

Lecture 1

Introduction - Who am I

- Bachelor's in actuarial science, 2013
 - Pricing actuary at Allstate until 2019
- Software Engineer in financial risk management 2019-2020
- 4th year PhD student in economics
 - Anticipated graduation next academic year
 - Current research in networks among boards of governors
- 1150 ELO in Age of Empires 2
- Married for 12 days

Introduction - Who Are You?

- This is a small class - I should learn all of your names quickly
- Name, major, year
- Something interesting about yourself (Optional, but recommended)
 - Hobbies? Fun summer activities? Favorite math theorem?

Introduction - What is Econometrics

Introduction - What is Econometrics

- Historically, measurement for economists
 - Use data to construct supply/demand curves, elasticity, etc.
- Current focus is causal analytics
 - Used for policy analysis. Used by many fields!

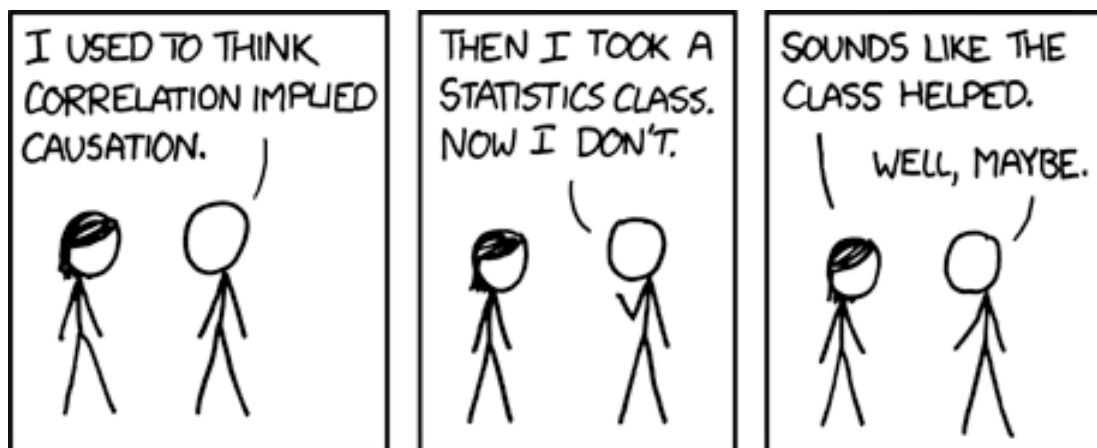


Figure 1: Source: Randall Munroe (xkcd)

- Mechanically, this class is about interpreting linear regression
 - And mostly about understanding its limitations

What is Econometrics - a motivating example

- What is the effect of college education on income?

Education level	Medi
Doctoral degree	\$2,1
Professional degree	\$2,2
Master's degree	\$1,7
Bachelor's degree	\$1,4
Associate degree	\$1,0
Some college, no degree	\$992
High school diploma, no college	\$899
Less than a high school diploma	\$708

Source: [U.S. Bureau of Labor Statistics](#)

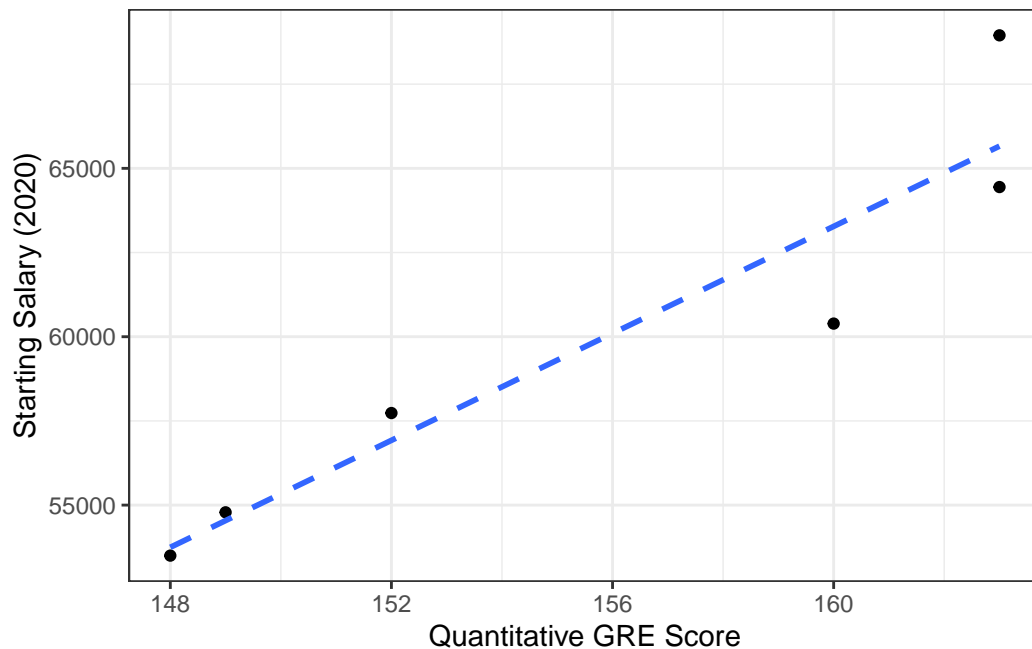
- Will getting a masters degree after graduating increase your earnings by \$13,000?

Motivating Example, major choice

Major	Starting Salary (2020)
Materials Engineering	6895
Math	6444
Economics	6039
Accounting	5773
Psychology	5478
History	5350

- Is the only difference the choice of major?

Motivating Example (continued)



- Engineering majors are very different from history majors before entering a program

Introduction - What is Econometrics

- What we want is the effect of college (or major) while holding all else constant (“Ceteris Paribus”)
- Normally we can achieve this by a randomized control trial
 - Usually not practical or ethical
 - e.g. randomly exposing people to wildfire smoke

Introduction - What is Econometrics

- Instead we make use of research designs that use “natural experiments”
 - For schools: lotteries for charter school attendance
 - For pollution: the direction that wind is blowing

Introduction - What is Econometrics

- Our workhorse model is ordinary least squares (OLS) regression
 - We're just fitting a line to data
 - The nuance lies in the interpretation
 - Building block of more advanced machine learning and AI

Syllabus Review

- Office hours after class. If these times don't work you can let me know and I should be able to accommodate most times.
- Statistical software will be used in class and homework
- Class participation via iclicker, and short weekly homework assignments
 - These are intended to be easy points to keep you engaged
- This class is harder than what you've probably had in the past. You'll need to pay attention in class to get an A/B
 - But it's really not that hard if you actually try!