Syllabus: ICPSR Summer School 5-day Session, 5-9 July 2010

Empirical Models for Time-Series-Cross-Section Data

Professor Robert (Rob) J. Franzese, Jr.
franzese@umich.edu  http://www.umich.edu/~franzese
Department of Political Science, University of Michigan

COURSE DESCRIPTION:

Time-series cross-section (TSCS) data harness both cross-temporal and cross-spatial variation to maximize empirical leverage for theory evaluation. However, this powerful data structure also requires careful consideration of temporal and spatial (cross-unit) heterogeneity, temporal and spatial dynamic processes, and potentially complex stochastic error structures. This course covers specification, estimation, interpretation, and presentation of empirical models that are appropriate for TSCS data. The course begins by discussing the nature of pooled data and the ways they deviate from the assumptions associated with the classic linear regression model. We then address a number of issues typically associated with TSCS data: fixed or stochastic cross-unit heterogeneity, complex error structures, and temporal and spatial correlation and dynamics. We consider a variety of methodological strategies for confronting these issues effectively, such as: fixed or random-effect models and associated tests; feasible-generalized-least-squares (FGLS); consistent coefficient-estimate variance-covariance (HAC) estimators (i.e., ‘robust’ standard errors); and temporal- and spatial-lag models. The course concludes with a brief overview of TSCS models for non linear-continuous dependent variables.

NOTES:

Students are encouraged to bring their own Panel or Time-Series-Cross-Section Datasets for exploration in lab exercises. (The lab assistant will conduct lab sessions in Stata.)

No textbooks are required, and articles will be made available online. The syllabus will suggest readings from Greene, Econometric Analysis, but students may easily substitute equivalent sections from any standard econometrics textbook they may own that covers time-series-cross-section or panel data methods (Wooldridge, Econometric Analysis of Cross Section and Panel Data or Cameron & Trivedi, Microeconometrics are two very appropriate alternatives). We will also cover Kam & Franzese, Modeling & Interpreting Interactive Hypothesis in Regression Analysis in its entirety, but students are not required to buy a copy (though they certainly may if they wish…).

All lecture notes, lab materials, data, and other course materials will be available for download from: http://www.umich.edu/~franzese.
MONDAY, 5 July 2010    Introduction & Review

09:00–09:30  Introductions; Advantages & Challenges of TSCS Data
  [This surveys most of material intended for the course; not intended that fully follow the material at this point. If can, probably don’t need the course!]

09:30–11:30  Review: Classical (Normal) Linear-Regression Model

11:30–13:00  Lunch

13:00–14:30  Review: Generalized (Normal) Linear-Regression Model

14:30–14:45 Break

14:45–15:30  C&G(N)LRM and Time-Series-Cross-Section Data

15:30–16:00  Introduce & discuss own projects

16:00–17:00  Lab

TUESDAY, 6 July 2010    TSCS and Heterogeneity

09:00–09:30  Heterogeneity across units and over time

09:30–11:00  Heterogeneity and Least-Squares Dummy-Variable (Fixed-Effect) Models

11:00–11:15  Break

11:15–12:15  Lab

12:15–13:45  Lunch

13:45–15:45  Heterogeneity and Interaction Models
15:45–16:00 Break
16:00–17:00 Lab

**WEDNESDAY, 7 July 2010 Random-Effect and Random-Coefficient Models**

09:00–10:00 Consistent Estimated-Coefficient Variance-Covariance (HAC) Estimation


10:00–11:30 Random-Effect and Random-Coefficient Models


11:30–11:45 Break

11:45–13:00 Random-Coefficient Models


13:00–14:30 Lunch

14:30–15:45 Extensions, Hybrids, and Testing


15:45–16:00 Break

16:00–17:00 Lab

**19:00–21:00 Office Hours (TBA)**
THURSDAY, 8 July 2010    (Time-)Dynamic Models

09:00–10:30    (Time-)Dynamic Models

10:30–10:45    Break
10:45–11:45    Lab
11:45–13:15    Lunch
13:15–15:00    (Time-)Dynamic Panel-Data Models

15:00–15:15    Break
15:15–16:15    Lab
16:15–17:00    Course Evaluations (TBA)

19:00–21:00    Office Hours (TBA)

FRIDAY, 9 July 2010    Spatial-Interdependence; and Qualitative Dependent-Variables

09:00–11:00    Spatial and Spatiotemporal Interdependence in TSCS Data

11:00–11:15    Break
11:15–12:15    Lab
12:15–13:45    Lunch
13:45–15:45    Qualitative Dependent-Variable Models in TSCS Data

15:30–17:00    Break; 15:45–17:00    Lab

19:00–21:00    “Office” Hours (Venue TBA)