Applied Panel Data Econometrics (SS22) (6 KP)

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Classes: The course will start **on the 19.04.2022**. Participants have to be enrolled on *studip.uni-goettingen.de*. The slides for each topic will be weekly uploaded on Studip. Participants are expected to prepare for the exam using the slides and the references (books and articles) indicated for each topic. Every week there will be two sessions to cover the material on the slides (Tuesday 8:15 to 9:45) and (Thursday 8:15 to 9:45), including Q&A. 'The classroom will be announced on Studip. The material will be covered in half semester, notice that there are two sessions each week.

Tutorials: Wednesdays from 12:15 to 13:45. First **virtual session on the 20.04.2022**. The tutorials would take place in WiSoRZ MZG 6.111: WiSo-RZ CIP-Pool 6.Etage. The first tutorial will be a short introduction to STATA. For access to STATA, please go to https://www.uni-goettingen.de/de/511106.html. Exercise sheets will be posted online (Studip) before the tutorial and the STATA solutions will be discussed during the tutorial. Register in Studip for "Übung zu Applied Panel Data Econometrics" and download the PDF with more details on the schedule and evaluation of the tutorial.

Program

Introduction

This course aims to study panel data econometric techniques in an intuitive and practical way and to provide the skills and understanding to read and evaluate empirical literature and to carry out empirical research. Empirical evaluation of economic models is an important feature of the study and application of economics. The course is concerned with the *application* of econometric methods, with little emphasis on the mathematical aspects of the subject (which may be studied in other modules). The computer software package STATA will be used for practical work. Previous knowledge of intermediate econometrics is required.

Organization of the Course and Evaluation:

Organization: 2 hours lecture and 2 hours tutorials (practical work in STATA).

Evaluation: Stata Assignment 30% and final exam 70%.

-*Assignment:* Deadlines for submitting the assignment: July 10th.

-*Final Exam*: on 15/07/2022 from 8:15 to 9:45 (Room to be determined).

Outline of the course:

Linear Panel Data Models

1. Static Linear Panel Data Models

      1.1 Introduction to Panel Data

      1.2 Assumptions

      1.3 Estimation and Testing

            1.3.1 Pooled OLS

            1.3.2 Random Effects Estimation

            1.3.3 Fixed Effects Estimation. Testing for Serial Correlation

            1.3.4 First-Differencing Estimation

      1.4. Comparison of Estimators and Testing the Assumptions

      1.5 Correlated Random Effects (CRE) or Mundlak's Approach

2. Endogeneity and Dynamics in Linear Panel Data Models

      2.1. Introduction

      2.2 Chamberlain's Approach

      2.3. RE and FE Instrumental Variables Methods

      2.4. Hausman and Taylor Models

      2.5. First Differencing and IV

      2.6. Dynamic Panel Data Models. Estimation under Sequential Exogeneity

3. Special Topics

      3.1 Heterogeneous Panels

      3.2 Random Trend Models

      3.3 General Models with Specific Slopes

      3.4 Robustness of Standard Fixed Effects Estimators

      3.5 Testing for Correlated Random Slopes

Non-linear Panel Data Models

4. Panel Data Models for Discrete Variables

      4.1Introduction. Binary Response Panel Data Models with Strictly Exogenous Variables

References

Main Textbook

Wooldridge, J.M. (2010), Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge (2nd ed.).

Other Textbooks

Arellano, M. (2003), Panel Data Econometrics, Oxford University Press, Oxford (1st ed.)

Baltagi, B.H. (2013), Econometric Analysis of Panel Data, John Wiley and Sons, Chichester (5th ed.)

Cameron, A. Colin and Pravin K. Trivedi (2005), Microeconometrics: Methods and Applications Cambridge University Press, New York.

Greene, W. H. (2012), Econometric Analysis, Prentice Hall, 7th Edition (chapters 11 and 13)

Hsiao, C. (2003), Analysis of Panel Data, Cambridge University Press, Cambridge (2nd ed.).

Lee, M. (2002), Panel Data Econometrics, Academic Press, San Diego (1st ed.).

Murray, M. P. (2006), Econometrics: A Modern Introduction. Pearson AddisonWesley. (Chapter 16).

Journal Articles

Linear Models

Arellano, M. and S. Bond (1991), Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equation, Review of Economic Studies, 58(2), 277-297.

Blundell, R. and S. Bond (1998), Initial Conditions and Moment Restrictions in Dynamic Panel Data Models, Journal of Econometrics, 87, 115-143.

Bond, S. and F. Windmeijer (2005), Reliable Inference for GMM Estimators? Finite Sample Properties of Alternative Test Procedures in Linear Panel Data Models, Econometric Review, 24(1), 1-37

Bonhomme, S. and Manresa, E. (2015) Grouped Patterns of Heterogeneity in Panel Data, Econometrica, 83 (3), 1147-1184.

Eberhardt,M. And Teal, F. (2012) "Productivity Analysis in Global Manufacturing Production" School of Economics, University of Nottingham. Mimeo.

Windmeijer, F. (2005), A Finite Sample Correction for the Variance of Linear Efficient Two-step Estimators, Journal of Econometrics, 126, 25-51.

