ECON-E 724 - Empirical Macro I

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Date created: July 30, 2020

Office Hours: by appointment via Zoom

What this course is about: This course is meant to provide you with tools to write a cutting-edge dissertation in macroeconomics, finance and related fields. As such, it focuses on the set of the most useful time series tools for applied economists. It is *not* an encyclopedic course that lists all topics that at some point were useful - to get you to the frontier, we'll necessarily have to be selective when it comes to topics. Throughout this course we'll mostly focus on a Bayesian approach to inference since it is both computationally and conceptually advantageous relative to other approaches (don't worry though if you don't know yet what Bayesian inference is). As such, we will not cover (interesting) topics such as GMM estimation of time series models etc. If you have an interest in any (time series) topic not listed on the syllabus, let me know - the syllabus can always be changed.
For now, the course is set up to teach one major topic: Multivariate time series models such as Vector Autoregressions (VARs), with a particular focus on how to impose structure from economic models on those time series models. This will be a *hands-on* course. The emphasis will be on you estimating models and writing code, rather than proving theorems. My view is that such an approach is more helpful for the majority of students.
Most of all, this course is meant to be *fun*!

Other related courses: You are lucky in that IU has outstanding faculty working on the intersection between macro and econometrics. Take advantage! I highly recommend you concurrently take ECON-E 672 Macroeconometrics with Joon Park and Yoosoon Chang. In the Spring Laura Liu will teach Empirical Macro II, which will focus on the estimation of DSGE models and hence will be a great complement to this course.

Textbook: There is no required textbook. Having said that, various books are useful:

1. Herbst and Schorfheide, Bayesian Estimation of DSGE Models, Princeton University Press. While we will not study the estimation of DSGE models this semester, the discussion of Bayesian estimation in this book is top notch.

2. Luetkepohl, New Introduction to Multiple Time Series Analysis, Springer. This is the bible on VARs. Not much on Bayesian estimation, though.

3. Kilian & Luetkepohl, Structural Vector Autoregressive Analysis, Cambridge University Press. Everything you'll ever want to know about identifying (the effects of) structural shocks from VARs.

4. Hamilton, Time Series Analysis, Princeton University Press. The standard time series book in econometrics. Takes an encyclopedic approach and as such can be very useful. A bit dated by now though.

5. Canova, Methods for Applied Macroeconomic Research, Princeton University Press. This book covers substantially more than what we will do in this course (it also talks about GMM, panel models etc.). Be warned: this book is very dense, but also potentially very useful.

6. Dejong and Dave, Structural Macroeconometrics, Princeton University Press. A more accessible version of Canova.

7. Sargent, Macroeconomic Theory, Emerald Group Publishing. A classic that is still useful for its discussion of frequency domain methods and univariate time series models.

8. Casella and Robert, Monte Carlo Statistical Methods, Springer. The gold standard in statistics when it comes to texts about Monte Carlo methods, which are used to implement Bayesian inference.

9. Geweke, Contemporary Bayesian Econometrics and Statistics, Wiley. Great book on Bayesian inference by one of the giants in the field.

10. Koop, Bayesian Econometrics, Wiley. Accessible introduction to Bayesian inference.

11. Durbin and Koopman, Time Series Analysis by State Space Methods, Oxford.

12. Cochrane, Time series for macroeconomics and Finance, `http://faculty.chicagobooth.edu/john.cochrane/research/papers/time_series_book.pdf`. Very nice and accessible set of lecture notes.

13. Blake & Mumtaz, Applied Bayesian Econometrics for Central Bankers, `https://www.dropbox.com/s/d2bcxh23p55bt6z/draft2.pdf?dl=0`. Lecture notes for the estimation of VARs and linear DSGE models.

There will be required readings from these books and the papers listed below throughout this class. I will update this syllabus to reflect required readings as we go along.

Prerequisites: You are expected to have completed first year sequences in macro and econometrics. In particular, I will assume that you know how to solve DSGE models using various methods such as log-linearization, higher-order perturbation or global solution methods.

Course Outline:

class 1 ..... course overview, introduction to time series tools (lag operators etc.). Read: Sargent
class 2 .. Introduction to Bayesian inference and MCMC algorithms I. Read: Herbst - Schorfheide
class 3 ..... Introduction to VARs. Likelihood, priors, examples
class 4 ..... VARs: mapping forecast errors into 'structural' shocks: recursive identification, long-run restrictions and sign restrictions I
class 5 ..... VARs: mapping forecast errors into 'structural' shocks: recursive identification, long-run restrictions and sign restrictions II
class 6 ..... Estimating Moving Average Models. Time permitting, we might dig deeper into issues of invertibility here.
class 7 ..... Local Projections
class 8 . Applications: Monetary shocks (High Frequency identification etc.)

class 9 ..... Applications: Fiscal shocks and technology shocks

class 10 ..... Applications: Uncertainty shocks / News shocks

class 11 ..... Linking empirical macro to recent work in applied micro

class 12 ... VARs: relationship to dynamic equilibrium models. Read: Fernandez-Villaverde, Rubio, Sargent and Watson (AER).

The rest of the term will be devoted to in-class presentations and catching up if topics required more time. Time permitting we might also discuss dynamic factor models in more detail.

Grade Policy: I will assign 3 homework assignments that count for 30 percent of the grade. You will be asked to present your solutions in class.
You will also have to write 2 research proposals throughout the semester (approximately two pages each). These proposals will count for 50 percent of the grade. You'll have to clearly state the question, the data you aim to use, as well as the methods you want to use. Most importantly, you will have to tell me how this idea adds to the existing literature. This might seem daunting, but is really meant to help you getting started with the process of doing research. I discard most research ideas I have, and I suspect you will do the same. Don't get discouraged! This should also help you to get going with any paper requirements IU has for third year students. The remaining 20 percent of the grade will be determined by an in-class presentation of a paper on the last day of class. We will decide together what paper you will present. I have some papers in mind, but we can always adjust so that there is overlap between the papers and your interests.
We will discuss due dates in class.

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