

# ETC3550/ETC5550

## Applied forecasting

Ch1. Getting started

[OTexts.org/fpp3/](http://OTexts.org/fpp3/)



# Outline

1 What can we forecast?

2 Some case studies

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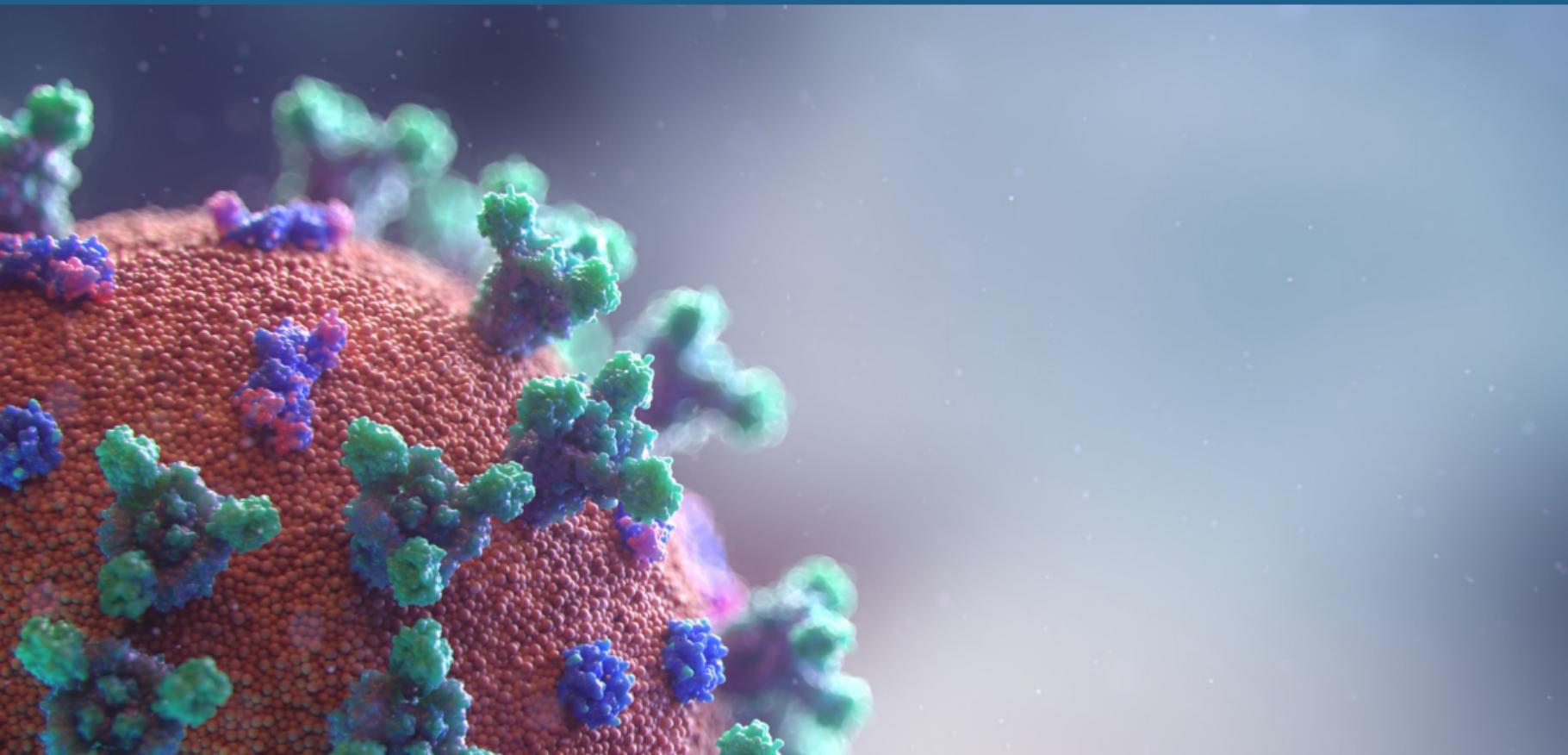
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# Which is easiest to forecast?

- daily electricity demand in 3 days time
- time of sunrise this day next year
- Google stock price tomorrow
- Google stock price in 6 months time
- maximum temperature tomorrow
- exchange rate of \$US/AUS next week
- total sales of drugs in Australian pharmacies next month
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[pollev.com/robjhyndman](http://pollev.com/robjhyndman)

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- how do we measure “easiest”?
  - what makes something easy/difficult to forecast?

