STATTA

CONSTRUCT AN ML FUNCTION

FORECASTING EVALUATION

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OFFICE HOURS: TR 3:30-5:00, and by appointment (you can call me anytime)

TEXTS

During the semester, we will use a variety of sources and much of the material we consider will appear in more than one place. The following books will provide the core of the material that we will study during most of the semester. They should be available in the bookstore or over the web.

Francis X. Diebold: *Elements of Forecasting* (4th edition)


The following text will help you to understand Stata procedures that we will use in this class. It is not required but is highly recommended:

Sean Becketti: *Introduction to Time Series Using Stata*

This book is available on-line through the Stata Bookstore or through Amazon.

Other texts that we will use this semester are listed below. Most, if not all of these will be available through the reserve desk at the library. If you cannot locate a book, please get in touch with me and I will loan you my copy on a short-term basis.

Michael P. Clements and David F. Hendry: *A Companion to Economic Forecasting* (An edited volume containing papers describing many different aspects of economic forecasting. A worthwhile purchase if you plan to pursue forecasting for a career.)

C. W. J. Granger and Paul Newbold: *Forecasting Economic Time Series* 2nd edition (A nice review of many time series techniques; not too advanced)

M. Hashem Pesaran and Mike Wickens: *Handbook of Applied Econometrics: Macroeconomics* (A group of articles dealing with various techniques employed by macro-econometricians.)
Russell Davidson and James G. MacKinnon: *Estimation and Inference in Econometrics* (A comprehensive handbook, graduate level.)

James D. Hamilton: *Time Series Analysis* (An encyclopedia of time series techniques; more advanced than Davidson and MacKinnon.)

Andrew Harvey: *The Econometric Analysis of Time Series*, 2nd edition (A nice companion to Diebold's book; it covers many of the same topics in more detail)

Spyros Makridakis, Steven C. Wheelwright, and Rob J. Hyndman: *Forecasting: Methods and Applications*, 3rd edition (An undergraduate textbook; simple & straightforward)


**Course Structure:**

This course will acquaint you with a variety of econometric topics in the areas of forecasting and time series analysis. Some of the topics covered this semester are forecast construction and evaluation, time series analysis, model development, estimation techniques for multi-equation models, and simulation.

The primary goal of the course is to give you hands-on experience with these different techniques so that you are familiar with them and able to apply them in your professional career. Thus there will be a number of homeworks throughout the semester. Your performance on these homeworks constitutes 70% of your final grade. While I expect that you will cooperate on the homework, it is important that, in the end, you do your own work. If you simply copy your answers from someone else, you will lose credit for the homework. The last page of this syllabus contains the IUPUI policies on academic dishonesty.

A research paper is also required for the class. The paper must utilize the time series techniques that we study during the semester. It may either be in the area of applied econometrics or forecasting. The paper constitutes 30% of your final grade. Your grade on the paper will be based on how well you demonstrate a command of the tools that we use this semester. Students generally write a forecasting paper. If you do this, a good grade will require a brief literature review justifying your forecasting model, description of the data, optimal model selection, ex post forecast evaluation and ex ante forecasts (these terms will be defined during the semester).

There are no exams in E574. However, depending on my impression of your progress during the semester, there may be an in-class quiz the last day of class. If this quiz is given, it will be open book and worth one homework.

**SOFTWARE**

This semester we will rely heavily on Stata (available through IUANYWARE: https://iuanyware.iu.edu/vpn/index.html) and, occasionally Excel.
Some Web Resources

For data on GDP and the various components of the National Income Accounts:
http://www.bea.gov/
This site is sponsored by the Bureau of Economic Analysis within the US Department of Commerce.

For data on money, interest rates, prices, and exchange rates:
http://research.stlouisfed.org/fred2/
This site is sponsored by the Federal Reserve Bank of St. Louis.

For data on consumer prices and the unemployment rate:
http://www.bls.gov/
This site is sponsored by the Bureau of Labor Statistics within the US Department of Labor.

For information about the Business Cycles (especially the official date for recessions):
http://www.NBER.org/ (go to the bottom of the page)
This site is sponsored by the National Bureau of Economic Research. This is a private research organization. There is a small group of economists sponsored by the NBER called the "Business Cycle Dating Committee" whose responsibility is to determine the months in which a recession begins and ends. Their dates are based on movements in a broad array of individual variables.

For information on economies around the world:
http://www.worldbank.org/
The World Bank is a global organization that collects funds from developed countries and channels these funds to less-developed countries in order to finance projects that will enhance the nation's productivity.
http://pwt.econ.upenn.edu/php_site/pwt_index.php
This site contains the Penn World Tables, an ongoing panel data set of macroeconomic data for economies around the world.
COURSE OUTLINE

Prior to the start of the semester, you should brush up on Stata by working through Ch. 1 in Becketti's text.

WEEK 1: DYNAMIC MODELS AND DIFFERENCE EQUATIONS
Enders, Ch. 1.

WEEKS 2: REVIEW OF REGRESSION
Harvey: Ch. 2; Diebold, Ch. 2, Ch. 11.1-11.2, Becketti, Ch. 2

WEEK 3: MAXIMUM LIKELIHOOD
Davidson and MacKinnon, Ch. 8; Diebold, Ch.14 (scan);

WEEK 4: SERIAL CORRELATION
Davidson and MacKinnon, Ch. 10; Becketti, Ch. 5; Greene, Ch. 13

WEEK 5-6: FORECASTING
Diebold, Ch. 1, 3, 12; Becketti, Ch. 4
Clements and Hendry, “An Overview of Economic Forecasting,” in A Companion to Economic Forecasting

WEEK 7: TREND AND SEASONALITY
Diebold, Ch. 5, 6; Enders, Ch 4.1; Makridakis, et. al., Ch. 4

WEEKS 8-10: MODELING CYCLES
Enders, Ch. 2; Diebold, Ch. 7-9; Becketti, Ch. 6 & 7;
Makridakis, et. al, Ch. 7&8; Granger and Newbold, Ch. 1

WEEK 11: UNIT ROOTS
Enders, Ch. 4; Diebold, Ch. 13; Davidson and MacKinnon, Ch. 20;
Becketti, Ch. 10

WEEK 12-14: MULTI-EQUATION MODELS
Enders, Ch. 5; Diebold, Ch. 11; Becketti, Ch. 10
Craig S. Hakkio and Charles S. Morris: "Vector Autoregressions" A User's Guide" (provided)
Adrian R. Pagan and John C. Robertson: "Resolving the Liquidity Effect,"
WEEK 15: COINTEGRATION

Enders, Ch. 6


WEEK 16(?): KALMAN FILTER

Handout

I adhere to the IUPUI policies on academic dishonesty below. If you violate these policies, you will receive a substantial reduction in your score on the relevant assignment.

Cheating: Cheating is dishonesty of any kind with respect to examinations, course assignments, alteration of records, or illegal possession of examinations. It is the responsibility of the student not only to abstain from cheating, but, in addition, to avoid the appearance of cheating and to guard against making it possible for others to cheat. Any student who helps another student to cheat is as guilty of cheating as the student assisted. The student should also do everything possible to induce respect for the examining process and for honesty in the performance of assigned tasks in or out of class.

Plagiarism: Plagiarism is the offering of the work of someone else as one’s own. Honesty requires that any ideas or materials taken from another source for either written or oral use must be fully acknowledged. The language or ideas taken from another may range from isolated formulas, sentences, or paragraphs to entire articles copied from books, periodicals, speeches, or the writings of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment is also considered plagiarism. Any student who fails to give credit for ideas or materials taken from another source is guilty of plagiarism.