

Economics 510
Applied Econometrics for Macroeconomics

Fall 2016

Contact Details

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Course Details

Lecture: Monday 9:50 AM - 11:10 AM, NJ-105
Thursday 9:50 AM - 11:10 AM, NJ-105

Required Textbook

Hamilton, J.D., (1994), *Time Series Analysis*, Princeton: Princeton U. Press.

Other Useful Textbooks

Francq, Christian and Zakoian, Jean-Michel, (2010), *GARCH Models: Structure, Statistical Inference and Financial Applications*, Wiley.

Cryer, Jonathan D. and Chan, Kung-Sik, (2008), *Time Series Analysis With Applications in R*, 2nd Edition, Springer.

Iacus, Stefano M., (2008), *Simulation and Inference for Stochastic Differential Equations With R Examples*, Springer.

Jacod, J. and Protter, P., (2011), *Discretization of Processes*, Springer.

Topics to be Covered

Part I. Discrete Time Modeling of Risk: GARCH Models

- GARCH(p,q) process
 - Strict stationarity and second-order stationarity
 - Moments and autocovariances
- Identification and Estimation
 - Identifying the GARCH orders

- Lagrange multiplier test for conditional homoscedasticity
- Estimating ARCH models by least squares
- Estimating GARCH models by quasi-maximum likelihood
- Statistical inference
 - Test of the second-order stationarity assumption
 - Significance of the GARCH coefficients
- Extensions
 - Generalized autoregressive score (GAS) model
 - Multivariate GARCH processes

Part II. Continuous Time Modeling of Risk: Stochastic Volatility and Jumps

- Introduction to stochastic process
 - Stochastic integral and stochastic differential equation
 - Brownian motion
 - Poisson process
- Volatility
 - Integrated volatility
 - Spot volatility
 - Volatility occupation time
- Jumps
 - Identification of jumps
 - Jump activity and jump tail behavior
 - Self- and mutual excitation of jumps
- Financial applications
 - Risk premia
 - Macro news and price jumps