

Workshop: Inferring 'causal' impacts from Time Series Analysis

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Description:

This workshop demonstrates the use of Interrupted Time Series Analysis (ITSA) with hands-on examples.¹ I explain the fundamentals of ITSA with an example from the State of Florida that amended self defense laws in 2005 to provide individuals legal immunity if they were to use lethal force in self defense.² The intent was to improve public safety and lower the incidence of violent crime.

The reverse happened. After the law was enacted, “there was an abrupt and sustained increase in the monthly homicide rate ... and in the rate of homicide by firearm.” The authors used ITSA to demonstrate the impact of a policy or strategy change where the underlying data are time series.

ITSA is a simple extension of ordinary regression models. It is straightforward to implement and interpret and has been used extensively in the health sector where control and treated groups are used.

ITSA could be an extremely powerful tool to analyze the impact of changes in policy and strategy where time series data are available for the dependent variable before and after the change was implemented. ITSA can be readily extended to treated and control groups to determine a more “causal” notion of the difference in impacts between the control and treated groups.

The workshop also introduces rather advanced applications of time series analysis using techniques developed by Alphabet, Google’s parent company, for analyzing time series data. CausalImpact infers impact of interventions by deploying Bayesian structural time series models.³

Bring your own device

Workshop participants are expected to have access to a computing device equipped with R, which is an open source platform. We recommend that the computing devices be equipped with R⁴ and RStudio.⁵ To use CausalImpact, kindly review instructions at the package’s GitHub page.⁶

Required Background: Basic understanding of Ordinary Least Squares Regression and some understanding of basic programming principles.

¹ <https://www.stata-journal.com/article.html?article=st0389>

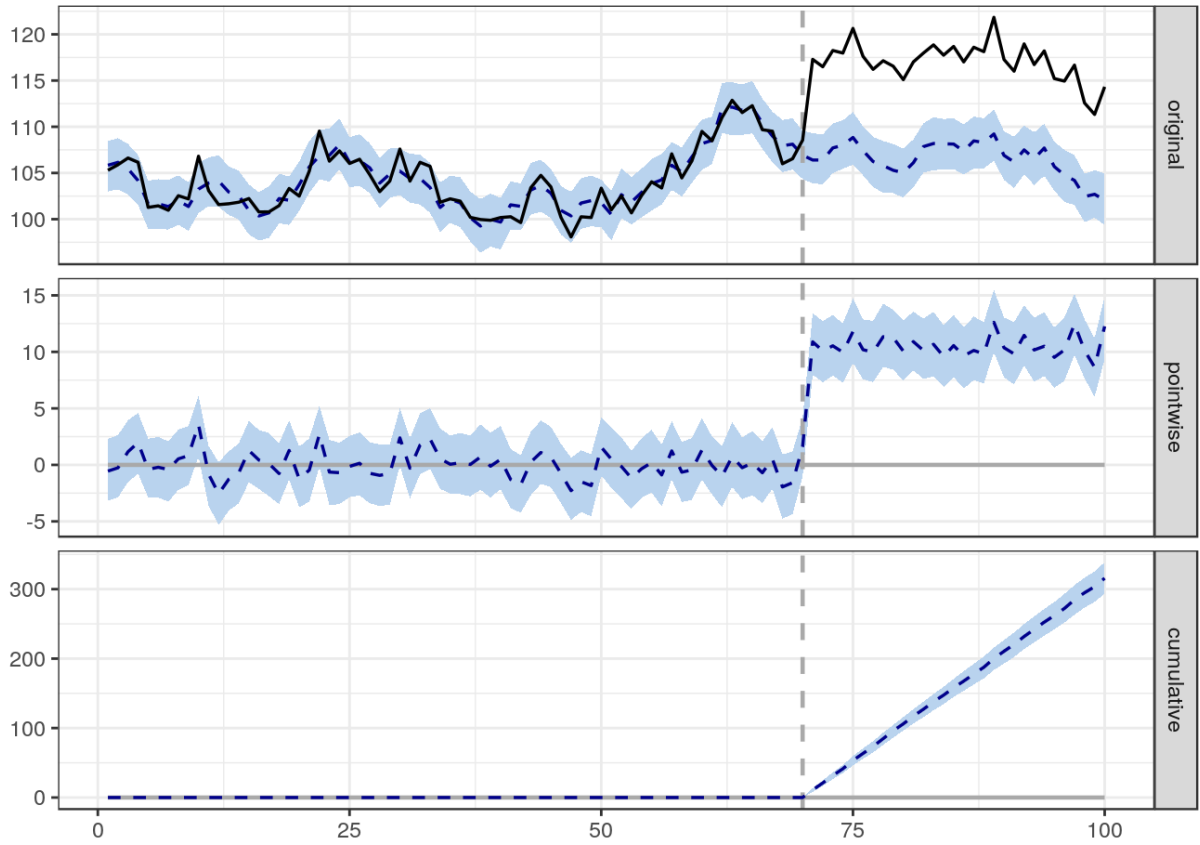
² <https://www.ncbi.nlm.nih.gov/pubmed/27842169>

³ <https://ai.google/research/pubs/pub41854>

⁴ <https://cran.r-project.org/>

⁵ <https://rstudio.com/products/rstudio/download/>

⁶ <https://google.github.io/CausalImpact/>



Source: <https://google.github.io/CausalImpact/CausalImpact.html>