotatedOutput/ (basic commands) (This website might be temporarily out of commission, but we believe that it will be back up soon).
http://www.princeton.edu/~otorres/
In terms of STATA, let me state at the beginning that Cesar is a much better STATA programmer than I am. He should be your go to person for STATA questions.

**Classroom Approach**
This class uses a technique known as Team-Based Learning. Team-based Learning ([www.teambasedlearning.org](http://www.teambasedlearning.org)) is a type of active learning approach to classroom teaching that is part of the “flipped classroom” movement. The standard lecture class has the teacher present material in the class, and students do applications or learning exercises outside of class. In a flipped classroom, students do much of the concept acquisition outside of class through reading or other mixed media presentation, and then participate in applied learning activities in the classroom. Team-based learning is distinguished from other flipped classroom techniques by two features. First, team-based learning emphasized decision making during class time, in which students must use key course concepts to make decisions about real-life problems. Second, students spend all of their class time as members of permanent teams which facilitate decision making and ultimately, learning. Team work is done almost exclusively in the classroom, and part of the course grade comes from the team effort.

I first learned about Team-based Learning after arriving at UAlbany eleven years ago. I have always done a lot of application but I struggled to motivate UAlbany students to apply concepts in the classroom. The technique has led to improved student outcomes (i.e. student learning) in my classrooms and I am a strong supporter of this approach both at UAlbany and at national conferences. For more information about my journey towards TBL adoption, see [http://www.itlal.org/index.php?q=node/287](http://www.itlal.org/index.php?q=node/287)
To see an academic article on Team Based Learning on which I am a co-author, please see the following website: [https://jstamatel.wordpress.com/courses/](https://jstamatel.wordpress.com/courses/)

**Academic Honesty**
The University’s standards for integrity are at the website below: [http://www.albany.edu/graduatebulletin/requirements_degree.htm#standards_integrity](http://www.albany.edu/graduatebulletin/requirements_degree.htm#standards_integrity)

Avoid plagiarism by properly acknowledging material and ideas taken from other sources. The University of Albany Library offers a useful tutorial on plagiarism and how to avoid it: [http://library.albany.edu/usered/plagiarism/index.html](http://library.albany.edu/usered/plagiarism/index.html)

I take plagiarism very seriously and will report any incidents directly to the University. We have had past experiences of plagiarism in this class around the papers and take home final. The consequences were severe. Please, follow the rules that we provide you in the assignments (sometimes you will be allowed to seek help from colleagues, and sometimes you will not. We will be very clear.)

**Grading Requirements and Procedures**
**RATS, Problem Sets, Papers and Exams:**
There will be 6 short, multiple choice Readiness Assessment Tests (RATs) given during the course. The same RATs will be given to individuals, and then the Teams will take the same Test again together. Both grades will count. There will be 6 problem sets. These will be graded (although not at the same level as an exam), and an answer key provided. Students will be
expected to study the answer key to complete the learning exercise. There will be a midterm and a final. Both will have an individual and a team component. These are graded separately. All students in the team get the team grade. The ultimate goal is to make sure that you can apply what you know to new situations.

The RATS and problem sets are tools that will help you be successful on the exams and papers. You will also read 6-7 mainstream public administration papers in this class that use the tools we are learning. For two assignments, you will replicate paper and produce a memo demonstrating the replication.

**Grading Criteria:**
The grades will be determined by scores in three major performance areas:

**Individual Performance, Team Performance and Team Contribution.**

**Grade Weights and Percentages**

<table>
<thead>
<tr>
<th>Grade Weights</th>
<th>Within Area</th>
<th>Of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Individual performance</td>
<td></td>
<td>75%</td>
</tr>
<tr>
<td>Individual Readiness Assessment Tests</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Problem Sets</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Mid Term (in class)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Replication 1</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Final (in class)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Replication 2</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade Weights</th>
<th>Of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Team Performance</td>
<td>15%</td>
</tr>
<tr>
<td>Team Readiness Assessment Tests</td>
<td>25</td>
</tr>
<tr>
<td>Midterm</td>
<td>35</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade Weights</th>
<th>Of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Team Contribution (Evaluated by your teammates)</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Evaluating Team Contribution:**
Each individual will rate the helpfulness all of the other members of their teams at the conclusion of the midterm and final exam. The midterm evaluation will be for practice and to help teammates adjust their behavior. The one after the final will be part of the final grade. Given that your teammates will be stuck with you during each and every class, they are in the best position to evaluate your contribution to the team.

Individual Team Contribution scores will be the average of the points they receive from the members of their team. Assuming that there are five members in a team, an example of this procedure would be as follows. Each individual must assign a total of 40 points to the other four members in their team. Raters must differentiate between their teammates in their ratings and they can only give integer scores (This means that each rater would have to give at least one score of 11 or higher and at least one score of 9 or lower). As a result, Team Contribution scores will produce
differences in grades only within teams. Consequently, team members can’t help everyone in their team get an A by giving them a high peer evaluation score. The only way for everyone in a team to earn an A is by doing an outstanding job on the individual and team exams and projects. These scores will be translated into a final participation score as follows:

Less than 20 D (60) (You have to be the world’s worst teammate to get less than 20 points in this system. I have only seen it happen once, and never in a PhD class.)

