

Econometrics, Spring 2022

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Data is the new oil. It's valuable, but if unrefined it cannot really be used. It has to be changed into gas, plastic, chemicals, etc to create a valuable entity that drives profitable activity; so must data be broken down, analyzed for it to have value. (Clive Humby, 2006)

Big data is like teenage sex: everyone talks about it, nobody really knows how to do it, everyone thinks everyone else is doing it, so everyone claims they are doing it. (Dan Ariely, 2013)

In school, we rarely learn probability & statistics, leaving us victims of our mind's own inability to process random events. (Neil deGrasse Tyson, 2017)

This course is an introduction to econometrics, which involves the application of statistical methods to study economic data and issues, primarily aimed at second-year students. Throughout this semester, we will explore various topics, including the least squares procedure, the linear model, the statistical properties of the ordinary least squares (OLS) estimator, hypothesis testing for linear regression, as well as the inclusion of irrelevant variables, omission of relevant variables, model selection, the asymptotic properties of OLS estimator and test statistics, the generalized method of moments (GMM), and extreme estimators.

Unlike typical statistics courses in Taiwan, National Taiwan University mandates the learning of R, an open-source programming language that is commonly used by statisticians and data miners for developing statistical software and analyzing data. It is crucial to emphasize that coding in R is a prerequisite for this course. If coding is not your forte, this course may not be the best fit for you.

Grading

One midterm exam (April 12, **40%**). One in-class presentation (May 24 or May 31, **50%**). Assignments (**10%**).

The final project can be an individual work or a teamwork with ≤ 4 team members in total. It can be a theoretical study, a Monte Carlo experiment or an empirical work. You should talk to me about your work by April 19.

Required Reading

1. Linton, Oliver (2017), *Probability, Statistics and Econometrics*, Academic Press.

Supplemental Reading

1. Heumann, Christian, Michael Schomaker, and Shalabh (2016), *Introduction to Statistics and Data Analysis: With Exercises, Solutions and Applications in R*, Springer.
2. James, Gareth, Daniela Witten, Trevor Hastie, and Robert Tibshirani (2021), *An Introduction to Statistical Learning: With Applications in R*, Second Edition, Springer.
<https://www.statlearning.com/>