Dr. Helmut Farbmacher

University of Mannheim
Fall Semester 2017

Topics in Empirical Economics

Linear regression model (OLS and IV)

A. Use the dataset "ols.dta" and consider the following population model

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u$$

with $cov(x_1, u) = 0$ and $cov(x_2, u) = 0$.

1. Use the Frisch-Waugh theorem to estimate β_1 and compare your result with the $\hat{\beta}_1$ that you get from a multiple regression.

2. Are the effects of x_1 and x_2 comparable? If not, can you make them comparable?

B. Use the dataset "iv.dta" and suppose we are only interested in the effect of x_1. Consider the following population model

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + u\,.$$

z is a potential instrumental variable for x_1. The following conditions hold jointly: $cov(x_1, u) \neq 0$, $cov(x_2, u) = 0$ and $cov(z, u) = 0$.

1. Is z a relevant instrument for x_1?

2. Use OLS and 2SLS to estimate β_1. Which one gives you a consistent estimate? And why?

3. How can you test the exogeneity of x_1?

4. Now, assume we don't observe x_2. Under what additional assumption is the IV estimate of β_1 consistent?