COMPUTER SKILLS FOR ECONOMIC ANALYSIS

Fall 2018   Dr. Steven Myers
Course times: 11:45 AM -1:00 PM Location: Polsky 550Q   Office: CBA 323
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Prerequisite: 3250:100 or 3250:200 or 3250:244
Instructional Days: August 27, 2018 to December 9, 2018
Last day to withdraw: October 14, 2018 (talk to your advisor and don't rely on this date.)
Scheduled Final Examination time: Wednesday December 12 12:15 PM-2:15 PM. We will use the final exam time block, however there is no final exam.
Grades Posted: Tuesday December 18, 2018

Most course material and all grades will be in http://brightspace.uakron.edu.

This is a course designed to establish a baseline of competency in computer usage among all economic majors and minors and other interested students, and to increase your ability to understand and apply economics in a data-intensive world. Each student will learning how to write and use program code in SAS for data management, analysis and reporting. They will learn the right tools in SAS that will allow them to apply their economic knowledge to data in order to learn about the problem they are studying. Other tools used include Excel and Tableau.

The student will experience the same thing that drew the great Thomas Sowell to the study of economics, that economics is not just ideas that may sounds good or dire, but that economics is evidence-based. All of economics is amenable to data analysis. There is a difference between using data to validate (or invalidate) economic ideas and using data alone to suggest outcomes. There is power in both of the choices below, but we will spend some time discussing how to apply our data skills and the appropriate tools for the outcomes we seek. Consider this table:

If you	Then with current and past data you can	And the future can be
Use economic theory as a basis for reasoning a problem	Explain the phenomenon, often in a causal way. "Causality always implies correlation."	Predicted on the basis of that causal pattern. This is the field of Econometrics.
Rely on data alone with little or no economic theory	Describe the phenomenon, but you can not explain it. "Correlation does not imply causality."	Forecasted or projected based on the patterns of the data alone. This is the fields of Forecasting and Predictive Analytics.

Statistics and econometrics, by the textbook, are mostly the learning and application of the proper estimation and hypothesis testing techniques. Peter Kennedy draws a hard distinction between that classical approach (which is an important foundation) and tell us that the Applied Economist must additionally learn how to articulate problems in such a way they are amenable to data analysis. He further emphasizes that the problems cannot be solved without serious data-management and data cleaning skills, and must be open to multiple model specifications centering on the best to answer the problem. While econometrics is your next course, this course is a critical first step to becoming an economic data scientist.

Communication Requirements

1. All emails from you to me must have "E226 Fall 2018" in every subject line and you must always include your first and last name, and your UAnetID in your message. A good practice is to include full name and UAnetID in your signature. Your UAnetID is associated with your email address, it is not the numbers that make up your student number.
2. If I communicate to your UAnet email account I will assume you have read it within a day. There is no exception to this.

3. Use your UAnet email as your primary email address. I can respond to any email address you use, but when I am mailing to you I will only send to your UAnet address.
4. You may call my office, but do not leave a message there. Instead please send an email.

Office Hours

I intend to keep the following office hours. This is subject to change as others impinge on my time for department meetings and stuff like that.

Tuesday 2:00 pm – 4:00 pm
Wednesday 3:00 pm - 4:00 pm
Thursday 3:00 pm – 4:00 pm (if I do not know you are coming this hour may get cancelled)

I intend to also be in my office on many Monday afternoons as well. Meetings get scheduled from time to time during my hours so please send an email ahead of your visit if you can.

Plan of the course:

1. Articulation and Acquisition
   a. Research problem articulation
   b. Correlation versus Causation
   c. Understanding Windows directory structure
   d. Hard drive, USB and the cloud storage options
   e. Finding data (FRED and other sources)
   f. Social media presence (LinkedIn and Feedly)
2. Data handling in Excel, SAS and other formats
   a. Learning to program in SAS
      i. Learning I/O R/W operations
      ii. Structured coding
      iii. Accessing data in various forms
      iv. Using Excel to SAS procedures
   b. Creating variables
   c. Combining data (concatenation and merging, left, right, inner and outer joins)
   d. Sub-setting data (creation of categorical class variables versus writing multiple datasets)
   e. PROC CONTENTS

   f. Simple reporting, the power of PROC PRINT
3. Analyzing data and simple statistics
   a. Exploratory data analysis, descriptive data
   b. PROCs PRINT, FREQ, UNIVARIATE
   c. PROC SGPLOT, scatter, time series and time series data
      i. Programming SGPLOT
      ii. Using tasks in SAS Studio
   d. Basic Statistics PROC MEANS, PROC CORR
      i. Mean, medium and mode
      ii. Correlation versus causation
      iii. Comparing means PROC MEANS / CLASS and PROC TTEST
   e. Regression using PROC REG
4. Reporting your results and visualizations
   a. Applications of SAS and Excel
   b. Setting up tables in Excel
   c. Excel graphics
   d. Tableau
5. Team-based learning paper
   a. Assigned near midterm and due at the end of the term

