

Econometric Forecasting

Spring 2015

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Office Hour: Tuesdays and Thursdays 2-3. Office is McNeil Room 512.

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This course provides an upper-level undergraduate introduction to forecasting, broadly defined, in economics and related fields.

Prerequisites: ECON 101, 102, and 104. MATH 104 and either MATH 114 or 115.

Wharton students can satisfy the ECON 101 prerequisite with BEPP 250 HONORS. The regular BEPP 250 course does not count as a substitute for ECON 101.

Key requirements are a background in (1) probability/statistics and (2) introductory econometrics.

Course Policies: The Economics department course policies, available at

<http://economics.sas.upenn.edu/undergraduate-program/course-information/guidelines/policies>

all apply.

Books:

- The primary book is Frank Diebold's open text:
<http://www.ssc.upenn.edu/~fdiebold/Teaching221/Forecasting.pdf>
- The secondary book is "The Analysis of Time Series: An Introduction", Chris Chatfield, 6th Edition, Chapman and Hall.
- On the lighter side, we will also read parts of "The Signal and the Noise: Why so Many Predictions Fail—But some don't" by Nate Silver, Penguin Press.

Syllabus: Topics to be covered potentially include but are not at all limited to: regression from a predictive viewpoint; conditional expectations vs. linear projections; decision environment and loss function; the forecast object, statement, horizon and information set; the parsimony principle, relationships among point, interval and density forecasts; forecasting trends and seasonals; model selection for forecasting; characterizing, modeling and forecasting cycles with ARMA and related models; Wold's theorem and the general linear process; nonlinearities and regime switching; the chain rule of forecasting; optimal forecasting under symmetric and asymmetric loss; recursive and related methods for diagnosing and selecting forecasting models; formal models of unobserved components; conditional forecasting models and scenario analysis ("stress testing"); vector autoregressions, predictive causality, impulse-response functions and variance decompositions; use of survey data; business cycle analysis using coincident and leading indicators: expansions, contractions, turning points, and leading indicators; incorporation of subjective information; Bayesian VARs and the Minnesota prior; evaluating a single forecast; comparing forecast accuracy; encompassing and forecast combination; combining forecasts;

preliminary series, revised series, and the limits to forecast accuracy; prediction markets; unit roots, stochastic trends, stochastic trends and forecasting; unit roots; smoothing; ARIMA models, smoothers, and shrinkage; using stochastic-trend unobserved-components models to implement smoothing techniques in a probabilistic framework; cointegration and error correction; evaluating forecasts of integrated series; volatility forecasting via GARCH, stochastic volatility and realized volatility.

Software: EViews will be the main software used. You are welcome to use R, Matlab or Python in problem sets if you prefer. EViews is available for purchase directly from Eviews at a massive discount, thanks to Penn's site license. Be sure to buy the full version, not the student version.

Grades:

- Problem Sets: 40 percent. There will be 5 problem sets, and I will drop the lowest one. Under no circumstances will late problem sets be accepted. Dropping one is your insurance policy for unforeseen events. Use it wisely!
- Final Exam: 40 percent.
- Class participation: 20 percent. This is meant to be an interactive course.