

Time Series Econometrics: Changing Gears with Time

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Abstract

A **time series data** set consists of observations on a variable or several variables over time. Because past events can influence future events and lags in behavior are prevalent in the social sciences, time is an important dimension in a time series data set. Unlike the arrangement of cross-sectional data, the chronological ordering of observations in a time series conveys potentially important information. A key feature of time series data that makes it more difficult to analyze than cross-sectional data is the fact that economic observations can rarely, if ever, be assumed to be independent across time. Most economic and other time series are related, often strongly related, to their recent histories. While most econometric procedures can be used with both cross-sectional and time series data, more needs to be done in specifying econometric models for time series data before standard econometric methods can be justified. In addition, modifications and embellishments to standard econometric techniques have been developed to account for and exploit the dependent nature of economic time series and to address other issues, such as the fact that some economic variables tend to display clear trends over time. Another feature of time series data that can require special attention is the **data frequency** at which the data are collected. In economics, the most common frequencies are daily, weekly, monthly, quarterly, and annually. Many weekly, monthly, and quarterly economic time series display a strong seasonal pattern, which can be an important factor in a time series analysis. When econometric methods are used to analyze time series data, the data should be stored in chronological order. When time is so important and econometric methods require reorientation to deal with it, a general overview of the theory and algorithm would be helpful to those who value time and an eye-opener to those who don't.

1. INTRODUCTION

An obvious characteristic of time series data which distinguishes it from cross-sectional data is that a time series data set comes with a temporal ordering. For analyzing time series data in the social sciences, we must recognize that the past can influence the future, but