

# 1. Getting started

## 1.7 The statistical forecasting perspective

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

Rob J Hyndman  
George Athanasopoulos

# FORECASTING PRINCIPLES AND PRACTICE

A comprehensive introduction to the latest forecasting methods using R. Learn to improve your forecast accuracy using dozens of real data examples.



3RD EDITION

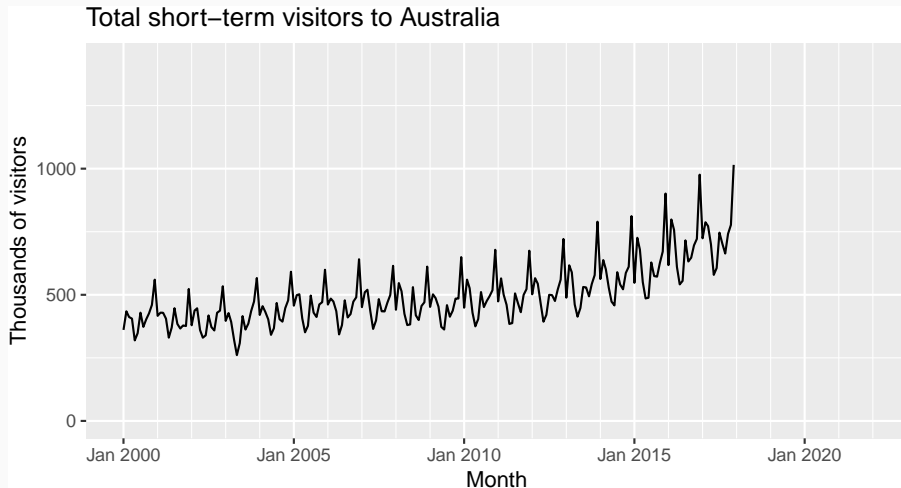
**OTexts**  
OPEN ACCESS TEXTS

# Random futures

A forecast is an estimate of the probabilities of possible futures.

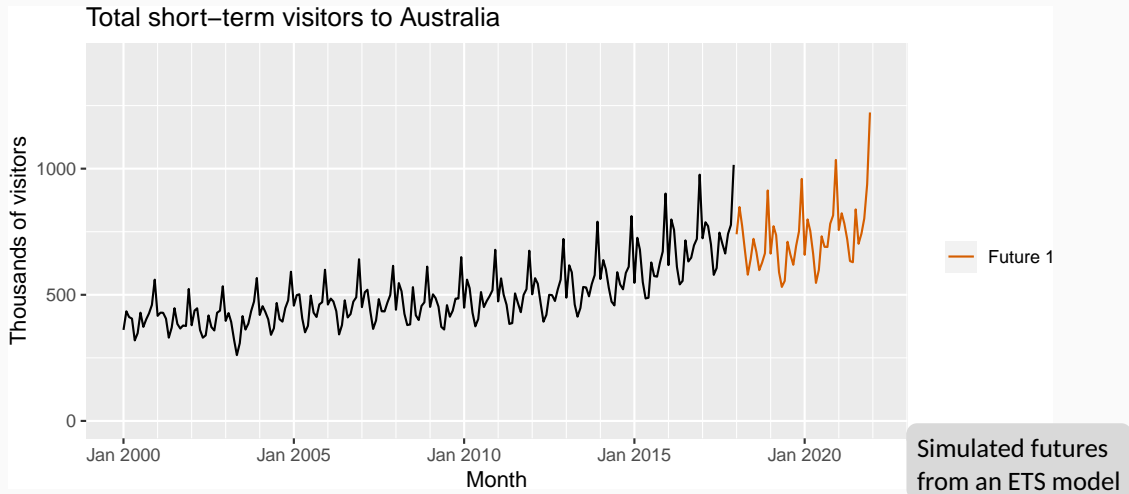
# Random futures

A forecast is an estimate of the probabilities of possible futures.



