Research Methods for PhD students

Vilnius University, Autumn 2017

1. **Contact Details of Lecturers**
   1. Matthias Weber: [mweber@lb.lt](mailto:mweber@lb.lt).
   2. Povilas Lastauskas: [PLastauskas@lb.lt](mailto:PLastauskas@lb.lt).
   3. Patrick Grüning: [patrick.gruening@ef.vu.lt](mailto:patrick.gruening@ef.vu.lt).
2. **Course times**
   1. Matthias:
      1. Thursday, 5 October 2017 (17:00-18:30, 18:45-20:15)
      2. Monday, 9 October 2017 (17:00-18:30, 18:45-19:30)
      3. Thursday, 12 October 2017 (17:00-18:30, 18:45-19:30)
   2. Povilas:
      1. Thursday, 26 October 2017 (17:00-18:30, 18:45-19:30)
      2. Thursday, 2 November 2017 (17:00-18:30, 18:45-20:15)
      3. Thursday, 9 November 2017 (17:00-18:30, 18:45-20:15)
   3. Patrick:
      1. Monday, 20 November 2017 (17:00-18:30, 18:45-20:15)
      2. Thursday, 23 November 2017 (17:00-18:30, 18:45-19:30)
      3. Thursday, 30 November 2017 (17:00-18:30, 18:45-19:30)
3. **Course location**

Room 303, Faculty of Economics, Vilnius University.

1. **Purpose of course**

The aim of this course is to provide an introduction to the most up-to-date research techniques in economics, both in terms of theories and numerical applications.

1. **Course outline**
   1. How to write a scientific paper and statistics with R (Matthias)
      1. How to write and publish a scientific paper.
      2. Introduction to R (and RStudio).
      3. Data analysis in R.
   2. Econometric Modelling (Povilas)
      1. Basics in Statistics
         1. Sampling Distributions
         2. Random Variables
         3. Concepts of convergence, law of large numbers, Slutsky’s theorem, central limit theorem
      2. Regression
         1. Conditional Expectation Function
         2. Multiple Regression in Matrix Notation
         3. Frisch-Waugh-Lovell Theorem
         4. Gauss-Markov Theorem
         5. Asymptotics of Ordinary Least Squares
      3. Causality
         1. Program Evaluation (Binary Treatment)
         2. Selection bias
         3. Control variables and proxies
         4. Instrumental variables and two-stage least squares
         5. Testing (Durbin-Wu-Hausman, over-identification tests)
      4. Panel Data
         1. Pooled cross-section and pooled OLS
         2. Fixed effects and within transformation
         3. Differences-in-differences
         4. Synthetic controls, dynamic unobserved factors (time permitting)
   3. DSGE Modeling (Patrick)
      1. Introduction to Dynamic Stochastic General Equilibrium (DSGE) Models
         1. Basics
         2. Real Business Cycle Theory
         3. Solving DSGE Models with Dynare and Dynare++
      2. Introduction to Macro-Finance
         1. Asset Pricing Puzzles
         2. Resolving Asset Pricing Puzzles in DSGE Models
      3. Introduction to New-Keynesian (NK) Models
2. **Exam and Grading** 
   1. There will be a **Take-home exam** with questions on theory and assignments to solve models or problems with the computer.
   2. The grade will solely be based on this take-home exam.
   3. The exam will be sent out by e-mail by 14 December 2017 with a deadline of 14 January 2018.
3. **Literature**

There is no need to study the literature beforehand – which literature to use for which purpose will become clear during the course. Some more references might be added later on.

1. Research Project Design and Statistics with R (ordered according to relevance)

Venables, W. N., Smith, D. M., and the R Core Team. *An Introduction to R – Notes on R: A Programming Environment for Data Analysis and Graphics*, available online at <https://cran.r-project.org/doc/manuals/R-intro.pdf>, 2017.

Nikolov, P. Writing Tips for Economics Research Papers, available online at <http://www.people.fas.harvard.edu/~pnikolov/resources/writingtips.pdf>, 2013.

Maindonald, J., and Braun, J. *Data analysis and graphics using R: an example-based approach*. Cambridge University Press, 2006.

Bonnini, S., Corain, L., Marozzi, M., and Salmaso, L. *Nonparametric Hypothesis Testing: Rank and Permutation Methods with Applications in R*. John Wiley & Sons, 2014.

