Economic Data Analytics I
Introduction to Data Management and Statistics for Decision Making
01:220:210

Instructor: Nora Paxton   **Classroom:** Hickman 202
Email: norapaxton78@gmail.com   **Office:**
Class Hours: M/W 5:35-6:55   **Office hours:** after class as needed

Introduction:

This is a lower level elective course for students in non-quantitative majors as well as working individuals who wish to acquire or renew basic skills for analyzing data in support of decision making. Organizations of all sorts—business, government, scientific, educational, non-profit and cultural—have 'customers' and need to make allocation decisions to operate effectively and efficiently. While certain specialized skills in big data analytics are strongly in demand in the current job market, many employers also look for individuals with general skills who are "trainable" in the specifics of a job. This course provides the tools and knowledge to use data to "size up" a situation or problem and to suggest alternative approaches or solutions based on available data. This course is meant to empower you in a very concrete way by demystifying the process of data collection, visualization, analysis, and presentation. It will also show you how to work in the ubiquitous Microsoft Excel environment and how to do basic statistical analysis. In the follow-up course, Economic Data Analytics II, you will be able to enhance your Excel skills by learning basic regression methods, which are econometric tools for estimating and explaining relationships among variables. The tools from both of these courses will allow you to provide important data-based decision support that organizations require.

Upon conclusion of the course, students will have an introduction to methods of economic data analysis and will be able to:
- Use spreadsheet software to collect, clean, transform, visualize, interpret and present data.
- Understand, conduct and interpret basic statistics including means, variability, and correlations.
- Present results of data analysis for a non-specialist audience.

Prerequisites: Advanced algebra, placement into precalculus. Those intending to complete the Economic Data Analytics Minor should take precalculus (640:111, 640:115, or equivalent), as this is required for the introductory economics sequence, Introduction to Microeconomics (220:102) and Introduction to Macroeconomics (220:103).

Text: *Statistics for People Who (Think They) hate Statistics*, Excel 2016 version, by Neil Salkind

Data analysis tools: Microsoft Excel. Access to personal or laptop computer with Excel installed is essential.

Evaluation: How is the grade determined?
- Class participation (10%)
- 1 Quiz (20%)
- 4 Homework assignments (30%)
- Final in-class presentation (40%)

Class	Date	Topic	Readings
1	1/18	What is data analysis? Why do we care about data analysis? Data is at the heart of data analysis Excel – a powerful tool	Chapter 1
2	1/23	Types of data --time series --cross sectional --pooled data (panel/longitudinal data) Sources of data --Survey data --Administrative data --Extant data from domestic and international agencies --Client data (sales, revenue, outputs, etc.) Data collection	Chapter 22 http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?_r=0 https://www.brookings.edu/wp-content/uploads/2016/06/04_obama_social_policy_haskins.pdf
3	1/25	Methods of evaluation --Exploratory --Descriptive --Inferential Qualitative vs. quantitative data and analysis	https://ies.ed.gov/ncee/pubs/20104029/pdf/20104029.pdf (pages 1-22 and pages 41-51) pact RF Social Networks.pdf (on Sakai)
4	1/30	*QUIZ* Exploring Excel - *The Basics*	Appendix A (start here) Chapter 1.A
5	2/1	Exploring Excel – *Going Beyond the Basics*	Chapter 1.B
6	2/6	How to prepare data for analysis	**Homework 1 Due**
7	2/8	Exploratory analysis --plotting data --scatter plots, histograms --outliers In-class Excel work	Chapter 4
8	2/13	Descriptive analysis	Chapter 2

		--population and sample --descriptive statistics In-class Excel work	**Homework 2 Due**
9	2/15	In class discussion of student presentations	Come to class with potential paper topics!
10	2/20	Descriptive analysis continued --Variability – what is it and why do we care? In-class Excel work	Chapter 3 **Homework 3 Due**
11	2/22	Q&A session on student projects Correlations --what is correlation? --correlation does not equal causation In-class Excel work	Chapter 5 **Homework 4 due**
12	2/27	Case studies	Studies TBD.
13	3/1	**In class presentations**	
14	3/6	**In class presentations**	
15	3/8	**In class presentations**	

Detailed Outline for Economic Data Analytics I
Introduction to Data Management and Statistics for Decision Making

Class 1
Readings:
1. Chapter 1
2. http://www.nytimes.com/2012/02/19/magazine/shopping-habits.html?_r=0
3. https://www.brookings.edu/wp-content/uploads/2016/06/04_obama_social_policy_haskins.pdf

What is data analysis?
Why do we are about data analysis?
Data is at the heart of data analysis
      -Structure of data
      -Observations (row)
      -Variables (columns)
            -Numeric
            -character
Excel is a powerful tool

Class 2
Types of data
--time series
--cross sectional
--pooled data (panel/longitudinal data)

Sources of data
--Survey data
      --Your own
      --Publicly available surveys (census, CCD, NHANES, etc.)

--Administrative data
      -Unemployment insurance, SNAP, WIC, TANF, Medicaid and Medicare, etc.
--Extant data from local, state, national and international agencies (BLS, World Bank, etc.)
--Client data (sales, revenue, outputs, etc.)

Data collection

Class 3
Methods of evaluation
--Exploratory
--Descriptive
--Inferential
Qualitative vs. quantitative data and analysis

Class 4
Readings: Chapter 1.A, 1.B, Appendix A
QUIZ

Exploring Excel
--entering data
--formulas
--functions
--filter
--conditional formatting
--analysis tools

Class 5
How to prepare data for analysis
--structure of the file
        What is unit of observation? Does it need to be reshaped?
        What is the sample? Do you have observations you do not need?
        What variables are on the file?
--codebooks
--look at amount of missingness
        What missing values are used? '.', ' ', 99, others?
        What percentage of cases are missing?
        Is there a pattern to missingness? All in one state/store/site/grade?
        Can you still use the variable?
--look at range of values
        Do you understand all values?
--look at outliers
        Are there any unusually low or high values?

Class 6
Readings: Chapter 4
Exploratory analysis
--plotting data
--scatter plots, histograms
--outliers
In-class Excel work

Class 7
Readings: Chapter 2
QUIZ
Descriptive analysis
--population and sample
--distributions/frequency
--means
--weighted means
--median
--mode
In class Excel work

Class 8
Readings: Chapter 3
Descriptive analysis continued

--Variability – what is it and why do we care?
--range
--variance
--standard deviation
In-class Excel work

Class 9
Readings: Chapter 5
Correlation
--what is correlation?
--correlation does not equal causation
In-class Excel work

Class 10
QUIZ
In class discussion of projects
--what is your research question?
--what data will you use?
--will your data allow you to answer your question?
      --correct sample?
      --correct timeframe?
      --correct variables?
      --amount of missing?
      --outliers?
      --does I it require any transformations?
      --does it require variable construction?
--What type of analysis will you conduct?
--How to write it up/present results?

Class 11
Case studies
Q&A session on student projects

Class 12
In-class presentations (6-7 10-minute presentations)

Class 13
In-Class presentations (6-7 10-minute presentations)

Class 14
In-class presentations (6-7 10-minute presentations)