Course learning objectives:

1. Students will apply principles learned in prerequisite economic courses and learn new approaches to explain and evaluate policy propositions.
2. Students learn about economic data sources and how to validate their value for analysis. Students also learn about the differences between descriptive and explanatory process.
3. Students learn to apply economic reasoning to problems and to match those problems with data analysis. Students will learn to survey the popular and economic literature to develop their economic literacy reasoning.
4. Students will learn to conduct an economic research analysis which will require the weighing and evaluation of alternative approaches to solve economic problems.
5. Students will learn about sources of data and how to evaluate them for analysis.

6. Students will manipulate data variables including the creation of new variables in Excel and SAS to prepare data for research and analysis.
7. Students will create economic graphic to show concepts visually and offer their interpretation to them.
8. Students will learn to access multiple economic Excel data bases and learn to read them in SAS, merging them to prepare a single dataset for analysis.
9. Students will learn to use social media to advance their economic career.
10. Students will become proficient with SAS and prepared for their econometric course to follow this one.
11. Student will learn to use Excel for data management in conjunction with SAS.

SAS Certificate

Every student, graduate and undergraduate, in the Department of Economics has the likelihood to receive a Certificate of Completion offered jointly by the Department of Economics and SAS Institute.

This is the first of three courses that you will take that will require your proficiency in SAS. Other courses include Econometrics and Your Senior Project course. You must also write your empirical paper in the Senior Project course using SAS to qualify. Other requirements are on the SAS Certificate page in the department of economics (http://www.uakron.edu/economics/academics/undergraduate/economics-department-sas-certificates). Normal presentation of this certificate is at the conclusion of your Final Project. (These requirements will be revised this term by the faculty to allow for the planned changes in the economics curriculum).

Evaluation:

Most of the assignments will require you to submit to the appropriate assignment folder in Brightspace. Some alternative turn-in arrangements will be different and explained in class.

You can expect homework in between each class period with due dates posted in Brightspace. If you ask me when something is due, I will direct you to Brightspace. This is because I do not always have the dates in my mind and I do not ever want to mislead you. If you have questions about what is posted in Brightspace, please email me anytime.

Grading:

Grades will be assigned based on the total points the student receives divided by the total available points. Exceptions will be announced in class.

Grades will be assigned for each module based on points. The grading scale is by percentage

A	92+
A-	90-91
B+	87-89
B	82-86
B-	80-81
C+	77-70
C	72-76
C-	70-71
D+	67-69
D	62-66
D-	60-61
F	< 60

Attendance Policy:

Attendance will be essential to have access to the projects and instructions for each week. Absences will be periodically recorded and will represent a detriment to the course grade.

Other policy

Academic dishonesty in any form is not tolerated. If you have any doubt whether it is academically dishonest then don't do it. In particular, use of work of any student, past or present, is considered academically dishonest and grounds for dismissal from the course and the University. Plagiarism will not be tolerated. Using the results of others from the web or other publish sources without proper footnote and reference is also academically dishonest. Using a substantial amount of the product of others even with proper reference can be a copyright violation.

The only exception is copying the SAS code from the web, but you are still to attribute the source in SAS comments. My exception for SAS coding is this: (1) to be effective as a learning tool you will often need the entire code and (2) learning by emulation of other's coding is the best way to become a proficient programmer. You will find that most authors and blog posters will be happy to give you permission or even to send you their entire code on request. Copying the code of your fellow students is not allowed. I need to state the obvious, when a number of students make the same misspelling errors, raise the same error codes or do something awkwardly it is obvious that some sharing of code has occurred.

