Forecasting: principles and practice

Rob J Hyndman

Wrap up
CASE STUDY 1: Paperware company

**Problem:** Want forecasts of each of hundreds of items. Series can be stationary, trended or seasonal. They currently have a large forecasting program written in-house but it doesn’t seem to produce sensible forecasts. They want me to tell them what is wrong and fix it.

**Additional information**

- Program written in COBOL making numerical calculations limited. It is not possible to do any optimisation.
- Their programmer has little experience in numerical computing.
- They employ no statisticians and want the program to produce forecasts automatically.
<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12 month average</td>
</tr>
<tr>
<td>C</td>
<td>6 month average</td>
</tr>
<tr>
<td>E</td>
<td>Straight line regression over last 12 months</td>
</tr>
<tr>
<td>G</td>
<td>Straight line regression over last 6 months</td>
</tr>
<tr>
<td>H</td>
<td>Average slope between last year’s and this year’s values. (Equivalent to differencing at lag 12 and taking mean.)</td>
</tr>
<tr>
<td>I</td>
<td>Same as H except over 6 months.</td>
</tr>
<tr>
<td>K</td>
<td>I couldn’t understand the explanation.</td>
</tr>
</tbody>
</table>
CASE STUDY 2: PBS
The **Pharmaceutical Benefits Scheme** (PBS) is the Australian government drugs subsidy scheme.
The **Pharmaceutical Benefits Scheme** (PBS) is the Australian government drugs subsidy scheme.

- Many drugs bought from pharmacies are subsidised to allow more equitable access to modern drugs.
- The cost to government is determined by the number and types of drugs purchased. Currently nearly 1% of GDP.
- The total cost is budgeted based on forecasts of drug usage.
Opp demands drug price restriction after PBS budget blow-out

The Federal Opposition has called for tighter controls on drug prices after the Pharmaceutical Benefits Scheme (PBS) budget blew out by almost $800 million.

The money was spent on two new drugs including the controversial anti-smoking aid Zyban, which dropped in price from $220 to $22 after it was listed on the PBS.
CASE STUDY 2: PBS

- In 2001: $4.5 billion budget, under-forecasted by $800~million.
- Thousands of products. Seasonal demand.
- Subject to covert marketing, volatile products, uncontrollable expenditure.
- Although monthly data available for 10 years, data are aggregated to annual values, and only the first three years are used in estimating the forecasts.
- All forecasts being done with the FORECAST function in MS-Excel!
CASE STUDY 3: Airline
CASE STUDY 3: Airline

Economy class passengers: Melbourne–Sydney

Not the real data! Or is it?
CASE STUDY 3: Airline

**Problem:** how to forecast passenger traffic on major routes?

**Additional information**

- They can provide a large amount of data on previous routes.
- Traffic is affected by school holidays, special events such as the Grand Prix, advertising campaigns, competition behaviour, etc.
- They have a highly capable team of people who are able to do most of the computing.
Workshop resources

- Slides
- Exercises
- Textbook
- Useful links

robjhyndman.com/nyc2018
Useful resources for forecasters


Journals:

Links to all these at forecasters.org
Useful resources for forecasters

Blog
- robjhyndman.com/hyndssight

Questions
- stackoverflow.com (for R questions)
- crossvalidated.com (for statistics questions)
Useful resources for forecasters

Blog

- robjhyndman.com/hyndsight

Questions

- stackoverflow.com (for R questions)
- crossvalidated.com (for statistics questions)

Happy forecasting

Good forecasters are not smarter than everyone else, they merely have their ignorance better organised.