Research Methods in Economics and Business

Syllabus[1]

Fall 2020

`Version: 2020-11-25`

Instructor:	Zhiyuan Chen	**Office:**	919 Mingde Business Building
E-mail:	chenzhiyuan@rmbs.ruc.edu.cn	**Time:**	Wednesday 2:00-5:30 p.m.
Place:	415 Mingde Main Building	**Office hours:**	Thursday 2:00-3:00 pm
Repository:	https://gitee.com/zhiyuanryanchen/econ-research-methods		
Homepage:	https://zhiyuanryanchen.gitee.io/web/teaching.html		

Description: This course is intended to train students in frontier research methods for good empirical and quantitative studies in areas related to economics and business. This course covers a variety of research tools and approaches and their applications in economics, business, finance, and management. It emphasizes a collaboration of various quantitative skills in conducting economic research, as well as a tight connection between the theory and empirical facts. The course begins with introducing various databases and web-scrapping methods of collecting online data. It then introduces data visualization, the classical econometric frameworks, and recent developments in machine learning and text analysis. Then it discusses the establishment of economic theories behind the observed empirical facts, including both verbal-based and math-based models. The course concludes by introducing basic computational methods in estimating and simulating economic models to perform the counterfactual analysis.

Prerequisites: This course will assume a knowledge of graduate-level microeconomics, macroeconomics, and econometrics. Some experience in working with Stata, Matlab, Python, Julia, Jupyterlab, and Git is preferred, but not a must for this course.

[1] This syllabus is evolving; make sure that you have the most recent version.

Requirements and Grading:
Class participation: Though this is a lecture course, class discussion and interaction are a crucial part of our synthesis of the material and learning. It is therefore vital that you come to every class, prepared and ready to contribute.
Problem sets: You may be required to do problem sets. Some problem sets will be discussed in class and students are required to present their solutions.
Research project: You are also required to complete a research project that is designed to walk you through the process of conducting independent economic research. A suggestive list of potential research projects will be announced in class. You may need to come to discuss with me if you choose a project not on the list. The research project requires you to replicate and\or extend an existing paper. Based on the results you find, you are required to develop your own research question, propose hypotheses or design theoretical frameworks, and design econometric models or build theoretical models to answer your research question. The project is to be written in the form of a journal article, with motivation, model and/or hypotheses, data, results, and a conclusion. Students may work in groups; the maximum number of members in each group should not exceed three. Two deadlines for the research project:

- December 30 (last class in the fall semester): A complete first draft is due in class. You will present your projects in class and receive comments. You may need to revise your paper based on the comments.
- January 15: Final draft of the research project is due by midnight.

Grading: Your grade for the course will be determined as follows:

- Class participation: 20%
- Problem sets: 20%
- Research project: 60% = 20% (presentation) + 40% (final draft)

The Tentative Class Schedule:

* means important!

1. Class 1 (11/11)–Working with data effectively: Various Chinese databases, using `STATA` and `Python` with `Jupyterlab` for data visualization

   References:

   - *Chinese Databases for Economic Research, lecture notes, 2020
   - *A. Colin Cameron and Pravin K. Trivedi, *Microeconometrics Using Stata*, Second Edition, 2010, Chapters 1, 2
   - *Stata Corporation,
     - *Stata User's Guide*, Release 15/Release 16, Stata basics (particularly sections 3 and 10)
     - Collection of Stata Graphs: https://www.stata.com/support/faqs/graphics/gph/stata-graphs/
   - *Webpages: QuantEcon DataScience, Introduction, Data Visualization (and references therein)
   - *Stata_kernel in Jupyterlab: https://kylebarron.dev/stata_kernel/

   Readings:

   - Edward R. Tufte, *The Visual Display of Quantitative Information*, Second, Edition, 2007.
   - *Loren Brandt, Johannes Van Biesebroeck, Yifan Zhang, "*Creative Accounting or Creative Destruction: Firm Level Productivity Growth in Chinese Manufacturing*", Journal of Development Economics 97 (2) (2012), 339–351.
   - *He, Z. L., T. W. Tong, Y. Zhang, and W. He. (2018): "*A database linking Chinese patents to China's census firms*," Scientific Data, 5, 1–16.

2. Class 2, 3, 4(11/18, 11/25, 12/02)–Choose the right econometric tools: Linear regressions, panel data models, Diff-in-Diff, simulations, machine learning, and text analysis

   References:

   - *A. Colin Cameron and Pravin K. Trivedi, *Microeconometrics Using Stata*, Second Edition, 2010, Chapters 1, 3, 4.
   - *Marianne Bertrand, Esther Duflo, Sendhil Mullainathan, *How Much Should We Trust Differences-In-Differences Estimates?*, The Quarterly Journal of Economics, Volume 119, Issue 1, February 2004, Pages 249–275