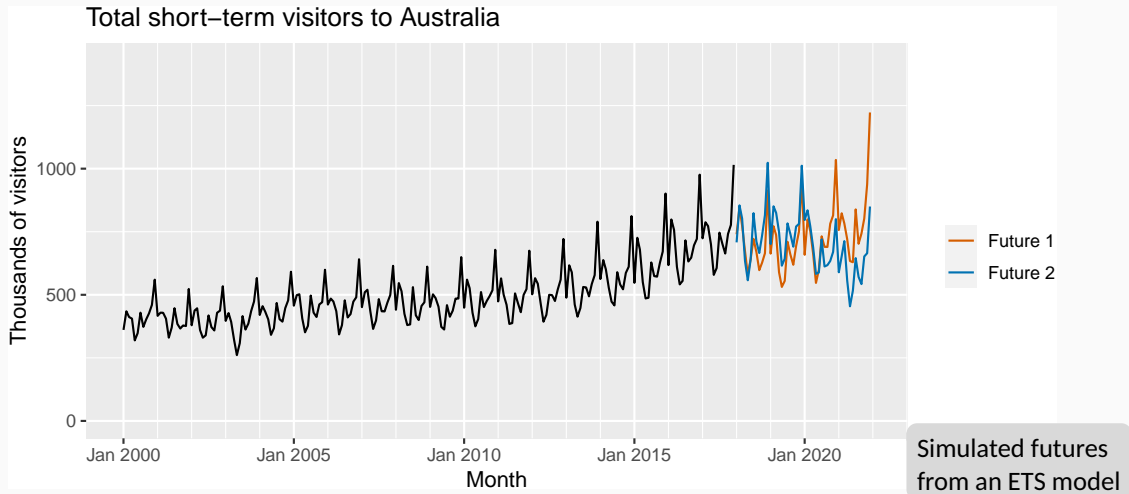
# Random futures

A forecast is an estimate of the probabilities of possible futures.



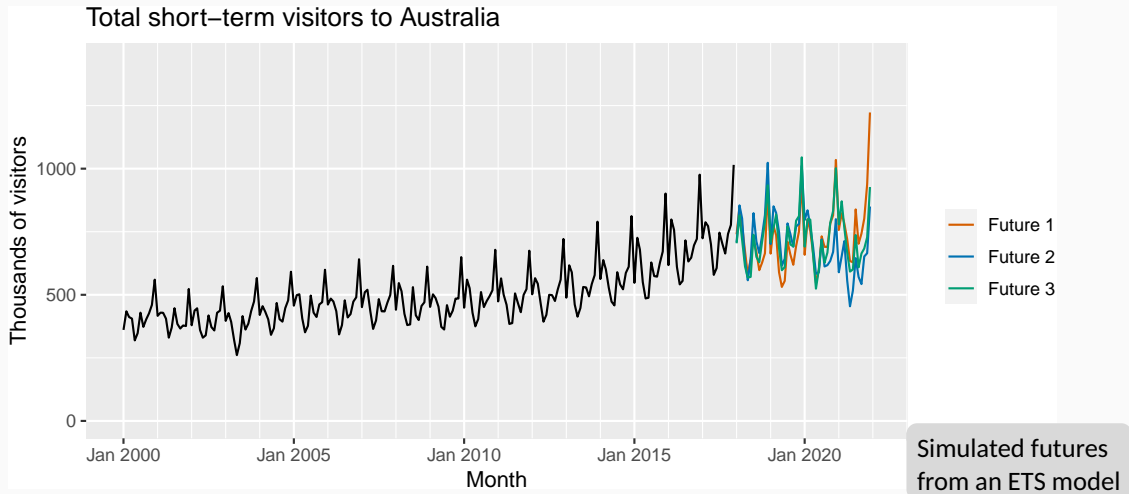
# Random futures

A forecast is an estimate of the probabilities of possible futures.