# Forecastability factors

Something is easier to forecast if:

- 1 we have a good understanding of the factors that contribute to it
- 2 there is lots of data available;
- 3 the future is somewhat similar to the past
- 4 the forecasts cannot affect the thing we are trying to forecast.

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1 What can we forecast?

2 Some case studies

# 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 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.



# CASE STUDY 1: Paperware company

## Methods currently used

- A 12 month average
- C 6 month average
- E straight line regression over last 12 months
- G straight line regression over last 6 months
- H average slope between last year's and this year's values.  
(Equivalent to differencing at lag 12 and taking mean.)
- I Same as H except over 6 months.
- K I couldn't understand the explanation.

## CASE STUDY 2: PBS



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**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.

# CASE STUDY 2: PBS



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## POLITICS

### 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.



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13

## 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: Car fleet company

**Client:** One of Australia's largest car fleet companies

**Problem:** how to forecast resale value of vehicles? How should this affect leasing and sales policies?

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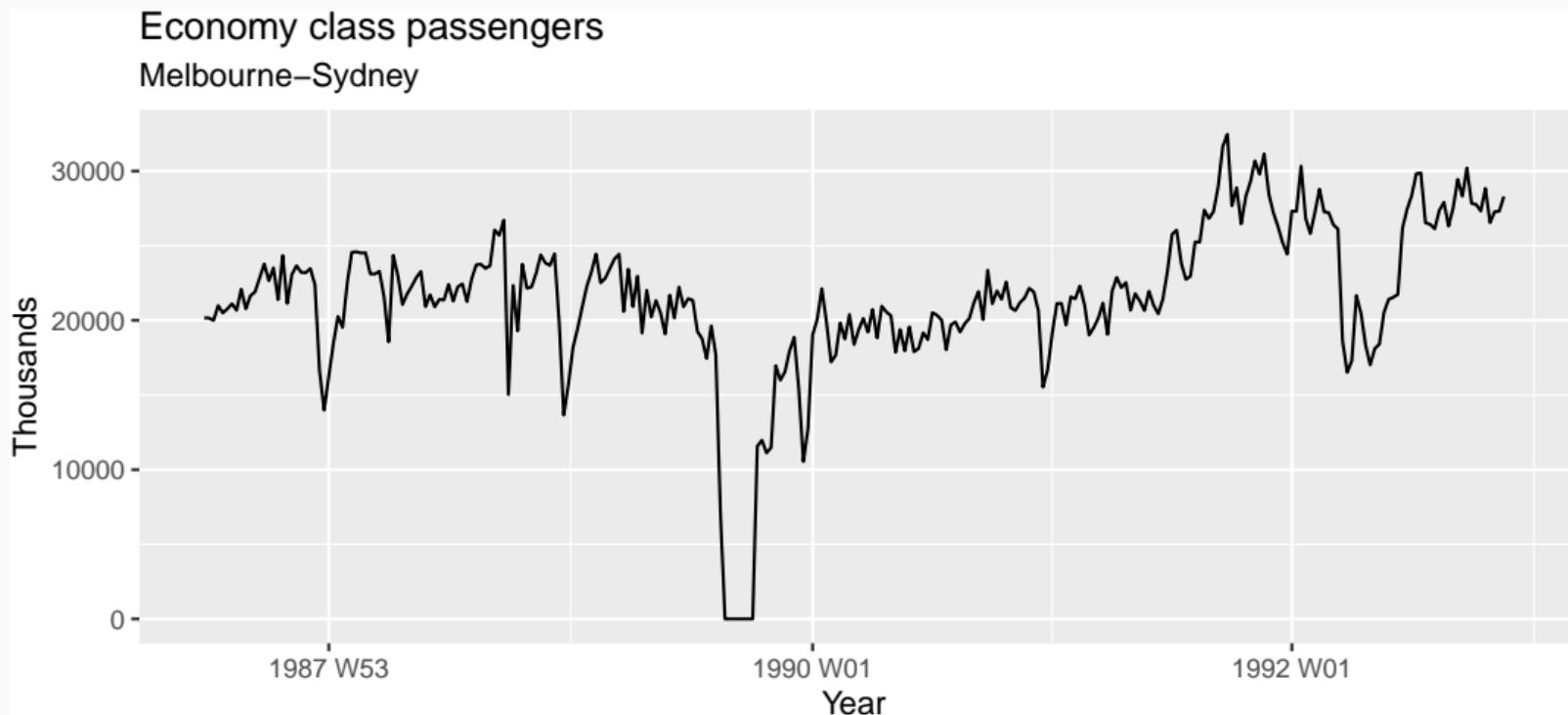
## Additional information

