UNIVERSITY OF OKLAHOMA - NORMAN

Econometrics III

ECON 6343 (Spring 2019)

TIME: TUESDAYS AND THURSDAYS 9:00 - 10:15 AM
ROOM: Physical Science Ctr, 0228

Instructor: Kim, Jaeho
Office: CCD1 428

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Office hours: Tuesdays and Thursdays 4:00-5:00 pm

Required Textbook:

1. *State-Space Models with Regime Switching*, by Chang-Jin Kim and Charles R. Nelson, MIT press, 1999.
2. *Time Series Analysis*, by James D. Hamilton, Princeton University Press, 1994.

The required text books are enough for our discussion. Additional materials used in class will be posted in our class website. (ozone.ou.edu)

Optional Textbook:

1. *Econometric Modelling with Time Series: Specification, Estimation and Testing* by Vance Martin, Stan Hurn, David Harris, Cambridge University Press
2. *Modelling Nonlinear Economic Time Series 5th edition* by Timo Terasvirta, Dag Tjostheim, Clive W. J. Granger, Oxford University Press
3. *Time Series Analysis*, by James D. Hamilton, Princeton University Press, 1994.

Course Description:

Econometric III is an advanced time series course to learn various statistical models and techniques used to investigate economic time series data. Time series analysis is an indispensable ingredient in economic research in that it helps to understand important dynamic patterns and causal relationships in actual economic data. The goals of the course are threefold: (1) develop a comprehensive set of tools to analyze various forms of univariate and multivariate time series; (2) learn how to use STATA, and MATLAB to estimate time series models; (3) survey some of the current research topics in time series econometrics and develop your own research topic.
The first block of the course presents the intensive theory of univariate stationary and non-

stationary time series variables. The second block covers multivariate time series issues such as VAR models, and cointegration with a special focus on financial and economic applications. The third block of the course deals with State-space models and Kalman Filter (ARIMA models, Time-varying parameter models, Unobserved Component model, Dynamic Factor models, and Markov-Switching models,…) The last block consists of some advanced topics recently popular in time series econometrics.

Prerequisites:
A good grasp of basic mathematical statistics and linear algebra is necessary for this course. I will assume everyone has taken the first year econometrics sequence.

Grading Policy:
There will be several homework, and two exams for this course. Homework will be passed out every two weeks approximately. **Every student must submit a complete research papers by May 10. For the last week of this semester, some selected students will present their works in class. You should get started with your project as soon as possible. Do not wait until the last minute.** Your final grade will be calculated in the following manner:

(100% = Midterm exam 30% + Final exam 30% + Independent Research 30% + homework 10%)

Exams:
Each exam will count for 30% of your grade, respectively. They are not cumulative. Each exam will be about 1 and half hour in length and are closed book. There is no make-up exam for midterm exam. (If you already know that you cannot take midterm exam, you will not be able to take this class.) If you could not take final exam for an avoidable situation, one more chance will be given with an official document to prove it. If you are not in the condition to re-take the exam, 70% of the average of all the scores from homework, and the first exam will be given for the second exam with an official document.

Midterm exam is scheduled on Thursday March 14, 2019, 09:00~10:15 AM, PHSC 228
Final exam is scheduled on Wednesday, May 08, 2018, 8:00~10:00 AM, PHSC 228

Independent Research:
Your research paper should contain the following contents.

1. Introduction and Motivations for your research
2. The literature review
3. Econometric Models
4. Empirical Results
5. Economic implications
6. Summary and Conclusions

First, think about a researchable and interesting economic problem. (To conduct your research, relevant data should be available.) It is good to find a topic worth investing your valuable time.
Second, search for similar studies. It is totally fine just to replicate the empirical results of the existing studies or update them by borrowing econometric models or using different data sets. But make sure to mention in your paper how you can make a marginal or significant contribution to the existing studies.
Third, do not try to be ambitious. As long as the implications in your paper economically make a sense, employing a simple time series model is totally fine. Always think about how to make an econometric model as simple as possible and avoid complicating models.

Homework:

Homework will be given out in class on particular Thursdays. They are meant as a guideline on how well you understand the material presented in class and in the textbook. To get a good grade from this course, you should be able to understand and solve all the problems in the homework. **Note that basic STATA and Matlab skills will be required to complete the homework.**

Tentative Course Schedule and References

1. Stationary Univariate Models:
Stochastic Difference Equations, Wold Representation, Stationary, Properties or stationary proce ss in time domain, ARMA representation, the autocorrelation function, and Prediction Error D ecomposition.

- Lecture Note

2. Introduction to Univariate Nonstationary Time Series and Unit Root:
Beveridge-Nelson decomposition, Functional Central Limit Theorem, Asymptotics for Nonstationary Process. Tests for Unit Roots.

- Lecture Note

- Beveridge, S. and Nelson, C. R. (1981). A new approach to decomposition of economic tim e series into permanent and transitory components with particular attention to measurement of the 'business cycle'. Journal of Monetary Economics 7, 151-174.