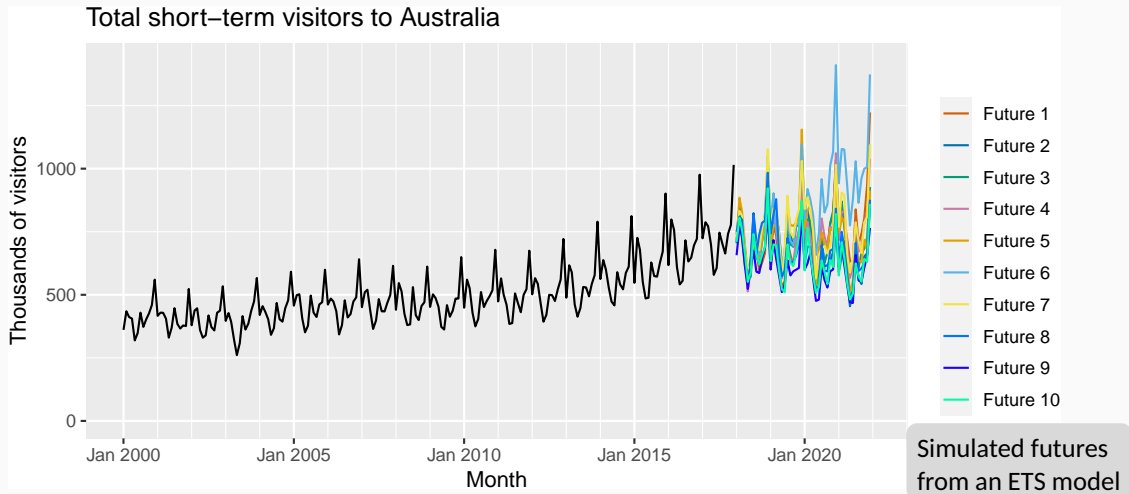
# Random futures

A forecast is an estimate of the probabilities of possible futures.



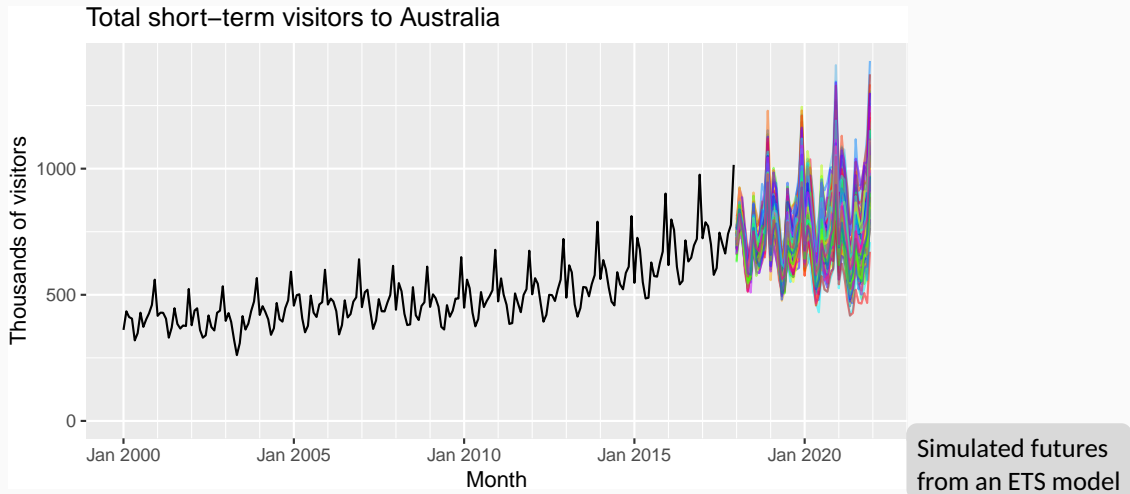
# Random futures

A forecast is an estimate of the probabilities of possible futures.



# Random futures

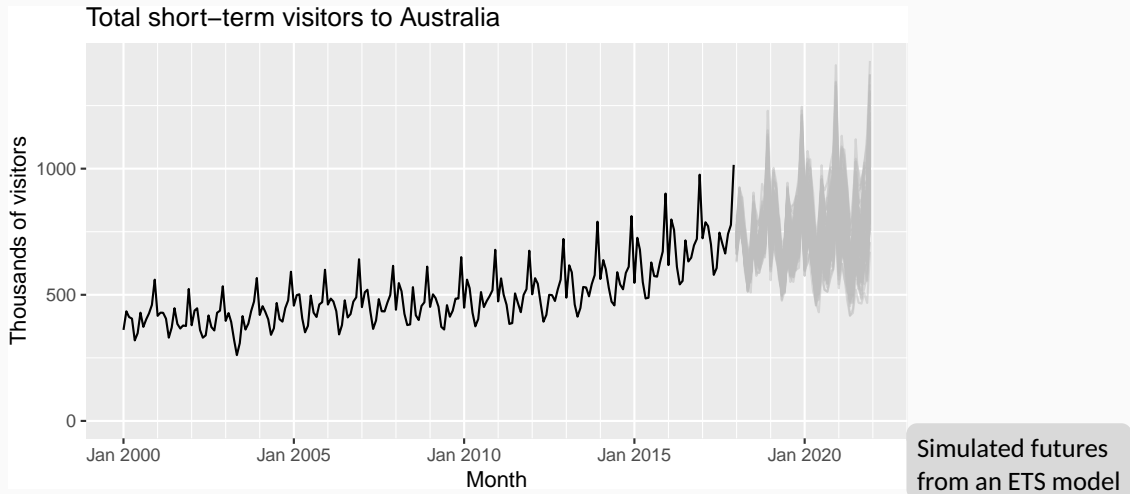
A forecast is an estimate of the probabilities of possible futures.