- They can provide a large amount of data on previous vehicles and their eventual resale values.
- The resale values are currently estimated by a group of specialists. They see me as a threat and do not cooperate.

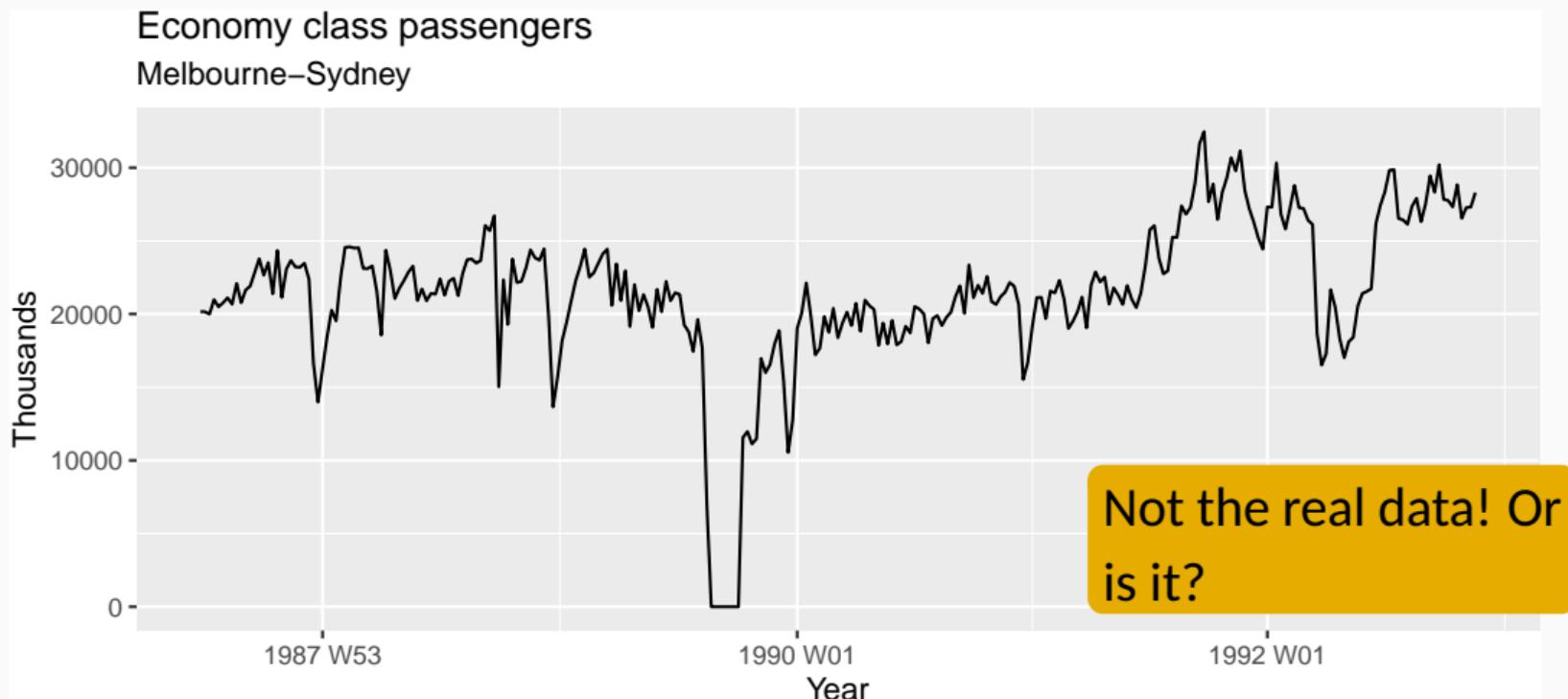
## CASE STUDY 4: Airline



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**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.