ECON6300/7320/8300

Advanced Microeconometrics
Instrumental variables

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Practical 4
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Introduction

- This class will review:
  - Instrumental variables
  - 2SLS and GMM estimation
  - Tests for endogeneity of regressors
  - Tests for weak instruments
  - Tests of overidentifying restrictions (instrument validity)
- We begin with a demonstration from Microeconometrics using STATA Chapter 6 looking at the effect of employer/union sponsored health insurance on drug expenditures
- We move on to a practical looking at the the returns to schooling

Demonstration (1)

- We analyse data on health, retirement and private insurance
  - The data is from the Medical Expenditure Panel Survey
  - We explore the effect of employer/union sponsored health insurance (hi_empunion) on (log) drug expenditure (ldrugexp)
  - We treat insurance as endogenous as it is a choice variable. Those who expect high future medical expenses are more likely to take out insurance.

Demonstration (2)

- We analyse data on health, retirement and private insurance
  - We consider as instruments:
    - The proportion of total income that comes from social security (ssiratio)
    - An indicator for low income status (lowincome)
    - The size of the individual's firm's labour force (firmsz)
    - Whether the firm operates in more than one location (multlc)
  - As exogenous regressors we include number of chronic conditions (totchr), age, female, black/hispanic indicator (blhisp) and log income (linc)
  - The data are mus06data.dta and the do file is mus06p1iv.do

Practical (1)

- We use data from Kling (2001) : mus06klingdata.dta are wage data collected in 1976
- We want to estimate the impact of years of schooling (grade76) on wages (wage76)
- Other covariates in the wage equation could be black, south76, smsa76, reg2-reg9, smsa66, age76 agesq76. (Use desc)
- Years of schooling (grade76) is endogenous! Those with higher ability tend to have more schooling, and ability ought also to determine wages.
- Possible instruments could be proximity to a 4 year college (col4) or family education levels (e.g. daded momed)

Practical (2)

- Load the data
- Describe, summarise and choose a baseline instrument(s)
- Estimate the 2SLS model and optimal two-step GMM. Assume heteroskedastic errors. Interpret your results
- Compare your results with the OLS estimator.
- Are your results sensitive to the choice of instrument(s)?
- Is there evidence of endogeneity of the regressors in your wage equation?
- Are your instruments weak?
- Are your instruments valid?