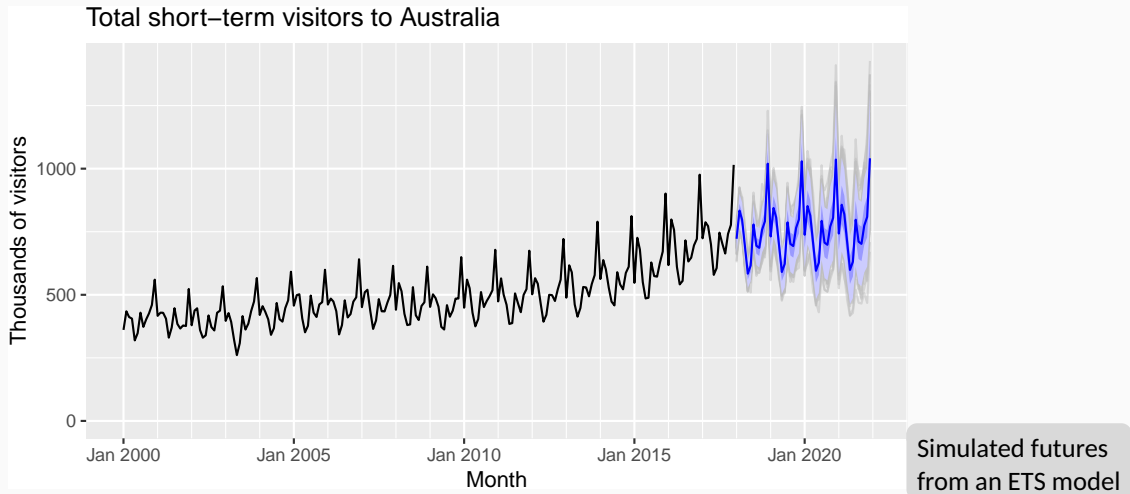
# Random futures

A forecast is an estimate of the probabilities of possible futures.



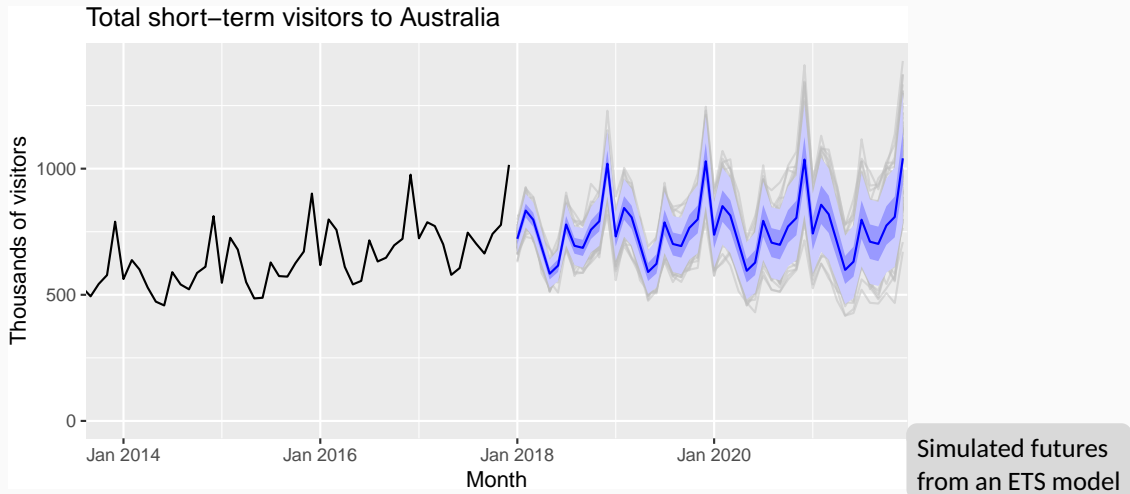
# Random futures

A forecast is an estimate of the probabilities of possible futures.



