The purpose of this course is to help you develop basic time series econometric skills. The focus is primarily applied, as opposed to theoretical. As such, it is important that you are (or become) familiar with an appropriate statistical software (STATA, MATLAB, E-views, R, etc). While the course will not require any specific statistical software, my preference is STATA, as it is highly adaptable to a variety of environments. (STATA also has an immense, and growing, library of commands, which is housed at Boston College.)

It is important to point out that, while the primary focus is applied, a great deal of understanding takes place at the theoretical level. When necessary, therefore, we will discuss the underlying theory behind some of the most popular time series techniques. To that end, you need to be familiar with: a basic understanding of differential equations (at a fundamental level, time series involves the estimation of difference equations with a stochastic component), a basic understanding of linear algebra (which make understanding of multivariate time series much easier to follow), and basic knowledge of trigonometry that will be very helpful for understanding analysis in the frequency domain (important for understanding filtering techniques, as well as spectral regressions).

Grade Requirements

Time series is best learned by “doing.” Therefore, there will be three small projects. We will also have a final exam, as per Mason requirements. Each project is worth 25 percent of the final grade, and the final exam counts for the remaining 25 percent of the grade. You can work in groups of not more than 4 in the projects, however, you must turn in your homework individually. The projects will be in the format of a mini-paper (about 3 to 5 pages): an introduction, a discussion of what you are doing, a conclusion, and the supporting tables as well as the code you wrote to generate the tables.

Basic References:


Becketti, Sean. 2013. *Introduction to Time Series Using STATA*. STATA Press Publication. College Station, Texas. (Required especially for those who have never used STATA.)


Topics:

*Application: A dynamic Cobb-Web model of price determination.*


*Application: Simulating an ARMA process*


*Application: Modeling nominal exchange rates*


*Application: What drives public interest in Austrian Economics?*


*Application: Is there evidence for (or against) the Austrian Business Cycle Theory?*

**Topic 6**: Cointegration. Engle-Granger Error correction set up and speed of adjustment. Dynamic inferences.

*Application: Estimation of dynamic money demand*

*Application: Estimation of long-run Purchasing Power Parity*

**Topic 7**: Introduction to analysis in the frequency domain. Fourier Theorem. Spectral distribution. Understanding the periodogram.

*Application: Modeling international political relations in the frequency domain*

**Topic 8**: Temporal aggregation/sampling problems. Illustrations and applications.

*Application: Evaluating gravity equations*

**Topic 9**: (Time permitting) Dynamic implications of global games and contagion.

*Application: Modeling bank runs from Diamond-Dybvig to coordination games*
Additional References (The list below is partial. It will be updated by January 2019):

**Advanced textbooks:**


**Stationarity tests and unit roots:**


**Stationary VARs:**


**Structural VARs:**


**Cointegration:**


**Temporal aggregation problems:**


**Filtering and stochastic detrending:**


