Course outline

Advanced linear regression models

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Short outline

This course aims to provide well-grounded understanding of regression analysis, which will enable students to make most use of this empirical technique. More specifically, the students will learn the assumptions of the regression models and property of its most famous estimation technique, ordinary least squares (OLS). These are crucial not only to better understand inferences in the regression analysis, but also to learn about further practical topics such as model specification or analysis of binary dependent variables by using linear probability model. Furthermore, the advanced knowledge about regression analysis make it clear what to care in interpreting the regression estimates in terms of causal inferences. While many researchers uncritically use regression analysis for causal inference purposes, the assumptions for causal inference and those of regression analysis are not exactly same. By explicating their differences, the students can learn to better interpret the results from regression analysis.

Readings

 Jeffrey M. Wooldridge. Introductory Econometrics. A Modern Approach. (5th edition or newer)

Day 1 Assumptions of linear regression models

* Basics of estimation and ordinary least squares
* Gauss-Markov-assumptions
* Classical linear model assumptions
* Bias and efficiency of OLS

Day 2 Model misspecification

* Model misspecification and its consequences
* F-tests
* Regression specification error test

Day 3 Regression asymptotics

* Consistency of OLS
* Asymptotic normality and large sample tests

Day 4 Linear probability model and heteroscedasticity

* Linear probability model
* Consequences of heteroscedasticity for OLS
* Weighted least squares

Day 5 Regression analysis and causal inference

* Assumptions for causal inference
* Interpretation of OLS estimates
* Regression paradoxes