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

- 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.

• 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.

• P. Perron and T. Wada (2009) , "Let's take a break: Trends and Cycles in US real GDP," Journal of Monetary Economics, vol 56, 749-765.

3. Introduction to Stationary VAR Models:

Recursive VAR, Structural VAR models, Long-run and Short-run Restriction, and Multivariate Beveridge-Nelson decomposition.

• Lecture Note

• Blanchard, O.J. and D. Quah, 1989, The Dynamic Effects of Aggregate Demand and Supply Disturbances, American Economic Review 79, 655-673.

• Eichenbaum, M. and C.L. Evans, 1995, Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates, Quarterly Journal of Economics 110, 975-1009.

• Faust, J. and E.M. Leeper, 1997, When do long-run identifying restrictions give reliable results? Journal of Business and Economic Statistics 15, 345-353.

• Rudebusch, G.D., 1998, Do Measures of Monetary Policy in VARs Make Sense? International Economic Review 39, 907-931.

• Faust, J. 1998, The robustness of identified VAR conclusions about money, Carnegie-Rochester Conference Series on Public Policy 49, 207-244.

• Christiano, L.J., M. Eichenbaum, and C. Evans, 1999, Monetary Policy Shocks: What Have We Learned And to What End? In Handbook of Macroeconomics 1, 65-148.

• Stock, J. and M. Watson, 2002, Vector Autoregressions, Journal of Economic Perspectives 15, 101-115. RP

• Canova, F. and G. De Nicolo, 2002, Monetary Disturbances Matter for Business Fluctuations in the G-7, Journal of Monetary Economics 49, 1131-1159.

4. Spurious Regression and Cointegration:

Spurious Regression, Cointegration and Error VAR model.

• Lecture Note

• Watson, M.W. (1994), "Vector Autoregressions and Cointegration," Handbook of Econometrics, v. IV, 2844-2915 (sections 1 and 2).

• Watson, M. W. (2008), "Cointegration", The New Palgrave Dictionary of Economics. Second Edition. Eds. Steven N. Durlauf and Lawrence E. Blume. Palgrave.

5. Structural Breaks:

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

• Diebold, F.X. and C. Chen, 1998, Testing Structural Stability with Endogenous Breakpoint: A Size Comparison of Analytic and Bootstrap Procedures, Journal of Econometrics 70, 221-241.

• Ireland, P.N., 1999, Does the Time-Consistency Problem Explain the Behavior of Inflation in the United States? Journal of Monetary Economics 44, 279-291.

• Engel, C. and C.-J. Kim, 1999, The Long-Run U.S./U.K. Real Exchange Rate, Journal of Money, Credit, and Banking 31, 335-356.

• Murray, C.J. and C.R. Nelson, 2000, The Uncertain Trend in U.S. GDP, Journal of Monetary Economics 46, 79-96.

• Hansen, B.E., 2001, The New Econometrics of Structural Change: Dating Breaks in U.S. Labor Productivity, Journal of Economic Perspectives 15, 117-128.

6. State-Space Models and Kalman Filter:

State-Space Form, Kalman Filter, ARMA Models, Unobserved Component Models, Dynamic F actor Models

• Kim and Nelson: Chapter 3

• Clark, P., 1987, "The Cyclical Component of U.S. Economic Activity," Quarterly Journal of Economics 102, 797-814.

• 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.

• P. Perron and T. Wada (2009) , "Let's take a break: Trends and Cycles in US real GDP," Journal of Monetary Economics, vol 56, 749-765.

• Cochrane, J.H., 2008, "State-Space vs. VAR models for Stock Return," Working paper, University of Chicago.

• Van Binsbergen, J.H. and R.S.J. Koijen, 2009, "Predictive Regressions: A Present Value Approach," Journal of Finance

7. Nonlinear Models:

Markov switching, Time-Varying Parameters

• Kim and Nelson Chapter 3-5

• Stock, James H., and Mark W. Watson (1998), Asymptotically Median Unbiased Estimation of Coefficient Variance in a Time Varying Parameter Model, Journal of the American Statistical Association, Vol. 93, No. 441, March 1998, pp. 349-358.

• Cogley, T. and T.J. Sargent, 2001, Evolving Post-World War II Inflation Dynamics, NBER Macroeconomics Annual 2001. RP

• Dangl T. and M. Halling, 2008, "Predictive Regression with Time-Varying Coefficients," Working paper.

• Turner, C.M., R. Startz, and C.R. Nelson, 1989, A Markov Model of Heteroskedasticity, Risk, and Learning in the Stock Market, Journal of Financial Economics 25, 3-22.

• Hamilton, J.D. and R. Susmel, 1994, Autoregressive Conditional Heteroskedasticity and Changes in Regime, Journal of Econometrics 64, 307-333.

• Kim, C.-J., 1994, Dynamic Linear Models with Markov-Switching, Journal of Econometrics 60, 1-22.

• Ramsey, J.B. and P. Rothman, 1996, Time Irreversibility and Business Cycle Asymmetry, Journal of Money, Credit, and Banking 28, 1-21.

