

**ECON 715**  
**Advanced Topics in Panel Data and Network Econometrics**

This course provides an up-to-date coverage of the various econometric issues that arise in the analysis of panel data models focusing on unobserved heterogeneity, dynamics and cross-sectional dependence, including regional and global interconnections. It will also cover new topics on econometrics of networks which is viewed as a type of interconnections. It is intended for those interested in getting acquainted with the econometric techniques needed to carry out analyses of time series across countries, firms regions, and/or industries. Consideration will be given to the different cases arising in practice where either the number of units (N) and/or the number of time periods (T) are reasonably large.

The course begins with a very brief review of the fixed and random effects static panel models, and discusses the problems of estimation and hypothesis testing in these models both when N and T are large, and when N is large but T is small. The focus of the course will be on panels with both N and T large and of the same order of magnitude. Particularly attention will be paid to the specific issues that arise in the analysis of interdependence across units over space or within a given network. The various recent developments are incorporated within a multi-variate spatiotemporal model with latent factors, thus distinguishing between global and local shocks in a coherent manner.

Applications to regional house prices changes, production and financial networks will be considered, as well as the analysis of Covid pandemic on the global economy using a threshold version of the GVAR modelling strategy,

**Prerequisite:** ECON 511 or equivalent

**LECTURE TIMES:** Mondays 9:00-12:00noon,  
First lecture January 25, 2021 Last lecture April 26, 2021

**LOCATION:** Via Zoom

**OFFICE HOURS:** By appointment through Akiko Matsukiyo [amatsu@usc.edu](mailto:amatsu@usc.edu)

**EXAMS:** Date/Time to be announced. (University Final Exam period May 5 – May 12)

**Readings : Books**

Arellano, M. (2003), *Panel Data Econometrics*, Oxford: Oxford University Press.

Baltagi, B.H., (2008), *Econometric Analysis of Panel Data*, Fourth Edition, Wiley-Blackwell.

Di Mauro, F. and M. H. Pesaran, eds, (2013), *The GVAR Handbook: Structure and Applications of a Macro Model of the Global Economy for Policy Analysis*, Oxford University Press, Oxford.

Hsiao, C., (2014), *Analysis of Panel Data*, Third Edition, Cambridge University Press.

Pesaran, M.H., (2015), *Time Series and Panel Data Econometrics*, Oxford University Press, Oxford.

**Topics:**

1. An Overview of static and dynamic panels with short  $T$  (time dimension) and large  $N$  (cross section dimension)
2. Heterogeneous dynamic panels with large  $N$  and  $T$
3. High dimensional techniques and their applications to panel data models. (Lasso and OCMT methods will be discussed and contrasted)
4. Cross- Sectional dependence in panels (strong and weak CD dependence)
5. Production and financial networks and how to detect pervasive units (if any) in networks
6. Spatial panel econometrics, and econometric analysis of networks
7. Aggregation in large panel data models
8. Multi-variate spatiotemporal models with common latent shocks
9. Global vector autoregressions (GVAR) and their applications to modelling interdependence