0.1 Multicollinearity:

- What is multicollinearity?
- How does it affect the precision (standard deviation) of our OLS estimators?
- How does it affect our t-statistic? What does high multicollinearity imply for hypothesis testing?

1 Model misspecification

1.1 Omitting a relevant variable:

Effect on unbiasedness and consistency of $\hat{\beta}$, effect on $var(\hat{\beta})$, and effect on reliability of t tests.
Case 1: Omitted variable is correlated with included explanatory variables.
Case 2: Omitted variable is NOT correlated with included explanatory variables.

- Explain the bias-precision tradeoff.
- Which is a worse problem, omitting a relevant variable correlated with the included explanatory variables or NOT correlated with them?

1.2 Including an irrelevant variable:

Effect on unbiasedness and consistency of $\hat{\beta}$, effect on $var(\hat{\beta})$, and effect on reliability of t tests.
Case 1: Irrelevant variable is correlated with included explanatory variables.
Case 2: Irrelevant variable is NOT correlated with included explanatory variables.

- Which is a worse problem, omitting a relevant variable or including an irrelevant variable?

2 Dummy Variables

- Intercept DVs
- Slope DVs
- Avoiding the dummy variable trap

- Testing for a structural break in the data
- Fixed effects in panel data versus pooled data
- Binary or qualitative *dependent* variable
  - Why is using a probit or logit model preferred to using OLS estimation?

3 Heteroskedasticity

1. Definition
2. Sources
3. Pure vs. impure heteroskedasticity
4. Consequences for OLS estimates (LUE not BLUE, $var(\hat{\beta})$ incorrect so t-tests unreliable)
5. Detection:
   - Graphical method
   - Goldfeld-Quandt Test
   - White's Test
6. Remedial measures & the outcome:
   - Taking logs (log(x)) can reduce heteroskedasticity.
   - GLS when variance of residuals is known
   - GLS when variance of residuals is not known but can be speculated (WLS)
   - White's correction when variance of residuals unknown and cannot be speculated.
   - Which of these is BLUE?