1 Dummy Variable Regression Models

Dummy Variables

- Represented as D_i

- $D_i = \{0 \text{ or } 1\}$

- Measure qualitative data

- Examples:

  - Gender: $D_{1i} = Male$ and $D_{2i} = Female$

  - Ethnicity: $D_{1i} = Caucasian$, $D_{2i} = Latino$, $D_{3i} = Asian$, etc.

  - Region: $D_{1i} = Northwest$, $D_{2i} = Southwest$, $D_{3i} = Central$, etc.

  - Time period: $D_{1i} = 1970s$, $D_{2i} = 1980s$, etc.

  Dummy-Variable Trap

- Seasonality: $D_{1i} = Spring$, $D_{2i} = Summer$, $D_{3i} = Fall$, and $D_{4i} = Winter$

- Regression model: $Y_i = \beta_1 + \beta_2 D_{2i} + \beta_3 D_{3i} + \beta_4 D_{4i} + u_i$

- Omit one category with an intercept – base category

- Otherwise, perfect multicollinearity

  Intercept Dummy

- $Y_i = \beta_1 + \beta_2 D_i + \beta_3 X_i + u_i$

- Parallel regression lines with shift

- Draw figure

  Slope (Interactive) Dummy

- $Y_i = \beta_1 + \beta_2 D_i + \beta_3 X_i + \beta_4 (D_i * X_i) + u_i$

- Two regression lines with shift and different slopes

- Draw figure

Applications

- Earnings equation: $Wage_i = \beta_1 + \beta_2 Union_i + \beta_3 Exper_i + \beta_4(Union_i * Exper_i) + u_i$

- Phillips curve