Course Description
This is a PhD course in which we will cover a set of topics in health econometrics that focus on the modeling of healthcare expenditures, costs, and use. The aim of this course is to learn how to conduct nonlinear econometric analyses to better understand the nature of relationships between healthcare expenditures, costs and use and their determinants. The emphasis in this course will be on applying nonlinear econometric models to real-world problems. However, this requires a solid understanding of the theory behind estimation techniques and inference procedures which require rudiments of probability theory and statistics, and knowledge of basic properties of estimators. The goal is to learn enough theory and get enough practice with empirical models to be able to read journal articles and to be able to conduct empirical research. Therefore, you will also be learn how to use Stata to estimate numerous nonlinear models and use the output to interpret results.

Prerequisites
You need to have taken at least one post-graduate course in Econometrics and have working familiarity with Stata.

Schedule
Lecture: Monday–Thursday 9:00am–11:30am
Practicum and presentations: Monday–Thursday 1:00pm–3:30pm

Assignments
Practicum: Students will be given a dataset and questions. They will use Stata to estimate models to answer the questions.

Presentations: Students will present either a paper from the reading list or work from their own research.

Final assessment: After the course, students will submit a brief report on a nonlinear econometric analysis of healthcare expenditure or use data. I will provide some Stata datasets to facilitate the analysis although students may choose to analyze some other dataset of their choice.

Course Topics and Readings
I plan to provide only a quick overview of linear models with emphasis on issues of specification that are not typically emphasized in first courses in econometrics. Because maximum likelihood will be the method of estimation of many of the types of models we will discuss in this course, I will spend some time going through some of the basic mathematics in the context of simple examples. It seems unlikely that I will be able to cover all of the remaining topics in depth so I may cover some topics only briefly, others not at all, and more generally adjust as needed as we go along. A list of topics with readings is given below. Some readings are from books (denoted b) and others are articles (denoted a). In addition,
I have used asterisks (*) to denote key references.

1. Review of Linear Econometric Models
   i. Estimation
   ii. Marginal, incremental, and treatment effects
   iii. Consequences of misspecification

   **Reading**

2. Maximum Likelihood Estimation
   i. Estimation
   ii. Quasi-maximum likelihood interpretation

   **Reading**

3. Generalized Linear Models
   i. Estimation
   ii. Marginal and incremental effects
   iii. Choice of link function and distribution family

   **Reading**


4. Two-part models
   i. Estimation
   ii. Marginal and incremental effects

**Reading**


5. Count Outcomes
   i. Poisson regression
   ii. Marginal and incremental effects
   iii. Negative binomial models
   iv. Hurdle and zero-inflated count models
   v. Model comparisons

**Reading**


6. Models for heterogeneous effects

i. Introduction

ii. Quantile regression

iii. Finite-mixture models

Reading


7. Endogeneity in nonlinear models

i. Review of linear instrumental variables methods

ii. Full information maximum likelihood

iii. Control functions

**Reading**


5

