

# ECON 606 - Winter 2016

## Macroeconometrics and Time Series Analysis

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Class: MW 5:00-6:15 p.m.  
Class Website: [cavas.emich.edu](http://cavas.emich.edu)  
Office Hours: MW 3:00-5:00 a.m.  
and by appointment

### Description

This is a seminar course that combines macroeconomic theory and policy with time series estimation techniques that are used to estimate and evaluate macroeconomic relationships. Some of the time-series topics covered in this course include, ARIMA modeling, unit roots, generalized autoregressive conditional heteroskedasticity (GARCH) models, vector autoregression (VAR), vector error correction (VEC) models, dynamic panel models, and dynamic stochastic general equilibrium models (DSGE).

Prerequisites: ECON 411, ECON 601, and ECON 415, or equivalent

### Textbook and Supplemental Material

In my view there is not a perfect textbook for this class. Graduate level econometrics textbooks are often mathematically sophisticated or rely too heavily on application with little theory. With that said, we will use the following textbook for the basis of this course:

*Applied Econometrics: A Modern Approach* (2nd edition) by Dimitrios Asteriou and Stephen G. Hall, Palgrave Macmillian, May 2011.

The following two books are a good complement to the course and are placed on reserve at the library:

- *Elements of Forecasting* (4th edition) by Francis Diebold.
- *Applied Econometric Time Series* (3rd edition) by Walter Enders.

The following list of books provide good references:

- Pesaran, M. Hashem. 1995. *Handbook of Applied Econometrics*. Volume I: Macroeconomics. Oxford, UK: Blackwell Publishers.
- Hamilton, James D. 1994. *Time Series Analysis*. Princeton, NJ: Princeton University Press.
- Lütkepohl, Helmut. 1993. *Introduction to Multiple Time Series Analysis*. 2nd ed., Berlin, Germany: Springer-Verlag.
- Another useful reference that is freely available electronically from the EMU library is: Gebhard Kirchgassner, Jurgen Wolters, and Uwe Hassler. *Introduction to Modern Time Series Analysis*. Second Edition.

## Grading

Your grade in the course will be determined as follows:

- Midterm Exam: 20%
- Final Exam: 20%
- Labs: 15%
- Project: 40%
- Presentations: 5%

The grading scale for the course is as follows:

A.....93-100%	C+.....76-79%
A-.....90-92%	C.....73-75%
B+.....86-89%	C-.....70-72%
B.....83-85%	F.....0-69%
B-.....80-82%	

## Exams

There will be a midterm and final exam that will make up 40% of your grade. The exams will test your competency in employing the time-series techniques discussed in class. The exams will require the use of computer software.

## Labs

I constructed a number of lab assignments that are used to reinforce the theoretical models and time-series applications discussed in class. These are learning-by-doing assignments that will require the use of statistical software (Eviews) and data. The data files along with any other relevant material will be located on Canvas. Hard copies of the labs will be handed out in classes and collected on the due date.

## Project

The main determinant of your grade is the project. The project is broken down into a number of “mini projects” that will culminate into a final project for which your grade will be based. You first want to start thinking about what area of macroeconomics you want to research. The next step is to start searching for published articles that use time-series macroeconometrics. You will be instructed to formulate a research question that requires the use of time-series techniques. I will provide more details of this assignment in class.

## Presentations

Throughout the course you will be required to conduct presentations. The purpose of the presentations is to give you experience presenting and to allow other students to learn material that is not covered in class. I will provide more details on this aspect of the course in class.

## Tentative Topics to be Covered

### I. Review of Basic Econometrics

Lab 1 - Review

*Readings:*

1. Asteriou & Hall - Chapters 3-4
2. Diebold - Chapter 1
3. Other

- Summers, L. 1991. The Scientific Illusion of Empirical Macroeconomics, *Scandinavian Journal of Economics*, 93(2): 129-148.
- Sims, C. 1980. Macroeconomics and Reality, *Econometrica*, 48(1):1-48.

*Applications:*

1. Money Demand (OLS)
  - McCallum, B., Chapter 3 “The Demand for Money” in *Monetary Economics*.\*

### II. General Method of Moments (GMM)

Lab 2 - GMM

*Readings:*

1. Wooldridge, J. 2001. Applications of Generalized Method of Moments Estimation, *Journal of Economic Perspectives*, 15(4):87-100.

