Final Review

Introduction ot Econometrics,Fall 2018

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Review: Review Lecture 0

- What is econometrics?
- Data Structure:
  - **Cross section**
  - **Times series**
  - **Pool-Cross sections**
  - **Panel Data**
- *Micro-Econometrics* v.s *Macro-Econometrics*

Review Lecture 1

- Main Missions of Empirical Work: Causality v.s. Forecasting
- A framework of Causal Inference
  - Rubin Causal Model
  - Randomized trial as the benchmark
  - RCT does not work in reality?

Review Lecture 2

- Review Statistics
  - LLW and CLT
  - Statistical Inference:
  - Point estimation: Estimator and Estimate
  - Three Characteristics of an Estimator
  - Properties of the sample mean and the sample variance
  - Hypothesis Testing and P-Value
  - Confidence Interval and significance level
  - Hypothesis Tests for the Difference Between Two Means

Review Lecture 3

- Why CEF is all you need?
  - The Law of Iterated Expectations(LIE)
  - The CEF Decomposition Property
  - **CEF-Prediction Property**
- What is Regression? and Why?
  - Three Reasons to Regress

Review Lecture 4

- Simple OLS:
  - OLS estimator β
  - R squares
- The Least Squares Assumptions:
  - Assumption 1
  - Assumption 2
  - Assumption 3
- Properties of the OLS estimator
  - The OLS estimator is unbiased, consistent and has asymptotically normal sampling distribution.

Review Lecture 5

- OLS with Multiple Regressor: Estimation
  - OVB Bias
  - Perfect multicollinearity: Assumption 4
  - Interpretation of coefficients
  - Partitioned regression: proof unbiased
  - Adjusted R-Squres

Review Lecture 6

- Statistical Inference of β
  - *standard error* of β
  - Hypothesis concerning β
  - Confidence interval
- Multiple Regressors: Hypotheses tests
  - Heteroskedasticity & homoskedasticity
  - Testing hypothesis on 2 or more coefficients: F-test

Review Lecture 7: Nonlinear Regression

- Polynomials, Logarithmic transformations and Interactions
  - How to explain these estimate coefficients?
- LPM,Logit and Probit
  - advantage and disadvantage
  - explain the estimate coefficient
  - Marginal effect
  - Maximum Likelihood Estimation
  - The pseudo-R2

Review Lecture 8

- Internal validity v.s External validity
- Threats to internal validity
  - **Omitted variables bias**
  - Function form misspecification
  - **Measurement error**
  - Simultaneous causality
  - Missing Data and Sample Selection
  - **Heteroskedasticity and/or correlated error terms**

Review Lecture 9: Decompostion

- OB decomposition framework
- Reference group problem: adjusted-weight
- Boostrap Method to obtain s.e

Review Lecture 10: Instrumental Variables

- Two assumptions
- Statistical propertise of 2SLS estimator
- Checking Instrument Validity
  - first stage: weak instrument
  - institutional backgroud to argue
  - more IVs: overidentification test
- Heterogeneous effect and LATE

Review Lecture 11: RDD

- RDD: Basic Ideas and Types
- Basic assumptions
- Check Validity of RDD

Review Lecture 12: Fixed Effects Model and DID

- Fixed effect: assumption and estimation
- Autocorelated in Panel Data
- DID: basic idea and assumption
- Extension: DDD and SCM