

Time Series Analysis

Introduction

Types of data

- There are 3 types of data which econometricians typically use for analysis:
 1. Time series data (longitudinal)
 2. Cross-sectional data
 3. Panel data, a combination of 1 & 2

Types of data

- A **time series** is an ordered sequence of values of a variable at equally spaced time intervals
- **Cross-sectional** data are data on one or more variables collected at a single point in time (or a short interval). Each statistical unit has one value for each variable.
- **Panel Data** has the dimensions of both time series and cross-sections (e.g. a consumer panel)

The purpose TSA

- Testing a theory
- Developing a new theory
- Estimating parameters
- Forecasting
- Finding patterns, trends ...

Time Series modelling: Simplistic Data analytic approach

- Trying to find patterns in data



- Defining a mathematical model to describe the data



- Estimating the model parameters statistically

Data Generating Process (DGF)

- In essence we can think that the data has arisen from some process, we call it a Data Generating Process
- We want to find out what that process is.
- In econometrics a DGF is often thought to be a mathematical model including randomness
- Therefore what we really want to do is to find and estimate the statistical model describing the DGP
- Statistical model is typically of the form
$$Y=f(X) + \varepsilon,$$
where $f()$ is some function and ε is the random term
- More complicated models may include several variables and even several equations

Steps involved in the formulation of econometric models