*Applications:*

1. Capital Asset Pricing Model (GMM)
  - Campbell, J. 1993. Intertemporal asset pricing without consumption data, *The American Economic Review*, 83(3).

### III. Modeling the Mean Dynamics: ARIMA Models

Lab 3a - ARIMA

Lab 3b - Forecast

*Readings:*

1. Asteriou & Hall - Chapter 13 (Box-Jenkins Methodology)

*Applications:*

1. Output Fluctuations

- Nelson, Charles R., and Charles R. Plosser. 1982. Trends and random walks in macroeconomic time series: some evidence and implications, *Journal of Monetary Economics*, 10(2): 139-162.
- Campbell, John Y., and N. Gregory Mankiw. 1987. Permanent and transitory components in macroeconomic fluctuations, *American Economic Review*, 77(2): 111-117.

#### IV. Modeling the Variance Dynamics: ARCH/GARCH Models

Lab 4 - ARCH

*Readings:*

1. Asteriou & Hall - Chapter 14

*Applications:*

1. Inflation Volatility
  - Owyang, Michael T. 2001. Persistence, Excess Volatility, and Volatility Clusters in Inflation. *The Federal Reserve Bank of St. Louis*, 41-52.

#### V. Non-stationarity & Unit Root Tests

Lab 5 - Unit Root

*Readings:*

1. Asteriou & Hall - Chapter 16
2. Others:
  - Dickey, D.A., and W.A. Fuller. 1979. Distribution of the estimators for autoregressive time series with a unit root, *Journal of the American Statistical Association*, 74: 427-431.
  - Elliott, G., T.J. Rothenberg, and J.H. Stock. 1996. Efficient tests for an autoregressive unit root, *Econometrica* 64: 813-836.
  - Phillips, P.C.B., and P. Perron. 1988. Testing for a unit root in time series regression. *Biometrika*, 75: 335-346.
  - Perron, Pierre. 1989. The Great Crash, the oil price shock, and the unit root hypothesis. *Econometrica* 57: 1361-1401.

*Applications:*

1. Budget Deficit Sustainability
  - Quintos, Carmela E. 1995. Sustainability of the deficit process with structural shifts. *Journal of Business & Economic Statistics* 13(4): 409-417.
  - Hamilton, James D., and Marjorie Flavin. 1985. On the limitations of government borrowing: A framework for empirical testing, *American Economic Review*, 76(4): 808-819.
2. Real Interest Rates and the Fisher Effect

- Rapach, David E., and Christian E. Weber. 2004. Are real interest rates really nonstationary? New evidence from tests with good size and power, *Journal of Macroeconomics*, 26(3): 409-430.
- Mishkin, Frederic S. 1992. Is the Fisher effect for real?: A reexamination of the relationship between inflation and interest rates, *Journal of Monetary Economics* 30(2): 195-215.

### 3. Real GNP

- Rudebusch, Glenn. 1993. The uncertain unit root in real GNP. *American Economic Review* 83: 264-272.

## VI. Dynamic Regressions

### Lab 6 - Dynamic Regressions

#### *Readings:*

1. Asteriou & Hall - Chapter 10 (pages 226-231)

#### *Applications:*

### 1. Partial Adjustment Models

- Judd, John P., and Glenn D. Rudebusch. 1998. Taylor's Rule and the Fed: 1970-1997. *Economic Review-Federal Reserve Bank of San Francisco* 3:3-16.\*
- Money Demand with partial adjustment (see class notes)

## VII. Vector Autoregressive (VAR) Models and Causality Tests

### Lab 7 - VAR

#### *Readings:*

1. Asteriou & Hall - Chapter 15
2. Others:

- Stock, James H., and Mark W. Watson. 2001. Vector autoregressions. *Journal of Economic perspectives* 15(4): 101-115.\*
- Granger, C.W.J. 1969. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37: 424-438.

#### *Applications:*

### 1. Tax-Spend Debate

- Hoover, Kevin, D. and Steven M. Sheffrin. 1992. Spending, and Taxes: Sand in the Sandbox or Tax Collector for the Welfare State? *American Economic Review*, 82(1): 225-248.

