

ECO lecture notes

Econometrics

These are the notes for econometrics course. The professor says it'll be an easy course, let's see about that. I am using Obsidian and this is an amazing markdown editor! It has a lot of community plugins. Anyways, study now... xD

Here is a somewhat detailed overview.

1. ECO (Dropped)/Lecture 1 : Introduction to the course and grading.
2. ECO (Dropped)/Lecture 2 : Something more here

e# First lecture This is day 2, first lecture of econometrics. The professor is pretty chill. The pre-requisite is Probability and Statistics course. No recording however multiple office hours. Note from professor: Read the course book, it's very good! Motivation to study? High demand field. The course would again revolve around data analysis like PB.

Course evaluations and reference

- Quiz/Assignments : 20%
- Project : 20%
- Midsem : 25%
- Endsem : 35%
- Introductory econometrics: A modern approach (4th edition, Cengage India) by Jeffery L. Wooldridge

What is Econometrics

- An envelope of methods to formally
 - Evaluate a govt. or business policy
 - * E.g. job training program
 - * impact of plagiarism/odd-even policy
 - Test a simple economic theory

- * E.g. Diversification of risks (stonks)
- * Minimum legal wages reduces an individual's prosperity
- Estimate a simple economic (or even social) relationship
 - * E.g. partisan political events increase the number of posts on Twitter
 - * higher minimum wages reduce crime rate of city

A (vague) econometric model

$$y_{\square} = \beta_0 + \beta_1 x_{1\square} + \beta_2 x_{2\square} + \dots + \beta_k x_{k\square} + u_{\square}$$

where

- y_{\square} is the dependent/explained/predicted response
- x_{\square} is the k th regressand/explanatory variable/control/predictor/regressor/covariate for unit \square ,
- β_0 is the intercept,
- β_k is the coefficient of $x_{k\square}$, also termed as slope (multi-dim)
- u_{\square} is the disturbance/error or bias term

Data Structures

- Cross-sectional data
 - Observation units are individual or entities like persons, states, etc.
 - Variables $height\{i\}$, $income\{i\}$
- Time-series data
 - Observation units is time.
 - Variables $gdp\{t\}$, $runtime\{t\}$
- Panel or longitudinal data
 - Multiple entries are observed over multiple time-periods.
 - Variable height of a hundred 8th graders over 20 years, i.e. $height\{i,t\}$.

Causality versus Correlation

- The notion of Ceteris Paribus or *all else held constant*
- Consider $wage_i = \beta_0 + \beta_1 educ_i + \epsilon_i; i \in \mathbb{N}$
- Can we really *say* that the above equation implies a **causal impact** of education status on wage? Consider the following:

$$educ_i = \frac{\beta_0}{\beta_1} + \frac{1}{\beta_1} wage_i - \frac{\epsilon_i}{\beta_1}$$

This course has been dropped --