

## **Econometric Methods for Health Policy Analysis Using Non-Experimental Data**

If asked, most researchers in applied health economics would say that the goal of their empirical research is to provide solid scientific evidence that will serve to inform current and future health policy. Unfortunately, many research studies that analyze non-experimental (survey) data, though adherent to the scientific method (hypothesize-observe-test), conclude without reporting their findings in a form that is useful to health policy makers who are typically interested in causal effects – i.e. the effect of a policy variable ( $x$ ) on the outcome of interest ( $y$ ). In the first part of the workshop, I will discuss the particular problems encountered in the analysis of causal effects with non-experimental data; and offer a rigorous and, therefore, useful definition of the *policy effect of  $x$  on  $y$* . Moreover, I will detail a unified framework for the estimation and statistical testing of policy effects using non-experimental data. In the second part of the workshop, I will present specific nonlinear econometric methods for the implementation of the policy effect estimator. The third part of the workshop will cover numerous examples of applications of these methods.

### **Workshop Overview (4 hrs.)**

- I. (1 hr.) A Modeling Framework for the Analysis of Policy Effects with Non-experimental Data
  - A) The problem with non-experimental data (confounders)
    - i) Observable confounders
    - ii) Unobservable confounders (endogeneity)
  - B) A rigorous definition and framework for policy effect estimation.
- II. (2.25 hrs.) Econometric methods for dealing with confounders
  - A) Observable confounders
    - i) Nonlinear regression
    - ii) Propensity score estimation
  - B) Unobservable confounders (endogeneity)
    - i) Instrumental variables estimation
    - ii) Generalized method of moments estimation
    - ii) Pitfalls in estimation – the plug-and-chug approach in nonlinear models
    - iii) Residual inclusion methods
    - iv) Two-stage (Generalized Heckman-type) methods
- III. (.75 hr.) Examples
  - A) Effect of physician advice on drinking (count models)
    - i) among hypertensive men
    - ii) among pregnant women
  - B) Effect of alcohol abuse on employment (multinomial response models)
  - C) Effect of drug therapy on time to mental health hospitalization (duration models)
  - D) Effect of CT scan on mortality (binary response models)

### **Faculty**

Joseph V. Terza, Medical University of South Carolina

### **Expected Audience**

All researchers who conduct empirical research in health economics.