Res Ec 797D: Panel Data Econometrics

Instructor: Bernie Morzuch
221 Stockbridge Hall
Phone: 545-5718
e-mail: morzuch@resecon.umass.edu

Office Hours: As you need me or by appointment

Panel data econometrics has its underpinnings in experimental design and analysis of variance (ANOVA). The techniques implemented in panel data econometrics can be a source of frustration for the student because they require a good working knowledge of ANOVA procedures that have to do with calculating “within” variation and “between” variation and knowing how to apply various “sweep-out” procedures to obtain parameter estimates. Basically, the background mathematics for this topic is tedious. Furthermore, advancing this background mathematics to a matrix setting, which is the standard format in the published literature, usually results in additional frustration.

Also, textbook treatment of this area of econometrics is quite heterogeneous both in terms of level of mathematical sophistication and how the topics and estimation issues are explained. The different texts presented in the reference section illustrate this point. It is not that one or a few of these are bad or that one in particular is superior. On the contrary, all are very well written. Each provides a different slant on the topic. Each possesses an element of orthogonality that distinguishes it from the others. All considered together promote a very complete understanding of this topic.

**Topic Coverage**

1. **ANOVA background:** Neter, et al. (1996, pp. 958-983) link ANOVA with regression and develop the variance components that are basic to random effects models. Judge, et al. (1985, p. 551) put these items into a matrix setting.

2. **Classical econometric approach:** Hill, et al. (2008, pp. 382-416) provide basic treatment and explanations of fixed-effects and random-effects models. They distinguish between balanced and unbalanced panels. They present the Hausman test for random effects.

3. **Classical approach extended to and linking a broad spectrum of models:** Judge, et al. (1985, pp. 515-560) and Judge, et al. (1988, pp. 468-496) present and develop a complete catalog of fixed-effects and random-effects models, where the fixed effects can be captured through the intercepts or the slope variables or both and the random effects can be captured over the cross-sectional units or through time or both. Examples of different models fitting these descriptions are Zellner’s seemingly unrelated regression (SUR), Park’s procedure for fixed effects, the Fuller-Battese procedure for random effects, the error components model, and Swamy’s random coefficient regression (RCR) model.
4. **Alternative mathematical treatments of fixed-effects and random-effects**: Frees (2004) and Baltagi (1995) do a good job in this area.

5. **Movement away from the classical approach to the time-series approach when dealing with panel data**: Wooldridge (2002), Arellano (2003), and Enders (2004) deal with nonstationarity of right-hand-side variables, cointegration, and panel unit-root tests.

6. **Estimation using different panel data sets**: We have access to different panel data sets. We will be programming the various models using SAS’ Interactive Matrix Language (IML) and comparing estimation results with the standard canned procedures available in SAS and also in STATA.

**Format For This Course**

From the Topic Coverage section directly above and the corresponding readings, I will extract at least 30 different topics that are associated with model development and estimation.

**Text Readings**


Exams

We will have two exams. Each is worth 40% of your final grade. The first exam is scheduled for Thursday, March 10 from 6:00 p.m. to 8:00 p.m. The second exam will be during finals week. The date and time for the final exam have yet to be determined. (You will notice that Exam 1 is scheduled on the Thursday directly before spring break, which begins Saturday, March 12.)

Assignments

Assignments are based on data sets that I obtain over the Internet and from texts and journal articles. We may attempt to replicate results reported by researchers who use these data sets, or we may simply attempt to apply the topic that we are addressing at the time. I may also ask you to try your hand at a mathematical proof. You can expect somewhere in the vicinity of 10 assignments throughout the semester. Assignments will be worth 20% of your final grade.