

# Advanced Topics in Quantitative Social Research

Week 1: Welcome and Introduction



# Plan for today

## ► **Module overview**

- Objectives and arrangements
- Syllabus: Readings and tutorials
- Assessment and presentations (Week 11)

## ► **Introduction:** Tell us about yourself

## ► **Exercise:** A quick recap on OLS (and will be continued in Week 2)



# Objectives and arrangements

- ▶ Advanced Quants covers a selection of topics on **model-** (Weeks 2-4) and **design-**based (Weeks 7-10) statistical inference
- ▶ Students are expected to be familiar with **multiple linear regression** and **basic R programming** before they join
- ▶ The weekly syllabus is **tentative** and can be adjusted depending on students' progress
- ▶ The 90- to 120-min in-person tutorials will be used to
  - Answer your questions about the readings and recorded lectures
  - Give you the chance to implement the analysis in R
  - Help you prepare for the final project (Weeks 5 and 11)

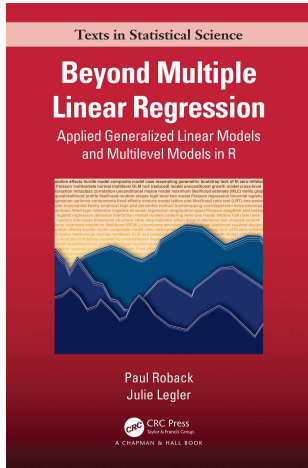


# Weekly syllabus

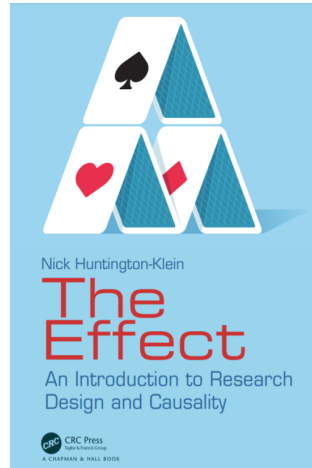
- ▶ **Week 1:** Introduction
- ▶ **Weeks 2-4:** Generalized linear model
  - Week 2: From OLS to GLM
  - Week 3: Logit regression
  - Week 4: Multilevel modeling
- ▶ **Weeks 5:** Final analytical project
- ▶ **Weeks 7-10:** Applied causal inference
  - Selection on the observables (matching)
  - Regression discontinuity design
  - Instrumental variable
  - Difference-in-difference
- ▶ **Week 11:** Looking beyond adv quants



Textbooks: Clear explanation without much math (under most circumstances)

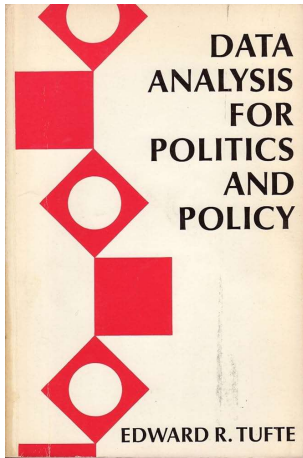


For Weeks 2-4



For Weeks 7-10





# Additional resources on Moodle

- ▶ You can find a variety of additional/supplementary resources – the key principle is to be **selectively thorough**
  - Supplementary textbooks: Use them when you find the main text is not clear; feel free to discuss with me if you are interested in purchasing any of them
  - Mathematics refresher: Review key math concepts and terms, especially **basic algebra**, if necessary; **Khan Academy** is a good start
  - R Programming: Help yourself when you have a hard time; pick one of the books and use the online community (e.g., **R-bloggers** and **Stack Overflow**) to keep yourself updated
  - Podcasts: Get a sense of how professional quant social researchers present and discuss their work



# Assessment

- ▶ **Exercises I and II (20%):** Students will complete **two short data analytical exercises** based on the weekly tutorials
- ▶ **Final project (60%):** Students will complete **a quantitative research note of about 4,000 words**, excluding footnotes, bibliography, and appendices (R script and supplementary information). More details will be discussed in **Week 5**





## Next week

- ▶ We will review OLS and discuss why we need GLM (non-linear multiple regression)
- ▶ Before you come to class
  - Install *R* and *RStudio* on your laptop and bring it to class
  - Read the assigned chapters (either *Beyond Multiple Linear Regression* OR *The Effect*)
  - Watch the recorded lecture (uploaded on Thursday or Friday)

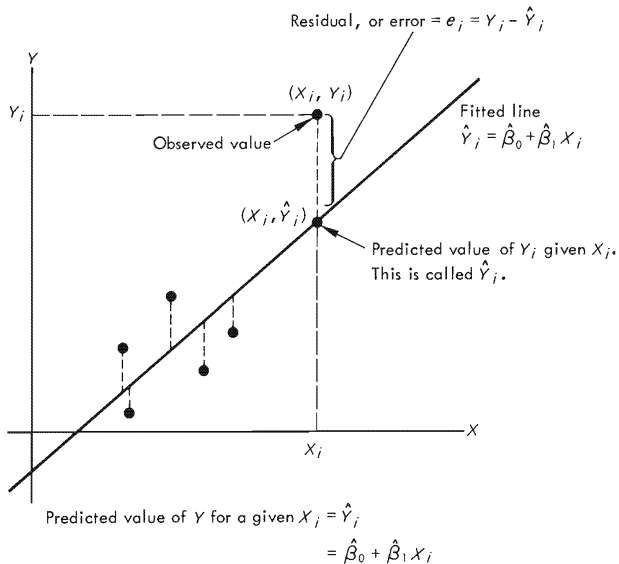


# Introduction

- ▶ Please share your name, course, and subject area (e.g., political science) with us
- ▶ Please share your experiences with quant social research. What are some of the most rewarding and/or challenging moments?
- ▶ Please share your potential research ideas for the final project. Any datasets you plan to study? We will continue the discussion on your research ideas in Week 5



# Recap: OLS



## Recap: OLS

- ▶ Go through the **two-dimensional scatterplot**; locate and define/explain the following concepts:
  - Explanatory and dependent variables
  - Data point or individual observation
  - Fitted line (intercept and slope)
  - Residuals and goodness-of-fit
  - Model specification
- ▶ What is the idea behind the name of ordinary least squares (OLS)?

