

Forecasting interrupted time series

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Abstract

A brief summary of our ideas

Keywords: blah, blah

1 Introduction

Not just about covid. How to handle forecasting when there has been a period of major structural change.

Not interested in identifying structural breaks – we know they have occurred. How to forecast in the presence of such change.

Covid has provided one example that is affecting many forecasters around the world. But similar ideas needed in many other contexts.

Time series models usually assume that the future is similar to the past, at least in how the data evolve. But a big event like covid makes the future different from the past, at least in the short term.

2 Handling covid effects when forecasting

Some options are:

1. Use a highly adaptive model – e.g., ETS with large smoothing parameters

Advantages: simple, easy to implement, fast to compute.

Disadvantages: large prediction intervals, because the model is downweighting the past data. Fails to remember things before the change. Also, the model may not adapt quickly enough to the change.

2. Use a dynamic regression model with intervention covariates

Advantages: retains full memory of the past, and allows the change period to be effectively modelled provided you choose the covariates well.

Disadvantages: requires a lot of thought to choose the covariates well. Assumes that the post-pandemic period will be similar to the pre-pandemic period.

3. Treat the covid period as missing and use a model that handles missing values

Advantages: effectively ignores the covid period

Disadvantages: throws away the covid-period data, and so starts the post-covid period with no recent history. Therefore prediction intervals will be relatively large.

4. Estimate what might have been and adjust the data

Advantages: relatively simple and doesn't throw away the covid-period data.

Disadvantages: need to have good estimates of covid-period data, and that may be difficult to obtain. Forecasts are conditional on the estimates being correct.

2.1 Example: Ambulance attendances