• Kim, C.-J. and C.R. Nelson, 1999, Friedman's Plucking Model of Business Cycle Fluctuations: Tests and Estimates of Permanent and Transitory Components, Journal of Money, Credit, and Banking 31, 317-334.

• Van Dijk, D. and P.H. Franses, 1999, Modeling Multiple Regimes in the Business Cycle, Macroeconomic Dynamics 3, 311-340.

• Kim, C.-J., J.C. Morley, and C.R. Nelson, 2001, Does an Intertemporal Tradeoff Between Risk and Return Explain Mean Reversion in Stock Prices? Journal of Empirical Finance 8, 403-426.

• Clements, M.P. and H.-M. Krolzig, 2003, Business cycle asymmetries: Characterization and testing based on Markov-switching autoregressions, Journal of Business and Economic Statistics 21, 196-211.

• Kim, C.-J., J.C. Morley, and C.R. Nelson, 2004, Is There a Positive Relationship between Stock Market Volatility and the Equity Premium, Journal of Money, Credit, and Banking 36, 339-360.

• Lo, M.C. and J. Piger, 2005, Is the Response of Output to Monetary Policy Asymmetric? Evidence from a Regime-Switching Coefficients Model, Journal of Money, Credit, and Banking 37, 865-886. RP

• Morley, J. and J. Piger, 2008, Trend/Cycle Decomposition of Regime-Switching Processes, Journal of Econometrics.

• Kim, C.-J., J. Piger, and R. Startz, 2008, Estimation of Markov Regime-Switching Regression Models with Endogenous Switching, Journal of Econometrics 143, 263-273

** Tentative Special Topics

Stochastic volatility and GARCH models:

• Bollerslev, T., Chou, R. Y. and Kroner, K. F. (1992). ARCH Modelling in finance: A revie w of the theory and empirical evidence. Journal of Econometrics 52, 5-59.

• Bollerslev T., Engle R. F. and Nelson D. B. (1994). ARCH model. In Handbook of Econo metrics 4, Engle R. F. and McFadden D. L. (eds). Elsevier Science: New York; 2961–3031.

• Engle R. F. (2001). GARCH 101: An introduction to the use of ARCH/GARCH models in applied Econometrics. Journal of Economic Perspectives 15, 157-168.

• Engle, R. F. (2002). New frontiers for ARCH models. Journal of Applied Econometrics 17, 425-446.

• Engle, R. F. (2004). Risk and volatility: Econometric models and financial practice. America n Economic Review 94, 405-420.

• Aït-Sahalia, Y. and Kimmel, R. Maximum likelihood estimation of stochastic volatility Economics 2142 Fall 2010.

• Kim, S., Shephard, N. and Chib, S. (1998). Stochastic volatility: Likelihood inference and comparison with ARCH models. Review of Economic Studies 65, 361-393.

Large data sets: Dynamic Factor Models and FAVAR:

• Bai, J., and S. Ng (2002), “Determining the number of factors in approximate factor models”, Econometrica 70:191-221.

• Bernanke, B.S., J. Boivin and P. Eliasz (2005). “Measuring the effects of monetary policy: a factor-augmented vector autoregressive (FAVAR) approach”, Quarterly Journal of Economics 120: 387–422.

• Geweke, J. (1977), “The Dynamic Factor Analysis of Economic Time Series”, in: D.J. Aigner and A.S. Goldberger, eds., Latent Variables in Socio-Economic Models, (North-Holland, Amsterdam).

• Stock, J.H., and M.W. Watson (2002a). “Forecasting Using Principal Components from a Large Number of Predictors,” Journal of the American Statistical Association 97:1167–1179.

• Stock, J.H. and M.W. Watson (2006a), “Forecasting with many predictors,” Ch. 6 in Graham Elliott, Clive W.J. Granger and Allan Timmermann (eds.), Handbook of Economic Forecasting, Elsevier, 515-554.

• Stock, J.H. and Mark W. Watson (2010), “Dynamic Factor Models,” forthcoming, Oxford

Endogenous Issues in Time-series:

• Chon, Sora, and Chang-Jin Kim. (2014) "Monetary Policy Rules and Macroeconomic Stability Revisited: Limited Information Approach Under Identifying Restrictions.", Working Paper

• Kim, Chang-Jin. (2010) “Dealing with endogeneity in regression models with dynamic coefficients.” Now Publishers Inc.

• Kim, Chang-Jin. (2006) "Time-varying parameter models with endogenous regressors." Economics letters 91.1: 21-26.

• Kim, Chang-Jin, and Charles R. Nelson. (2006) "Estimation of a forward-looking monetary policy rule: A time-varying parameter model using ex post data." Journal of Monetary Economics 53.8:1949-1966.

• Kim, Chang-Jin. (2004) "Markov-switching models with endogenous explanatory variables." Journal of Econometrics 122.1: 127-136.

Statistical Inference in Dynamic System Equations: Dynamic Stochastic General Equilibrium Models