

# ETC3550/ETC5550

## Applied forecasting

Revision



# Assignment 1

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- Random walk model says forecast variance =  $h\sigma^2$ .

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## **Maximum temperature at Melbourne airport (Q2)**

- Weather is relatively stationary over similar time of year and recent years.
- So take mean and var of max temp in April over last 10 years.

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## **Seasonally adjusted estimate of total employment (Q4)**

- Probably locally trended.
- Perhaps use drift method based on average monthly change in last 2 years.

# 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

- 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

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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.

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Five Sections, all to be attempted.

- A** Short answers/explanations. Write about 1/4 page on four topics (out of six possible topics). Nuanced answers required.



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- C, D, E** Benchmarks, ETS models, ARIMA models, Dynamic regression models, forecast evaluation.

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**C, D, E** Benchmarks, ETS models, ARIMA models, Dynamic regression models, forecast evaluation.

- Interpretation of R output, but no coding.
- Closed book with ETS formula sheet
- Allowed: a calculator, 1 A4 double-sided sheet of notes, 5 working sheets

# Preparing for the exam

- Exams from 2021–2023 on website.
- Solutions available from 1 June.
- Exercises. Make sure you have done them all (especially the last two topics).
- Identify your weak points and practice them.
- Write your own summary of the material.
- Practice explaining the material to a class-mate.

# Help available

- See us during the consultation times (for details refer to the website).
- Discuss on the forum.

# Useful resources for forecasters

## Organization:

- International Institute of Forecasters.

## Annual Conference:

- International Symposium on Forecasting
  - ▶ Charlottesville, Virginia, June 25–28, 2023

## Journals:

- International Journal of Forecasting
- Foresight (the practitioner's journal)

Links to all of the above at **forecasters.org**

# IIF Best Student Award

- [forecasters.org/programs/research-awards/students/](https://forecasters.org/programs/research-awards/students/)
- US\$100
- A certificate of achievement from the IIF
- One year free membership of the Institute with all attendant benefits. Subscriptions to:
  - ▶ the *International Journal of Forecasting*
  - ▶ the practitioner journal: *Foresight*
  - ▶ The Oracle newsletter

Discounts on conference and workshop fees, and links to a worldwide community of forecasters in many disciplines.

# Happy forecasting

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