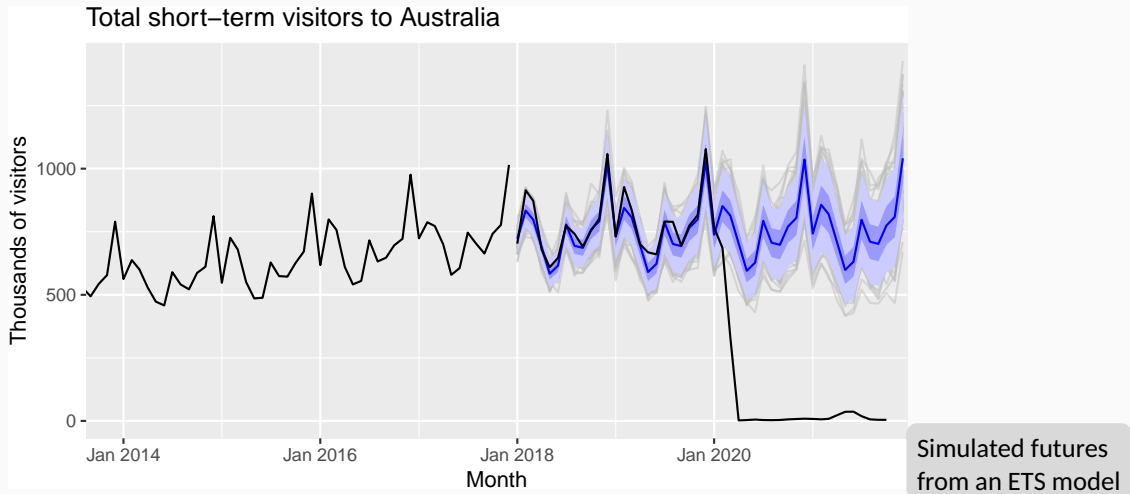
# Random futures

A forecast is an estimate of the probabilities of possible futures.



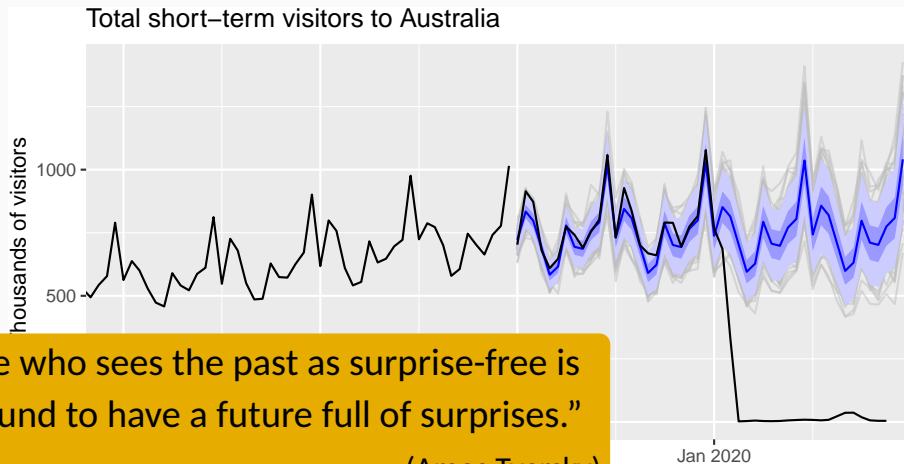
# Random futures

A forecast is an estimate of the probabilities of possible futures.



# Random futures

A forecast is an estimate of the probabilities of possible futures.



“He who sees the past as surprise-free is bound to have a future full of surprises.”

(Amos Tversky)

Simulated futures  
from an ETS model

# Statistical forecasting

- Thing to be forecast: a random variable,  $y_t$ .
- Forecast distribution: If  $\mathcal{I}$  is all observations, then  $y_t|\mathcal{I}$  means “the random variable  $y_t$  given what we know in  $\mathcal{I}$ .”
- The “point forecast” is the mean (or median) of  $y_t|\mathcal{I}$
- The “forecast variance” is  $\text{var}[y_t|\mathcal{I}]$
- A prediction interval or “interval forecast” is a range of values of  $y_t$  with high probability.
- With time series,  $y_{t|t-1} = y_t|\{y_1, y_2, \dots, y_{t-1}\}$ .
- $\hat{y}_{T+h|T} = E[y_{T+h}|y_1, \dots, y_T]$  (an  $h$ -step forecast taking account of all observations up to time  $T$ ).