Non-linear Models

Honore, B. and E. Kiriazidou (2000), Panel Data Discrete Choice Models with Lagged Dependent Variables, Econometrica, 68(4), 839-874.

Lewbel, A., Dong, Y., & Yang, T. T. (2012). Comparing features of convenient estimators for binary choice models with endogenous regressors. *Canadian Journal of Economics/Revue canadienne d'économique*, *45*(3), 809-829.

Lewbel, A. (2012). Using heteroscedasticity to identify and estimate mismeasured and endogenous regressor models. *Journal of Business & Economic Statistics*, *30*(1), 67-80.

Long, J. S., and J. Freese (2006) *Regression Models for Categorical Dependent Variables Using Stata*. 2nd ed. College Station, TX: Stata Press.

Martin, R. S., & Wooldridge, J. M. (2021). The robustness of conditional logit for binary response panel data models with serial correlation. *Journal of Econometric Methods*.

Rios-Avila, F. (2021). *XTHECKMANFE*: Stata module to fit panel data models in the presence of endogeneity and selection.

Stewart, M. (2006) Maximum simulated likelihood estimation of random-effects dynamic probit models with autocorrelated errors, The Stata Journal 6 (2), 256-272.

Vella, F. and M. Verbeek (1998), Two Step Estimation of Panel Data Models with Censored Endogenous Variables and Selection Bias, Journal of Econometrics, 90, 239-263.

Wooldridge, J. M. (1995), Selection Corrections for Panel Data Models under Conditional Mean Independence Assumptions, Journal of Econometrics, 68, 115-132.

Wooldridge, J. M. (2000), A Framework for Estimating Dynamic, Unobserved Effects Panel Data Models with Possible Feedbacks to Future Explanatory Variables, Economic Letters, 68, 245-250.

Wooldridge, J. (2021). Two-way fixed effects, the two-way mundlak regression, and difference-in-differences estimators. *Available at SSRN 3906345*.

Prerequisites

1. Classical Linear Regression Model, Finite and Asymptotic Properties of the LS Estimator

2. Heteroskedasticity and Autocorrelation

3. Endogeneity, IV and GMM

4. Maximum Likelihood and Specification Tests (W, LR, LM)

5. Cross-sectional Limited Dependent Variables Models (Probit, Logit, Tobit)

Basic References:

Introductory Econometrics: A Modern Approach 4th edition by Jeffrey M. Wooldridge, South-Western College Publishers (2008, 865pp) --- This textbook contains a comprehensive treatment of undergraduate econometrics. The book is a bit more technical than some other undergraduate texts (like Stock and Watson's "Introduction to Econometrics"), but most of the advanced mathematics is left as optional material. Wooldridge explains concepts very clearly. The topic coverage goes well beyond the multiple regression model, hitting important topics like binary-choice models, panel-data models, and forecasting techniques. Examples are abundant throughout the text, and many end-of-chapter exercises (based on real datasets) provide students the opportunity to fully absorb the book's material.

Econometric Analysis 67th edition by William H. Greene, Prentice Hall (2013, 1229pp) --- Greene's *Econometric Analysis*, now in its 6th edition, has long stood as a prominent choice among first-year graduate econometrics textbooks. The book covers an amazing number of different topics, ranging from finite sample to asymptotic, cross-sectional to time-series, frequentist to Bayesian, and so on. The appendices themselves are extremely valuable, serving as review material on linear algebra and statistical theory (without having to reference other sources for these topics). Additional resources: book website, datasets, solutions manual.

Introduction to Econometrics 3rd edition by James H. Stock and Mark W. Watson, Addison-Wesley (2012, 827pp) --- This textbook by Stock and Watson is an excellent option for a student's first exposure to econometrics. The book is extremely well written, with interesting empirical examples used to motivate the importance of econometrics to the field of economics. The book is primarily targeted for a less theoretical course in econometrics, but there are several chapters (particularly in Part V of the book) that could be used in a more formal course. Additional resources: book website, sample chapter (from 1st edition), lecture slides, also available in a brief edition.

Essentials of Econometrics 4th edition by Damodar Gujarati and Dawn Porter, McGraw-Hill/Irwin (2009, 576pp) --- Book website, author profile.

Principles of Econometrics 3rd edition by R. Carter Hill, William E. Griffiths, and Guay C. Lim, Wiley (2007, 608pp) --- book website, datasets, a free ebook (by Prof. Lee Adkins) for this textbook using the *gretl* software package, an EViews guide for *Principles of Econometrics*, a Stata guide for *Principles of Econometrics.*

Introduction to Econometrics 3rd edition by Christopher Dougherty, Oxford University Press (2007, 480pp) --- book website, datasets, lecture slides (from Prof. Dougherty), Google preview

Using Econometrics: A Practical Guide 6th edition by A. H. Studenmund, Addison-Wesley (2010, 648pp) --- book website, datasets

Statistics and Econometrics: Methods and Applications by Orley Ashenfelter, Phillip B. Levine, and David J. Zimmerman, Wiley (2006, 320pp) --- Datasets. Lecture slides.