20-29 = C (75)
30-32 = B- (80)
33-38 = B (85)
39-42 = B+ (88)
43-47 = A- (92)
48 or higher A (95)

Three additional points:
  a) Teams with more than/less than 5 teammates will use a slightly different, but analogous scale.
  b) You can collaborate to give each member of the team the same grade (40 points). This is fine, but you all have to agree ahead of time to get the same grade or it won’t work (there is no talking during the evaluations). If everyone collaborates, and everyone writes a statement indicating that they honestly believe that all the contributions were equal, a 40 will translate to a 90, rather than an 88.
  c) In addition to the point totals, you will be asked to provide feedback on your teammates strengths as well as provide constructive feedback on areas where the person could improve.

**Determination of Final Grades:**
The final grades will be determined as follows:
1) A raw total score will be computed for each student in each major performance area (In the individual performance area, this will be a weighted combination of the sum of the individual Readiness Assessment Test scores and the final exam score, in the team performance area, this will be the sum of the scores on each of the graded team assignments and the Team Contribution score will be the average of the peer evaluations received from the other members of his or her team.)
2) Total scores will be computed by multiplying the raw scores in each area by the grade “weight” (see above).
3) Course grades will be based on each individual’s standing in the overall distribution of total individual scores within the class. (Note: When this procedure is followed: a) the actual impact of any score on an individual student’s final grade depends on both his or her actual score and also how high or low he or she scores relative to other members of the class and, b) the conventional practice of 90% is an A, 80% is a B, etc. simply does not apply.) I will give all A’s if everyone performs at an equally high level (this has never happened, but it could). In general, I do not anticipate giving grades of less than B-, unless a student has clearly demonstrated
that they do not understand the material. This is a core class, and it is important that you take it seriously.

**Students with Disabilities**
If you have a documented disability and wish to discuss academic accommodations with me, please contact me. All reasonable efforts will be made to accommodate your needs.

