Time Series Econometrics
Econ 835

Instructor: N. Kundan Kishor

E-mail:-kishor@uwm.edu

Time and Location: MW 11:00AM:12:15PM, NWQB G567.

Office Hours: MW 1-2 PM, or by appointment.

Office: Bolton 822

1 Course Objectives

The last few decades has witnessed an explosion in macroeconometric work that estimates various macroeconomic and finance models. Most of the empirical work in macro and finance uses time series econometric techniques. The goal of this course is to introduce time series models that are applied widely. This course will stress models and methods over formal proofs. Class work is largely mathematics, intuition building, and examples of computer use. Homework emphasizes hands-on computer work.

2 Prerequisites

The official prerequisite for this course is ECON 735. I will assume that all of you have already taken at least a semester of mathematical statistics. You should also be comfortable with algebraic manipulations, basic statistical concepts. If you have not mastered the prerequisite skill, then you must expect to spend additional time. The mathematical appendix in Hamilton gives a very good summary of useful mathematical and statistical tools.

3 Required Materials

The required textbook for this course is

- Time Series Analysis, by James D. Hamilton, Princeton University Press, 1994.
- Time Series for Macroeconomics and Finance, by John Cochrane, unpublished lecture notes, updated 2005. Available from Cochrane's web site in Adobe Acrobat
- State-Space Models with Regime Switching, by Chang-Jin Kim and Charles R. Nelson, MIT Press, 1999.

3.1 Other Useful Books in Time Series Econometrics:

- Time Series Models, Second Edition, by Andrew Harvey, MIT Press, 1993.
- Applied Econometric Time Series, Second, Edition, by Walter Enders, Wiley, 2004.
- Structural Macroeconometrics, by DeJong and Dave, Princeton University Press, 2011.
- An Introduction to Multiple Time Series Analysis by Helmut Lutkephol, Springer, 2007.

4 Miscellaneous

If you have special needs, requests, requirements, please let me know immediately.

5 Grading

Your grading is based on 7-8 assignments (35%), class project (35%), one midterm exam (25%), and class participation (5%). Everyone must turn in their own homework, but collaboration is permitted. Collaboration on the computer assignments is encouraged! You also have to write a term paper for this course. The grade on the term paper depends on both substance and presentation.

6 Software Information

We will be using econometric/statistics software **R** in this class. **R** is an open source software. It is widely used in the industry and academia. The detailed information about **R** is given on

https://www.r-project.org/. There will be regular demonstration of the forecasting methods using **R** in the class. Make sure to download a copy of the software as soon as possible. I'll also post links to useful websites for the use of this software.

7 Policy Regarding Make-up Exams

In the normal circumstances, there will be no make-ups for the exam. If you can't take exam at the scheduled time because of personal, health and employment related reasons please let me know as soon as possible.

8 Our Road Map

1. *Stationary Univariate Models*

   C, chapters 1-4, and 6

   H, chapters 1- 3.

2. *Volatility Modeling*

   H, chapter 21

   Zivot, E. (2008). "Practical Issues in the Analysis of Univariate GARCH Models," forthcoming in the Handbook of Financial Time Series.

   Diebold, F.X. and J. Lopez (1995). "Modeling Volatility Dynamics," NBER Technical Working Paper No. 173.

   Engle, R.F. (2000). "What Good is a Volatility Model," unpublished manuscript, Stern School of Business, NYU.

   Engle, R.F. (2001). "GARCH 101: The Use of ARCH/GARCH Model in Applied Economics," Journal of Economic Perspectives, 15(4), 157-168.

3. *Univariate Nonstationary Models and Unit Root Tests*

   C, chapter 10

H, chapters 15, 17

Nelson, C.R. and C.I. Plosser (1982), "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications," Journal of Monetary Economics, 10, 139-162.

Stock, J.S. and M. Watson (1988), "Variable Trends in Economic Time Series," Journal of Economic Perspectives, Vol 2, No. 3. Available in JSTOR.

Phillips, P.C.B. and Z. Xiao (1997), "A Primer on Unit Root Testing," Cowles Foundation Discussion Paper.

Campbell, J. and G. Mankiw (1987), "Are Output Fluctuations Transitory?," American Economic Review.

Phillips, P.C.B., Y. Wu, and J. Yu. (2011),"Explosive Behavior in the 1990s NASDAQ: When did Exuberance Escalate Asset Values?," International Economic Review, 52, 201-226.

4. *State Space Models*

H, chapter 13

C, chapter 5

Kim and Nelson, chapter 2.

Kim, Chang-Jin (2008)," Dealing with Endogeneity in Regression Models with Dynamic Coefficients," Foundations and Trends in Econometrics, 3(3), 165-266.

5. *Trend Cycle Decomposition*

Kim and Nelson, chapter 2.

Beveridge, S. and C.R. Nelson (1981), "A New Approach to Decomposition of Economic Time Series into Permanent and Transitory Components with Particular Attention to Measurement of the Business Cycle," Journal of Monetary Economics, 7, 151-74.

