ECO 672: Applied Time Series Analysis

Spring 2024

Time: 1:15 – 2:35 pm, TR, FSB 0014

Instructor:	Jing Li
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Office Hour	2:45-5:45 pm Tuesday (or by appointment)

Recommended Books and Online Notes:

Applied Econometric Time Series written by Walter Enders (3rd or latest edition) and published by Wiley.

Online Notes: *Time Series for Macroeconomics and Finance* by John H. Cochrane

Hands-On Time Series Analysis with R: Perform time series analysis and forecasting using R by Rami Krispin

The Signal and The Noise by Nate Silver

Course Objectives:

The main objective of this course is to develop the skills needed to do empirical research in fields operating with time series data sets. Topics covered will include difference equations, ARIMA models, ARCH/GARCH models, Unit Root Test, VAR models and Cointegration.

Lecture Notes:

I will write down lecture notes on whiteboard in class. Please ask your classmates for completed lecture notes if you miss a class.

Software

We will use the free software R for this course, which is downloadable at
http://www.r-project.org/

You need to download R into your laptop, and bring the laptop to class when instructed. I will provide data sets and computer codes if needed. I will also provide SAS codes even though SAS is not required for this course.

Homework Sets:

There will be 5 homework sets. Each set is worth 4 points, and consists of both mathematical derivation and computer exercise. The total points of homework sets are 20. For the computer exercise, you need to print out the codes and results. You are allowed to discuss the homework in groups. But the homework should be finished and submitted individually. Homework is due at the beginning of the class on the due date (see the schedule).

Exams

There are two closed book midterm exams. There is no final exam. Each midterm exam is worth 25 points, and consists of mathematical derivation and problems related to R results. Total points of two midterm exams are 50. Exams are based on the lecture notes and homework. Cellphone and formula sheet are not allowed in the exam. You need to bring a calculator (not the one in the cellphone) to the exam.

Make-Up Policy:

You will get zero point for a missed exam. Exams will be given only at the scheduled times. Regardless of the reason for missing an exam, no make-up will be given unless arrangements are made prior to the time of the

relevant exam. You must provide documented evidence of a conflict that merits rescheduling (e.g. a university sponsored event).

Empirical Project
You need to independently work on an empirical project, which is worth 30 points. The complete project is due at 12 PM on May 13, 2024. No exception. I will provide a data file, and you are supposed to answer several questions using R. I will provide detailed instruction after the second exam.

Grades:
Your final grade will be determined by your points earned on the 5 homework sets, 2 exams and the empirical project. The maximum total points are 100. You only need to add up all points you earned.
Letter grades will be assigned as follows (where X is the total points earned):
$97 \leq X \rightarrow$ A+; $94 \leq X < 97 \rightarrow$ A; $90 \leq X < 94 \rightarrow$ A-
$87 \leq X \rightarrow$ B+; $84 \leq X < 87 \rightarrow$ B; $80 \leq X < 84 \rightarrow$ B-
$77 \leq X \rightarrow$ C+; $74 \leq X < 77 \rightarrow$ C; $70 \leq X < 74 \rightarrow$ C-
$67 \leq X \rightarrow$ D+; $64 \leq X < 67 \rightarrow$ D; $60 \leq X < 64 \rightarrow$ D-
$X < 60 \rightarrow$F

Academic Integrity
Please check out http://miamioh.edu/fsb/academics/integrity/index.html. The full FSB Honor Code may be found at: http://miamioh.edu/fsb/about/honor-code/index.html

I will follow closely the schedule as follows. Please mark those testing dates on your calendar

Schedule

Dates	Topics	Remarks
Jan 30	Syllabus and Introduction to Time Series	
Feb 1	Basic Time Series Regression with R	Bring laptop to classroom
Feb 6, 8, 13, 15, 20	Difference Equation	Chapter 1, HW 1 is due on Feb 22
Feb 22, 27, 29, Mar 5, 7	ARMA Model	Chapter 2, HW 2 is due on Mar 7
Mar 12	Exam 1	Cover chapters 1, 2
Mar 14, 19, 21	ARCH/GARCH Model	Chapter 3, HW 3 is due on Apr 2
Apr 2, 4, 9	Unit Root and ARIMA Model	Chapter 4, HW 4 is due on Apr 16
Apr 11, 16, 18, 23, 25, 30	Vector Autoregression (VAR)	Chapter 5, HW 5 is due on Apr 30
May 2	Exam 2	Cover chapters 3, 4, 5
May 7, 9	Co-integration	Chapter 6, No HW
May 13	Empirical Project is due at 12PM	