COURSE OUTLINE AND READING LIST

There will be 12 lectures. The dates in the right-hand margin are a rough guide that may have to be modified. Because some topics span more than one lecture, not every lecture date is listed in the margin. The Hamilton (1994) book is a comprehensive reference, which you have probably already bought for the first part of the course. The Bauwens, Lubrano, and Richard (1999) book is closer in approach to this course than is Hamilton's but because of its variations in mathematical level and choice of topics only parts of it are assigned reading. Schervish (1995) is at a higher mathematical level than this course, but is an excellent book and worth purchasing if you contemplate research in econometrics. Unfortunately it seems to have become unavailable for purchase anywhere this year. Much of it assumes knowledge of basic measure theory. Robert (1994) is a theoretically oriented Bayesian statistics textbook. Bernardo and Smith (2000) is a clear, though extensive, discussion of the foundations of Bayesian inference. (The Robert and Bernardo-Smitt books were not ordered via the PU store, but should be available at the library or via Amazon.) Gelman, Carlin, Stern, and Rubin (1995) is a more applied Bayesian statistics book. It has a more thorough treatment of some topics we will cover (such as Markov Chain Monte Carlo methods) than does Bauwens et al, but has no econometric examples or applications. Buying both Gelman et al and Bauwens et al would be a luxury, though a possibly useful one.

(1) Bayesian Preliminaries 11/5
- The course will reflect a Bayesian perspective on inference and will assume familiarity with it at least at the level of last year's lectures on the topic in 517, for which the notes are listed below. The only readings here that are required for now are the lecture notes (if you were not in 517 last year) and the Hildreth paper.

  Notes on Bayesian Basics
  (Berger and Wolpert, 1988)
  (Sims and Zha, 1998b, sections 1, 2 ,4-6)
  (Schervish, 1995, sections 1.1-1.4, 2.1-2.3,3.1-3.2)
  (Robert, 1994, p.?)
  (Hildreth, 1963)
  (Sims and Uhlig, 1991)

(2) Bayesian asymptotics
- Type A: Approximating the true likelihood as Gaussian, centered at MLE
- Type B: Conditioning on asymptotically normal statistics, rather than on the full sample.
- Correspondences between Bayesian and classical distributions in large samples.

- Examples of Bayesian and classical inference leading in different directions: unit root time series models; inference about the location of a "break" in the sample; model choice, or more generally models with discrete parameters; models with large numbers of parameters relative to data points.

(3) Mechanics of priors and posteriors for linear Gaussian models
- (You're supposed to know this already. We won't go over it in class.)

(Bauwens, Lubrano, and Richard, 1999, section 2.7)

(4) Testing restrictions: Schwarz and Akaike criteria, model selection 11/7
(a) Bayes Factors
(b) Derivation of SC (BIC) from Gaussian asymptotics
(c) Adaptation of SC to trending regressors, non-stationary models
(d) Priors over sequences of models: sieves; choosing lag length

Notes: "Testing Restrictions and Comparing Models"
(Schervish, 1995, sections 4.1-4.2, 4.6)
Kwan (1998)

(5) Importance Sampling, Metropolis-Hastings MCMC 11/12,18
(a) Importance sampling and its pitfalls
(b) Metropolis Markov Chains and their pitfalls
(c) Metropolis-Hastings
(d) "Gibbs" Sampling
(e) Application to factor models

(Hamilton, 1994, section 12.3)
Gelman, Carlin, Stern, and Rubin (1995), Chapter 11
Notes: "Proof of Fixed Point Property for Metropolis Algorithm"

(6) Hidden Markov chain models 11/19
(a) Structural breaks
(b) Regime shifts
(c) Approximation to parameter change and stochastic volatility models

Hamilton (1994), Chapter 22
Chib (1996)

(7) High-order and multivariate AR models 11/21
(a) Review of multivariate linear stochastic difference equations (some of this to be reviewed in precept rather than lecture)
  (i) Roots to qualitatively characterize models
  (ii) Impulse response functions
    (A) Impulse responses vs. ACF's as data summaries
  (iii) Exogeneity, Granger causality, Wold and Granger causal orderings
  (iv) Structural VAR's and identification
    (A) Delay restrictions
    (B) Long run restrictions
    (C) Restrictions on impulse responses

(Hamilton, 1994, Chapters 10.1-10.3)

(8) Modeling initial conditions and "trend" 11/26
  (a) High-order AR + conditioning on initial conditions + flat prior ⇒ belief in likely historical uniqueness of sample start date
  (b) Unit roots
  (c) Cointegration
  (Sims, 2000)
  (Sims, 1989)
  (Sims, revised 1996)
  (Hamilton, 1994, section 19.1)

(9) Dummy-observation priors for VAR's 11/28
  (Sims and Zha, 1998a)
  Notes: Dummy observation priors

(10) Inference: formulating, using, testing restrictions or priors on VAR's 12/3,5
  (a) Recursiveness restrictions
    (i) Exogeneity and likelihood structure
      (Bauwens, Lubrano, and Richard, 1999, sections 2.6, 5.2.1-2)
  (b) Priors and restrictions for structural VAR's
    (i) Litterman/Leeper/Sims/Zha
    (ii) Long run restrictions
    (iii) Priors on impulse responses
    (iv) Reduced form vs. structural parameters as space for prior
    (v) Error bands for impulse responses
    (Hamilton, 1994, Chapters 11, and 9, section 12.2)
    Notes: "Granger Causality" (There is some redundancy between these notes and the set below.)
    Notes: Likelihood for VAR systems
    Blanchard and Quah (1989)
    Leeper, Sims, and Zha (1996)
    Sims and Zha (1998a)
    Sims and Zha (1998b)

(11) Panel data VAR's 12/10
  Canova and Ciccarelli (2001)

(12) Data summary vs. structure 12/12
  (a) Structural models vs. "reduced form" models
  (b) Calibration vs. "estimation"
  (c) Looking for a true model vs. characterizing flaws of false models
  (Schorfheide, 1998)
  (Sims, 1996)
  (Rissanen, 2001, optional)

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