### 2. Fiscal Policy Effectiveness

- Ramey, Valerie A. 2011. Identifying Government Spending Shocks: It's All in the Timing. *Quarterly Journal of Economics*, 1-50.\*

## VIII. Cointegration and Error Correction Models

Lab 8 - VECM

*Readings:*

1. Asteriou & Hall - Chapter 17
2. Others:

- Murray, Michael P. 1994. A drunk and her dog: an illustration of cointegration and error correction. *The American Statistician*, 4(1): 37-39.
- Johansen, Soren. 1992. Cointegration in partial systems and the efficiency of single-equation analysis. *Journal of Econometrics* 52(3): 389-402.
- Johansen, Soren, and Katarina Juselius. 1990. Maximum likelihood estimation and inference on cointegration-with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2): 169-210.
- Johansen, Soren, and Katarina Juselius. 1992. Testing structural hypotheses in a multivariate cointegration analysis of the PPP and the UIP for UK. *Journal of Econometrics*, 53(1): 211-244.
- Engle, Robert F., and Clive W.J. Granger. 1987. Co-integration and error correction: representation, estimation, and testing. *Econometrica*, 55(2):251-276.

*Applications:*

1. The permanent income hypothesis (PIH)

## IX. Dynamic Panel Estimation

Lab 9 - Dynamic Panel

*Readings:*

1. Asteriou & Hall - Chapter 20
2. Bond, S.R., Hoeffler, A. and Temple, J. 2001. GMM Estimation of Empirical Growth Models. Working Paper.
3. Others:

- Roodman, David. 2009. How to use xtabond2: An Introduction to “Difference” and “System” GMM in Stata. *The Stata Journal*, 9(1): 86-136.

*Applications:*

- Levine, Ross, Norman Loayza, and Thorsten Beck. 2000. Financial Intermediation and Growth: Causality and Causes. *Journal of Monetary Economics*, 46(1): 31-77.

## X. Nonstationary Panel Time-Series Models

Lab 10 - Nonstationary Panel

*Readings:*

1. Asteriou & Hall - Dynamic Heterogeneous Panel Data Models (Ch. 21)
2. Asteriou & Hall - Non-stationary Panel Data Models (Ch. 22)
3. Blackburne, E.F. and Frank, M.W. 2007. Estimation of Nonstationary Heterogeneous Panels. *The Stata Journal*, 7(2): 197-208.
4. Others
  - Eberhardt, M. “Nonstationary Panel Econometrics and Common Factor Models: An Introductory Reader.”
  - Baltagi, Badi. 2008. *Econometric Analysis of Panel Data*. Vol. 1. John Wiley & Sons.
  - Coakley, Jerry, Ana-Maria Fuertes, and Ron Smith. 2006. Unobserved heterogeneity in panel time series models. *Computational Statistics & Data Analysis*, 50(9): 2361-2380.
  - Eberhardt, Markus, and Francis Teal. 2011. Econometrics For Grumblers: A New Look At The Literature On Cross-Country Growth Empirics. *Journal of Economic Surveys*, 25(1): 109-155.
  - Eberhardt, Markus, Anindya Banerjee and J James Reade. November 2010. Panel Estimation for Worriers. Working paper.

*Applications:*

\*Data and Stata code for the following papers can be found here

<https://sites.google.com/site/medevecon/publications-and-working-papers>

1. Eberhardt, Markus, and Francis Teal. 2013. Structural Change and Cross-Country Growth Empirics. *World Bank Economic Review*, 27(2): 229-271.
2. Eberhardt, Markus, Christian Helmers and Hubert Strauss. 2013. Do spillovers matter when estimating private returns to R&D? *The Review of Economics and Statistics*, 95(2):436-448.
3. Eberhardt, Markus, and Francis Teal. 2014. The Magnitude of the Task Ahead: Productivity Analysis with Heterogeneous Technology. Working paper.

## **XI. An Introduction to DSGE Models**

### Lab 11 - DSGE

*Readings:*

1. Sbordone, Argia, Andrea Tambalotti, Krishna Rao, and Kieran Walsh. 2010. Policy analysis using DSGE models: an introduction. *Economic Policy Review*, 16(2): 23-43.
2. Others:
  - Ruge-Murcia, Francisco J. 2007. Methods to Estimate Dynamic Stochastic General Equilibrium Models. *Journal of Economic Dynamics and Control*. 31(8): 2599-2636.

*Applications:*

1. Estimating a Vanilla RBC Model with Dynare
  - Chapter 3 of Dynare User Guide, 2013.\*