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Econ 220
Time Series Econometrics
Barbara Rossi

SYLLABUS

The objective of the course is to provide basic ‘spells’ to analyze data, estimate theoretical (simple) models, and hopefully teach you to love time series econometrics.

Classes are M-W 10:05-11:20AM in Room 229.

My office is Room 204, Social Science Building, phone 660 1801, email: brossi@econ.duke.edu. Please feel free to stop by at any time during office hours, M-W 2:30-3:30PM.

Note that this course builds on Econ139-239, which is therefore required, and requires knowledge of linear algebra.

There will be problem sets approximately every two weeks. Exams will be discussed in class.

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Reading list and references

The books that we will use are available at the Duke University Store and are:

Stock and Watson, Introduction to Econometrics, Addison Wesley (abbr. SW)

(you should already have this book if you took Econ 139-239 – you should be familiar with the material covered in Parts 1-3, which we will briefly review during the first week. We will mainly focus on Part Four in this course)

Hamilton, Time Series Analysis, Princeton University Press (abbr. H)

(this is a more advanced book that covers similar topics but at a much deeper level)

Diebold, Elements of Forecasting

(this book is optional)

The list of topics is as follows (in parenthesis, you can find the assigned chapters to read in the books – one star means “harder – you can skip what we did not cover in class”, three stars mean “really very hard and not required except for what explained in class”).

WEEKS 1-2: Review of OLS & asymptotic distribution theory: convergence in probability and in distribution, LLN, CLT, Slutsky and CMT. Review of hypotheses tests and conditional homoskedasticity.

SW 4-5

SW 15

WEEK 3: Introduction to Time Series data -- Covariance stationary processes: ARs, MA's and ARMA processes, and the correlogram, Forecasting and Lag length selection
SW 12.2, 12.3, 12.4
H 3.1-3.5, 4, 10

WEEK 4-5: Non-stationarity: trends (deterministic and stochastic) and unit root tests: consequences, detection, remedies
SW 12.6
H 15, 16***, 17***

WEEK 6: Non-stationarity: breaks, and tests for a structural break at a known and at an unknown break date (Chow and Andrews' QLR tests)
SW 12.7

WEEK 7: Estimation of Dynamic Causal effects w/ exogenous regressors, and dynamic multipliers
SW 13.1, 13.2, 13.3

HAC robust estimation for serial correlation
SW 13.4

WEEK 8-9: GMM Estimation and IV: exactly identified and overidentified models, asymptotic properties and distribution, efficient GMM and tests for overidentifying restrictions
H

WEEK 10: MLE: asymptotic properties, OLS as a special case, and relationship with GMM
H

WEEK 11: GLS estimation, Cochrane Orcutt and the Elliott-Rothemberg-Stock ADF-GLS efficient test for unit root
SW 14.3

WEEK 12: VARs: estimation, identification by recursive ordering, Impulse Responses, variance decomposition and forecasting
SW 14.1, H 11
Stock and Watson, VARs, Journal of Economic Perspectives

OPTIONAL: Cointegration
SW 14.4, H 19***, 20***

NOT COVERED: Conditional heteroskedasticity: ARCH models
SW 14.4
H 21
Engle, GARCH 101, Journal of Economic Perspectives

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