# PANEL DATA ANALYSIS WITH STATA: AN EXTENSION METHOD

A panel data set include both cross-sectional and time series dimension. There are some advantage when we use panel data as an estimation. First ,pooling this data gives a richer sources of variation which allows for more efficient estimation of the parameters. Second, with more informative data, one can get more reliable estimates and test more sophisticated behavioral models with less restrictive assumptions. Third, their ability to control for individual heterogeneity which means not controlling for these unobserved individual specific effects leads to bias in the resulting estimates. Fourth, panel data also better able to identify and estimate effects that are simply not detectable in pure cross-sections or pure time-series data. In particular, panel data set are better able to study complex issues of dynamic behavior.

The workshop will provide some advanced method when we dealt with panel data model. The workshop assumed the participants already has some basis knowledge about the pool, fixed effects and the random effects model.

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**DAY 1**

**1. Introduction**

- **Getting started.**
- **Load data from Excel.**
- **Command: describe; summarize.**
- **The structure of Stata Commands.**
- **Panel data organization.**

**2 Panel Data Summary**

- **Data description .**
- **Within and between variation.**
- **Time-series plot for each individual.**
- **Overall scatterplot.**
- **Within and between scatterplot.**

**3 Basic Panel Estimation**

- **Pool estimation with cluster-robust standard errors.**
- **Fixed Effects estimation.**
- **Random Effects estimation.**
- **Hausman (1978) specification test for panel.**
- **The Wooldridge(2002) version of Hausman test.**
- **Sargan(1975) and Hansen (1982) or S-H test for overidentifying.**
- **Prediction for panel data.**

**4 Autocorrelation and heteroskedasticity in panel data**

- **Panel data with AR(1) process.**
- **Bhargava, Franzini & Narendranathan(1983) test for autocorr.**
- **Baltagi-Wu (1999)Locally Best Invariant (LBI) test for autocorr.**
- **Breusch-Pagan (1980) LM test for cross-sectional correlation.**
- **Pesaran (2004) test for cross-sectional dependence.**
- **Pesaran, Ullah & Yamagata (2008) test for cross-sectional dependence.**
- **Wooldridge (2002) and Drucker (2003) or WD test for serial correlation.**
- **Greene (2000) version of Wald test for groupwise heteroskedasticity.**

**5 Instrumental Variables (IV) and 2SLS in panel data**

- **IV in panel data.**
- **Fixed effects model.**
- **GLS random effects model.**
- **Balestra and Varadharajan-Krishnakumar (1987) `G2SLS`.**
- **Baltagi (2009) `EC2SLS`.**
- **Baltagi and Chang (2000) variance-component estimators.**

**Day 2**

**6 Hausman-Taylor(1981) and Amemiya-MaCurdy (1986) estimator**

- **Fixed effects model.**
- **GLS random effects model.**

**7 Panel Data Model with Multilevel Mixed Effects**

- **Random –intercept model.**
- **Cluster-robust standard errors.**
- **Random-slope model.**
- **Random-coefficient model.**
- **Two-way random effect model.**

## 8 Dynamic Models for Panel Data

- **Dynamic model with exogenous variables.**
- **Arellano-Bond (1991) estimator .**
- **Arellano-Bond (1991) test for autocorrelation for GMM model.**
- **Within estimates.**
- **First-difference estimates.**
- **Anderson-Hsio (1981) estimates with IV in difference.**
- **Anderson-Hsio (1982) estimates with IV in levels.**
- **GMM-estimates: Arellano-Bover (1995)**
- **GMM-dif estimates: Arellano-Bond (1991).**
- **GMM-dif and GMM-sys estimates: Blundell-Bond (1998).**
- **A-B (1991) autocorrelation tests.**
- **Sargan or Hansen J-test.**

## 9 Long Panel Dataset : Unit Root and Stationarity Panel Data

- **Unit root panel data.**
- **Levin,Lu and Chin (LCC) (2002)test.**
- **Im, Pesaran and Shin (IPS)(2003) test.**
- **Breitung (2005) test.**
- **Fisher-type (2001) test.**
- **Hadri (2000) test.**

## 10 Long Panel Dataset: Cointegration Panel

- **Westerlund (2007) method.**
- **Pedroni (1999,2004) method.**