**Schedule** – Please note this schedule is preliminary, and reading assignments may change. Please check on Blackboard. Readings that are not from the required text will be available on Blackboard.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 8/28/17</td>
<td>RAT 1 Introduction, Simple</td>
<td>Bailey Ch. 1, 2, 16, 3.1-3.3 (in that order)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>King (1991)</td>
</tr>
<tr>
<td>L1 8/31/17</td>
<td>In class Stata team exercises</td>
<td>Cameron &amp; Trivedi Ch. 1 &amp; 2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Watch Weinberg’s PAD 688 five “Stata Demo” videos.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Link to the webpage is on blackboard.</td>
</tr>
<tr>
<td>9/4/17</td>
<td>Labor Day</td>
<td>No Class</td>
</tr>
<tr>
<td>L2 9/7/17</td>
<td>In class Stata team exercises</td>
<td>Problem Set 1 Due</td>
</tr>
<tr>
<td>C2 9/11/17</td>
<td>RAT 2 Bivariate Ordinary Least</td>
<td>Bailey Ch. 3.4-3.8, 4, &amp; Ch 14.1-14.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cameron &amp; Trivedi Ch. 4.</td>
</tr>
<tr>
<td>L3 9/14</td>
<td>In Class OLS Exercises</td>
<td></td>
</tr>
<tr>
<td>C3 9/18/17</td>
<td>In Class OLS Exercises continued</td>
<td>Problem Set 2 Due</td>
</tr>
<tr>
<td>9/21/17</td>
<td>Rosh Hashanah</td>
<td>No Class</td>
</tr>
<tr>
<td>C4 9/25/17</td>
<td>RAT 3 Multivariate Regression</td>
<td>Bailey Ch. 5 &amp; 6.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lewis-Beck (1983) Ch. 3.</td>
</tr>
<tr>
<td>L4 9/28/17</td>
<td>Multivariate Regression, In class</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exercise</td>
<td></td>
</tr>
<tr>
<td>C5 10/2/17</td>
<td>Multivariate Regression Continued</td>
<td>Bailey Ch. 7, 14.3 to end of Chapter 14 (You should have already read 14.1-2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Problem Set 3 Due</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Academic Paper 1 (Moynihan &amp; Pandey (2007))</td>
</tr>
<tr>
<td>L5 10/5/17</td>
<td>Multivariate Regression Continued</td>
<td>Academic Paper 2 (Meier &amp; O’Toole (2002))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Academic Paper 3 (Walker et al (2010))</td>
</tr>
<tr>
<td>C6 10/9/17</td>
<td>Midterm</td>
<td></td>
</tr>
<tr>
<td>L6 10/12/17</td>
<td>Introduction to replication</td>
<td>Replication Exercise: Read Herring (2009) prior to class.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cesar will have data available for replication in class, but you need to</td>
</tr>
<tr>
<td></td>
<td></td>
<td>understand the paper well enough to attempt the replication prior to class.</td>
</tr>
<tr>
<td>C7 10/16/17</td>
<td>P-Hacking, Statistical</td>
<td>Please read in this order.</td>
</tr>
<tr>
<td></td>
<td>Significance, good research</td>
<td>Cohen (1990)</td>
</tr>
<tr>
<td></td>
<td>practice</td>
<td>Nuzzo (2014)</td>
</tr>
</tbody>
</table>
| L7  | 10/19/17 | P-Hacking Practice | Simmons, Nelson, & Simonsohn (2011)  
Head, Holman, Lanfear, Kahn and Jennions (2015)  
|-----|----------|-------------------|------------------------------------------------------------------|
| C8  | 10/23/17 | RAT 4 Panel Data  | Bailey Ch. 8 (Fixed Effect)  
Cameron & Trivedi Ch. 8 (Optional)  
**Replication I Due** |
King (1999) Ch. 1-4. (Read carefully up to p. 51, skim afterwards.)  
Watch Lambert’s lecture series:  
1) https://www.youtube.com/watch?v=I_dhPETvll8  
2) https://www.youtube.com/watch?v=Z582V53dfr8  
3) https://www.youtube.com/watch?v=jpHreXjtw1Q  
Problem Set 4 Due |
| L9  | 11/2/17  | Working on MLE    |  
| C10 | 11/6/17  | Logit & Probit    | Bailey Ch. 12.  
Cameron and Trivedi Ch. 14-15.  
| L10 | 11/9/17  | In Class Stata Exercise | Academic Papers Set 5  
| C11 | 11/13/17 | Count Models, Limited Dependent Variable | King (1999) Ch. 5.7-5.9, & 9.  
Cameron & Trivedi Ch. 16-17.  
Problem Set 5 Due |
| L11 | 11/16/17 | In Class Stata Exercise | Academic Paper set 6  
Piatak 2014; Neshkova 2014. |
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/23/17</td>
<td>Thanksgiving</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pindyck and Rubinfeld Ch. 8, 15, &amp; 16.</td>
</tr>
<tr>
<td>L12</td>
<td>11/30/17</td>
<td>Academic Paper set 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cantor &amp; Land (1985); Chandley et al. (2000)</td>
</tr>
<tr>
<td>C14</td>
<td>12/4/17</td>
<td>Cameron &amp; Trivedi Ch. 13.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Problem Set 6 Due</td>
</tr>
<tr>
<td>L13</td>
<td>12/7/17</td>
<td>Replication II Due</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/16/17</td>
<td>Final Exam</td>
<td>3:30-5:30pm</td>
</tr>
<tr>
<td></td>
<td>(Saturday)</td>
<td>Husted 004</td>
</tr>
</tbody>
</table>
Bibliography


**Assigned Academic Papers**

These are the papers we will be reading in class as applications of the methods. I reserve the right to add/subtract papers as the course develops.


STATA COMMANDMENTS
(BY AUDREY HICKERT, FOR THE LAB)

I
THOU SHALT ALWAYS USE A .DO FILE TO RUN AND SAVE COMMANDS

II
THOU SHALT USE THE MOST EFFICIENT COMMAND POSSIBLE
(E.G., EGEN, LOOP, MACROS)

III
THOU SHALT JUDICIOUSLY ANNOTATE .DO FILES FOR LATER REFERENCE AND OTHERS' UNDERSTANDING

IV
THOU SHALT NOT OVERWRITE ORIGINAL VARIABLES

V
THOU SHALT ORGANIZE ALL RELATED PROJECT FILES IN A SINGLE DIRECTORY

VI
THOU SHALT LABEL FILES, VARIABLES, AND VALUES USING UNDERSTANDABLE NAMING CONVENTIONS FOR LATER REFERENCE AND OTHERS' UNDERSTANDING

VII
THOU SHALT SEPARATE .DO FILES FOR DATA CLEANING AND SUBSEQUENT ANALYSES ON FINAL ANALYTICAL FILE (CALLING .DO FILES WITHIN .DO FILES AS NEEDED)

VIII
THOU SHALT EXPLORE DATA DESCRIPTIVELY AND GRAPHICALLY (TO OBSERVE PATTERNS AND ANOMALIES) PRIOR TO ANALYSES

IX
THOU SHALT SEARCH FOR AND DOWNLOAD .ADO (USER WRITTEN SUCH AS OUTREG2 & TABOUT) FILES TO IMPROVE EFFICIENCY AND CAPACITY

X
THOU SHALT USE "HELP" IN COMMAND WINDOW TO SEE COMMAND OPTIONS, EXAMPLES, AND DESCRIPTIONS AND GOOGLE ERROR MESSAGES AND QUESTIONS TO REFERENCE HELP FROM THE STATA COMMUNITY