Clark. P.K. (1987), "The Cyclical Component of U.S. Economic Activity," Quarterly Journal of Economics. Available in JSTOR.

Morley, J., C.R. Nelson and E. Zivot (2003), "Why are Beveridge Nelson and Unobserved Components Decompositions of GDP so Different?," Review of Economics and Statistics.

Lettau, Martin and Sydney C. Ludvigson (2004),"Understanding Trend and Cycle in Asset Values:Re-evaluating the Wealth Effect on Consumption," American Economic Review

Nelson, Charles, R. (2008) ."The Beveridge-Nelson decomposition in retrospect and prospect." Journal of Econometrics, 146(2): 202-206.

6. *VAR Models*

C, chapter 7

H, chapters 10, 11.1-11.6

Canova, F. (1995), "The Economics of VAR Models," chapter 3 in Hoover, K.D. (ed.) Macroeconometrics: Developments, Tensions, and Prospects, Kluwer.

Sims, C.A. (1980), "Macroeconomics and Reality," Econometrica, 48, 1-48. Available in JSTOR.

Stock and Watson (2001), "Vector Autoregressions", Journal of Economic Perspectives, 15(4).

Blanchard, O.J. and D. Quah (1989), "The Dynamic Effects of Aggregate Demand and Supply Disturbances," American Economic Review, 79, 655-673. Available in JSTOR.

Rigobon, Roberto (2003)," Identification Through Heteroskedasticity," Review of Economics and Statistics, 85(4), 777-792.

Faust, Jon, Eric Swanson and John Wright (2004),"Identifying VARS based on high frequency futures data ," Journal of Monetary Economics, 51(6), 1107-1131.

Kilian, Lutz (2012)," Structural Vector Autoregressions" Handbook of Research Methods and Applications in Empirical Macroeconomics, edited by Hashimzade, N. and Thornton M., Edgar Publisher.

Uhlig, Harald (2005),"What are the effects of monetary policy on output? Results from an agnostic identification procedure," Journal of Monetary Economics, 52(2), 381-419.

7. *Cointegration Models*

C, chapter 11

H, chapters 18; chapter 19, section 1.

Campbell, J.Y. and P. Perron (1991), "Pitfalls and Opportunities: What Macroeconomists Should Know About Unit Roots," NBER Macroeconomics Annual, Cambridge, MA: MIT Press.

Watson, M. (1995), "VARs and Cointegration" chapter 47 (sections 1-3) in Handbook of Econometrics, Vol 4.

Stock, J.S. and M. Watson (1988), "Variable Trends in Economic Time Series," Journal of Economic Perspectives, Vol 2, No. 3. Available in JSTOR.

Lettau, Martin and Sydney C. Ludvigson (2001), "Consumption, Aggregate Wealth and Expected Stock Returns," Journal of Finance,56(3),815-849.

8. *Forecasting*

H, chapters 4 (pgs. 72-85, 102-113)

Diebold, F.X. (1998), "The Past and Present of Macroeconomic Forecasting," Journal of Economic Perspectives, 12, 175-192.

Diebold, F.X. and R.S. Mariano (1995), "Comparing Predictive Accuracy," Journal of Business and Economic Statistics, 13, 253-265. Re-printed in Journal of Business and Economic Statistics, 20(1), 134-145, January 2002.

Mark, N. (1995), "Exchange Rates and Fundamentals: Evidence on Long-Horizon Predictability," American Economic Review. Available in JSTOR.

Stock, J.S. (2001). "Forecasting Economic Time Series," chapter 27 in Baltagi (ed.) A Companion to Theoretical Econometrics, Basil Blackwell.

Lettau, Martin and Sydney C. Ludvigson (2001), "Consumption, Aggregate Wealth and Expected Stock Returns," Journal of Finance,56(3),815-849

Orphanides, Athanasios, and Simon van Norden (2005)," The Reliability of Inflation Forecasts Based on Output Gaps in Real-Time," Journal of Money, Credit and Banking, pp 583-601.

Croushore, Dean (2011),"Forecasting with Real-Time Vintages" Oxford Handbook of Forecasting.

9. *Markov Switchng Models*

   Kim and Nelson, chapter 3

10. *Structural Break Models*

    Andrews, D.W.K. (1993), "Tests for Parameter Instability and Structural Change with Unknown Change Point," Econometrica, 59, 817-858.

    Andrews, D.W.K. and W. Ploeberger (1994), "Optimal Tests When a Nuisance Parameter is Present Only Under the Alternative," Econometrica, 62, 1383-1414.

    Bai, J. and P. Perron (1998), "Estimating and Testing Linear Models with Multiple Structural Changes," Econometrica, 66, 47-78.

    Bai, J. and P. Perron (2002), "Computation and Analysis of Multiple Structural Change Models," Journal of Applied Econometrics, 18, 1-22.

    Hansen, B.E. (1992). "Testing for Parameter Instability in Linear Models, Journal of Policy Modeling, 14(4), 517-533.