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| Week | Monday | Wednesday | Lab |
| 1 | off | Introduction   * Overview * Philosophy of Science * Example: *Blue Paradox* * Hype up R | Introduction to R   * Installation of R and RStudio * R basics (objects, functions, simulated data, basic plots, comments, etc.) |
| 2 | Math/stats Review   * Math ad probability theory * Worksheet with examples | Stats Review + Data   * Stats review (add bit on hypothesis testing) * Tidy data and data structures (untidy data examples) | Introduction to the tidyverse   * Cleaning data with tidyr * Generate new variables with mutate and summarize from dplyr * Plotting with ggplot2 |
| 3 | Fundamental econometric problem   * Potential outcomes * Selection bias (difference-in-means) * RCTs and “ideal” experiments * Informal discussion of statistical significance * **Problem Set 1 Due** | Regression Logic   * Chapter 2 of Mastering metrics * Alternative for making ceteris paribus comparisons (selection-on-observables) * Omitted variable bias (informal) * Stress high concepts and basic interpretation, not the weeds * Informal discussion of statistical significance | Experimental vs. non-experimental data   * Difference-in-means using formulas from MM * Regression using lm() and tidy() * Literal and substantive interpretation * Regression tables using stargazer |
| 4 | Review   * Overview * Worksheet * **Problem Set 2 Due** | Midterm 1 | Introduction to Rmarkdown   * Provide template * Style points available for future problem sets |
| 5 | Simple Linear Regression | SLR: OLS Mechanics | Regressions   * Run regressions * Coefficient interpretation * R^2 interpretation * Make predictions * Scatter plots with regression line * If time: Ggplot2 themes and options |
| 6 | SLR: OLS Properties and Assumptions   * **Problem Set 3 due** | SLR: Inference   * Worksheet | Hypothesis testing   * Run regressions; interpret coefficients literally and substantively * Conduct hypothesis tests * *Derive confidence intervals for fitted values*; plot regression line * If time: Ggplot2 themes and options |
| 7 | Multiple Linear Regression | Multiple Linear Regression: Inference   * Worksheet | Regressions   * Run regressions with data that illustrate omitted variable bias; make tables * Conduct hypothesis test (t and F) |
| 8 | Review   * Overview * Worksheet * **Problem Set 4 due** | Midterm 2 | Make maps with ggplot2 (Kieran Healy’s examples) |
| 9 | Categorical Variables | Interactive Relationships | Gender/racial pay gap example   * Run regressions, interpret coefficients on dummy variables and interaction terms * F test * Plot marginal effect by discrete group (with appropriate confidence interval using the margins command) |
| 10 | Non-Linear Relationships   * **Problem Set 5 due** | Review   * Overview * Worksheet | Interpret regressions with nonlinearities   * Level-level, log-level, level-log, log-log * Polynomial regression (plot fitted line then marginal effects) * Continuous interactions (plot marginal effects) |