Required Books & Materials:

1. USB drive: Every Student must have a USB data storage device that they have with them at every class. It must only have information from this class in case I or my assistant will ever need to use it. Keep it backed up to your home computer in case you lose it and have to replace your work.
2. Delwiche, Lora and Susan Slaughter. The Little SAS Book: A Primer, 5th edition, SAS Publishing, November 7, 2012, 350 pages. (ISBN 1612903436) Amazon http://amzn.to/2giqDSw price: $43.75 (Used from $37, Kindle $24.99)
   a. Chapter 1 is free here: http://www.sas.com/storefront/aux/en/splsb/65423_excerpt.pdf
3. SAS Support Site http://support.sas.com/index.html
4. SAS Documentation for version 9.4 (look for Base SAS / SAS/Stat and SAS/ETS primarily) http://support.sas.com/documentation/
5. Economics in One Lesson by Henry Hazlitt. Free for download at https://mises.org/library/economics-one-lesson

Recommended Books:

1. Clayton, Gary E. and Martin Gerhard Giesbrecht. A Guide to Everyday Economic Statistics, 7th edition, McGraw-Hill/Irwin, 2009. (ISBN 0-073-52319-4) Amazon http://amzn.to/2wgC3dE Price $31 (used from $22).
2. Companion Web Site http://www.econsources.com
3. Illowsky, Barbara and Susan Dean. Introductory Statistics, OpenStax College, November 2013. (ISBN 1938168208) Free access at https://openstaxcollege.org/textbooks/introductory-statistics (This is an introduction to statistics text and is not a mathematical statistics support book).

Computer Requirements

In order to fully participate in the course, you need to have the following:

1. Each student will need to be familiar with Internet Explorer or another comparable browser. You may use mobile devices for some of your work, but access to a laptop or desktop computer running Windows 8 or better will be expected (Windows 10 is in our lab).

2. Each student needs a USB that they bring to campus every day. Students are responsible for backing up the entire contents of the zip drive to their computer or cloud solution of choice. Losing your USB is not an excuse for work not turned in.
3. Additionally the student should find and use a cloud solution such as Zipspace https://support.uakron.edu/wiki/index.php/Zipspace
4. The course outline, grades and other course materials will be posted at http://brightspace.uakron.edu.
5. Students must use their UAnetID@zips.uakron.edu email in this class.
6. Interested students can seek help for off-campus use in the basement of the library. Their phone number is (330) 972-6888, or email them at supportdesk@uakron.edu. Hours are on the page listed in the next link under "contact us." The best URL for help is http://support.uakron.edu.
7. Help in using the university library including full text access from home is here http://www.uakron.edu/libraries/.

SAS specific requirements
1. SAS 9.4 is installed on our lab computers in Polsky 550Q. We will be using SAS extensively in this course.
2. SAS has various interfaces (1) windowing environment (2) SAS Enterprise and (3) SAS studio for example. We will use (1) almost exclusively, never use (2) and refer to some cool features of (3) at times.
3. **Get SAS**: SAS may not be available to you (via a lab) when you need it or have time to work on it so you should (not must), should download SAS to your computer if and only if you have a Windows computer and plenty of space and RAM.
   a. How? Go to the Technology Support tab of https://my.uakron.edu and click on the software link, software downloads. Find SAS and read the paragraph clicking the correct link which is probably the SAS icon. At the new page navigate to the SAS tab and click it. Then click on SAS 9.4 and follow all prompts. Give yourself time to install this and make sure you are in a fast internet environment such as on campus.
   b. This should install the SAS windowing environment as choice SAS 9.4 (English). You will also see a lot of choices in your start menu including SAS Studio.
4. **GET SAS alternative**: SAS Virtual lab.
   a. How? Go to the Technology Support tab of https://my.uakron.edu and click on the UA Virtual Lab. This opens up a window that explains what is the virtual lab. When ready click on the green button that says "Virtual Lab >"
   b. You will be presented with a choice for VMware Horizon. You might want to choose HTML Access the first couple of times, but if you are going to make use of this Virtual SAS you should download the VMware Horizon Client.
   c. If you shoes the HTML interface then you will be prompted for your UAnetID (or email) and password. Press login.
   d. At the next screen choose statistics and on the next screen (after it "chats with you") you will see a Virtual Windows 10 screen with a SAS 9.4 shortcut. You can take it from here.
5. A third version that you can use after you are away from the University is called SAS University edition. It runs like the SAS Virtual Lab here on campus and supports SAS Studio.
   a. https://support.sas.com/en/software/university-edition.html

Some Important Links to bookmark:

http://www.ats.ucla.edu/stat/sas/library/default.htm
SAS Library from UCLA. Includes a good getting started section.

http://www.ats.ucla.edu/stat/sas/webbooks/reg/default.htm
SAS Web Books. Regressions with SAS.

http://www.aeaweb.org/RFE/
Resources for Economists

http://Scholar.google.com
Google Scholar