- *Cameron, A.Colin, and Douglas L. Miller. "*A Practitioner's Guide to Cluster-Robust Inference*." Journal of Human Resources, vol. 50, no. 2, 2015, pp. 317–372.
- *Gentzkow, M., B. Kelly, and M. Taddy. (2019): "*Text as Data*," Journal of Economic Literature, 57, 535–74. [PDF]
- *Athey, S., and G. W. Imbens. (2019): "*Machine Learning Methods That Economists Should Know About*," Annual Review of Economics, 11, 685–725. [PDF]
- *Cameron, A. Colin, 2019, *Machine Learning Methods in Economics*, slides
- *Hoberg, G., and G. Phillips. (2016), *Text-based network industries and endogenous product differentiation*, Journal of Political Economy, 124, 1423–65.
- J.D. Angrist and J.S. Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion,* Princeton University Press, 2009. [Chapter 8]
- Rudra Pratap, *Getting Started With Matlab: A Quick Introduction for Scientists and Engineers*, Oxford University Press, 2010. [Chapter 1]

Readings:

A. Causal Inference

- *Abadie, A., and M. D. Cattaneo. (2018): "*Econometric Methods for Program Evaluation*," Annual Review of Economics, 10, 465–503.
- Abadie, A., A. Diamond, and A. J. Hainmueller. (2010): "*Synthetic control methods for comparative case studies: Estimating the effect of California's Tobacco control program*," Journal of the American Statistical Association, 105, 493–505.
- Christine Cai, 2020, *Literature on Recent Advances in Applied Micro Methods.* [PDF]
- Jeff Woodridge 2007 NBER Lecture "Difference in Differences Estimation"
- *Cameron, A. C., J. B. Gelbach, and D. L. Miller. (2008): "*Bootstrap-Based Improvements for Inference with Clustered Errors*," The Review of Economics and Statistics, 90, 414–27.
- Brodeur, Abel, Nikolai Cook, and Anthony Heyes (2020): "*Methods Matter: p-Hacking and Publication Bias in Causal Analysis in Economics*." American Economic Review, 110 (11): 3634-60.

- Douglas Almond, Kenneth Y. Chay, David S. Lee, *The Costs of Low Birth Weight*, The Quarterly Journal of Economics, Volume 120, Issue 3, August 2005, Pages 1031–1083
- John J. Donohue, III, Steven D. Levitt, *The Impact of Legalized Abortion on Crime*, The Quarterly Journal of Economics, Volume 116, Issue 2, May 2001, Pages 379–420

B. Machine Learning in Economics

- Susan Athey (2018), *The Impact of Machine Learning on Economics*. [PDF]
- Sendhil Mullainathan and J. Spies, 2017, *Machine Learning: An Applied Econometric Approach*, Journal of Economic Perspectives, 87-106.
- Gareth James, Daniela Witten, Trevor Hastie and Robert Tibsharani (2013), *An Introduction to Statistical Learning: with Applications in R*, Springer. [Python Code]
- Scikit-learn: Machine Learning in Python, Pedregosa et al., JMLR 12, pp. 2825-2830, 2011

C. Text-analysis

- *Scott R. Baker, Nicholas Bloom, Steven J. Davis, *Measuring Economic Policy Uncertainty*, The Quarterly Journal of Economics, Volume 131, Issue 4, November 2016, Pages 1593–1636, https://doi.org/10.1093/qje/qjw024
- *Kelly, B. T., D. Papanikolaou, A. Seru, and M. Taddy. (2020): "*Measuring Technological Innovation over the Long Run*," NBER working paper w25266.
- Raffo, J., and S. Lhuillery. (2009): *"How to play the ' Names Game ': Patent retrieval comparing different heuristics,"* Research Policy, 38, 1617–27.

3. Class 5 (12/09)–Seeking the theory behind the empirical facts

References:

- *Melitz, M. J. (2003): "*The impact of trade on intra-industry reallocations and aggregate industry productivity*," Econometrica, 71, 1695–1725.
- *Eaton, J., S. Kortum, and F. Kramarz. (2011): "*An Anatomy of International Trade: Evidence From French Firms*," Econometrica, 79, 1453–98.

- * Berry, S., J. Levinsohn, and A. Pakes, 1995, "*Automobile Prices in Market Equilibrium*," Econometrica, 63, 841–890.

Readings:

- Chen, Z., Z. Liu, J. C. Suárez Serrato, and D. Y. Xu. (2018): "*Notching R&D Investment with Corporate Income Tax Cuts in China*," NBER Working Paper No. w24749

4. Class 6, 7 (12/16, 12/23)–Model computation and simulation

   References:

   - *Mario J. Miranda and Paul L. Fackler, *Applied Computational Economics and Finance*, MIT Press, 2002.
   - *Kenneth L. Judd, *Numerical Methods in Economics*, MIT Press, 1998.
   - Jérôme Adda and Russell Cooper, *Dynamic Economics: Quantitative Methods and Applications*, MIT Press, 2003.

   Readings:

   - *Anderson, B. J. E., and E. V. A. N. Wincoop. (2003): "*Gravity with Gravitas : A Solution to the Border Puzzle*," American Economic Review, 93, 170–92.
   - * Berry, S., 1994, "*Estimating Discrete-Choice Models of Product Differentiation*," Rand Journal of Economics, 25, 242–262.
   - * Nevo, A. (2000): "*A Practitioner's Guide to Estimation of Random-Coeffcients Logit Models of Demand*," Journal of Economics & Management Strategy, 9, 513–48.
   - Vincent, D. W. (2015): "*The Berry-Levinsohn-Pakes estimator of the random-coefficients logit demand model*," Stata Journal, 15, 854–80.

5. Class 8 (12/30)– Student presentations