1. Econometric Modeling

Though the course is not built on a single text, the following one will prove most useful:

Angrist, Joshua D. and Jörn-Steffen Pischke: *Mostly Harmless Econometrics:  
An Empiricist's Companion*, Princeton University Press, 2009.

Compulsory readings include

Acemoglu, Daron, Simon Johnson and James A. Robinson (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American Economic Review*. 91 (5): 1369-1401.

Angrist, Joshua and Alan Krueger (1991). Does Compulsory School Attendance Affect Schooling and Earnings?, *Quarterly Journal of Economics*, 106 (4): 979-1014.

Angrist, Joshua (1990). Lifetime Earnings and the Vietnam Draft Lottery: Evidence from Social Security Administrative Records. *American Economic Review*. 80 (3): 313-336.

Card, David and Alan B. Krueger (1994). Minimum Wages and Employment: A Case Study of the Fast-Food Industry in New Jersey and Pennsylvania. *American Economic Review*. 84 (4): 772-793.

Supplementary readings include

Buse, A. (1982). [The Likelihood Ratio, Wald, and Lagrange Multiplier Tests: An Expository Note](http://www.uh.edu/~cmurray/courses/econ_7331/Trilogy%20of%20Tests.pdf), *The American Statistician*, **3(1)**: 153-157.

Engle, Robert F. [Wald, likelihood ratio, and Lagrange multiplier tests in econometrics](http://www.stern.nyu.edu/rengle/LagrangeMultipliersHandbook_of_Econ__II___Engle.pdf), (1984) in: Z. Griliches & M. D. Intriligator (ed.), *Handbook of Econometrics*,  **1(2)**, Ch 13, 775-826.

Gobillon, L. and T. Magnac (2016). [Regional Policy Evaluation: Interactive Fixed Effects and Synthetic Controls](http://www.mitpressjournals.org/doi/suppl/10.1162/REST_a_00537), *The Review of Economics and Statistics*, **98(3)**: 535-551.

Those with less formal grounding in econometrics are encouraged to consult

Stock, J. H. and M. W. Watson: *Introduction to Econometrics*, Third Edition, Pearson Education, 2014.

Wooldridge, Jeffrey M.: *Introductory Econometrics: A Modern Approach,* Fifth Edition, Cengage Learning, 2013.

Useful more advanced texts in micro and macro-econometrics, respectively, are

Cameron, A. C. and P. Trivedi, *Microeconometrics: Methods and Applications*, Cambridge University Press, 2005.

Pesaran, M. Hashem: [*Time Series and Panel Data Econometrics*](http://ukcatalogue.oup.com/product/9780198736912.do)*,* Oxford University Press, 2015.

1. DSGE Modeling

Galí, J.: Monetary Policy, Inflation and the Business Cycle: an Introduction to the New Keynesian Framework. Princeton University Press, 2008.

Romer, D.: Advanced Macroeconomics. McGraw-Hill, 2011.

Bansal, R., and Yaron, A. (2004): *Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles*, Journal of Finance, 59, 1481-1509.

Croce, M. M. (2014): *Long-Run Productivity Risk: A New Hope for Production-Based Asset Pricing?*, Journal of Monetary Economics, 66, 13-31.

Jermann, U. J. (1998): *Asset Pricing in Production Economies*, Journal of Monetary Economics, 41, 257-275.

Kung, H., and L. Schmid (2015): *Innovation, growth, and asset prices*, Journal of Finance, 70(3), 1001-1037.

Lucas, R. E. (1978): *Asset Prices in an Exchange Economy*, Econometrica, 46(6), 1429-1445.

Mehra, R., and E. C. Prescott (1985): *The Equity Premium: A Puzzle*, Journal of Monetary Economics, 15, 145-161.

Romer, P. M. (1990): *Endogenous Technological Change*, Journal of Political Economy, 98(5), 71-102.

Shiller, R. J. (1981): *Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends?*, American Economic Review, 71(3), 421-436.

Weil, P. (1989): *The Equity Premium Puzzle And The Risk-Free Rate Puzzle*, Journal of Monetary Economics, 24, 401-421.

Dynare User Guide: <http://www.dynare.org/documentation-and-support/user-guide>.

Dynare Manual: <http://www.dynare.org/documentation-and-support/manual>.

Dynare++ Tutorial: <http://www.dynare.org/documentation-and-support/dynarepp>.