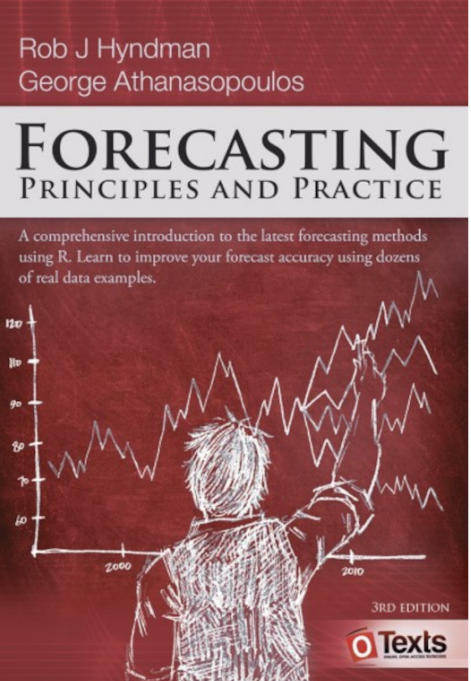

1. Getting started

1.7 The statistical forecasting perspective

OTexts.org/fpp3/

Random futures

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

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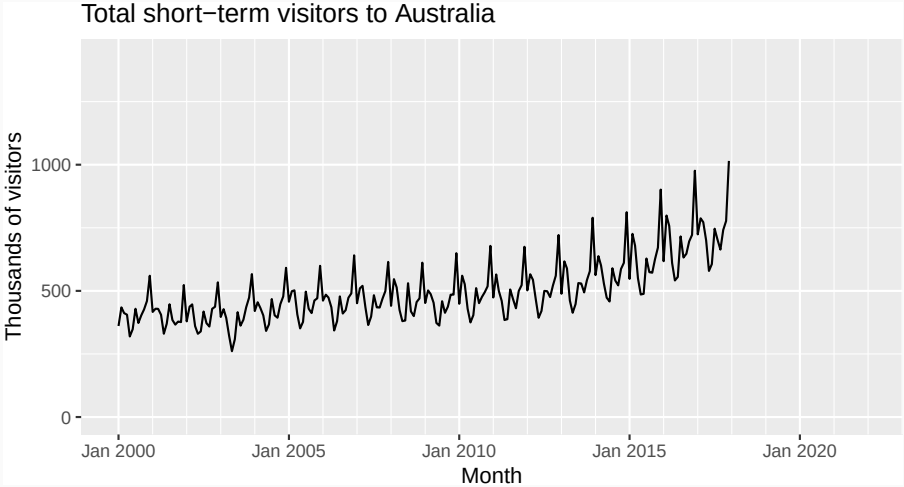

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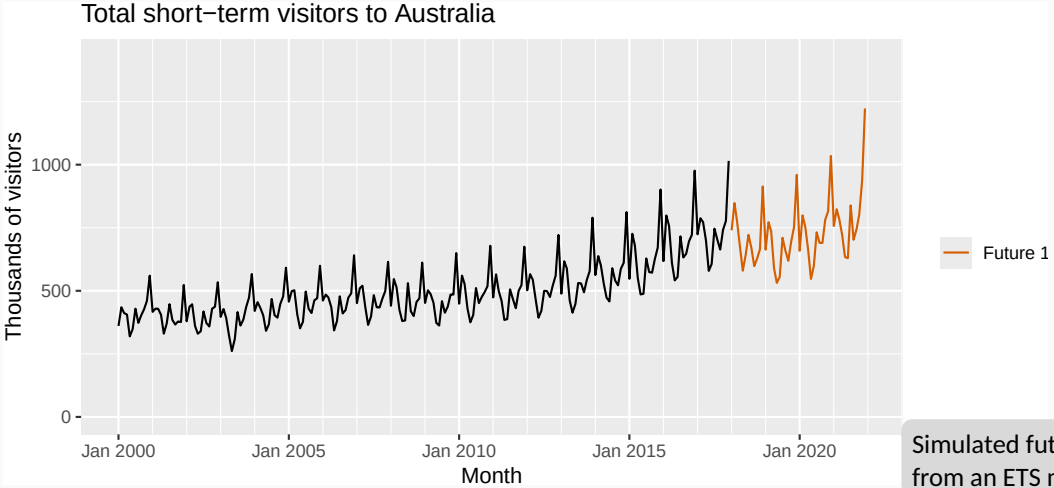

Simulated futures from an ETS model

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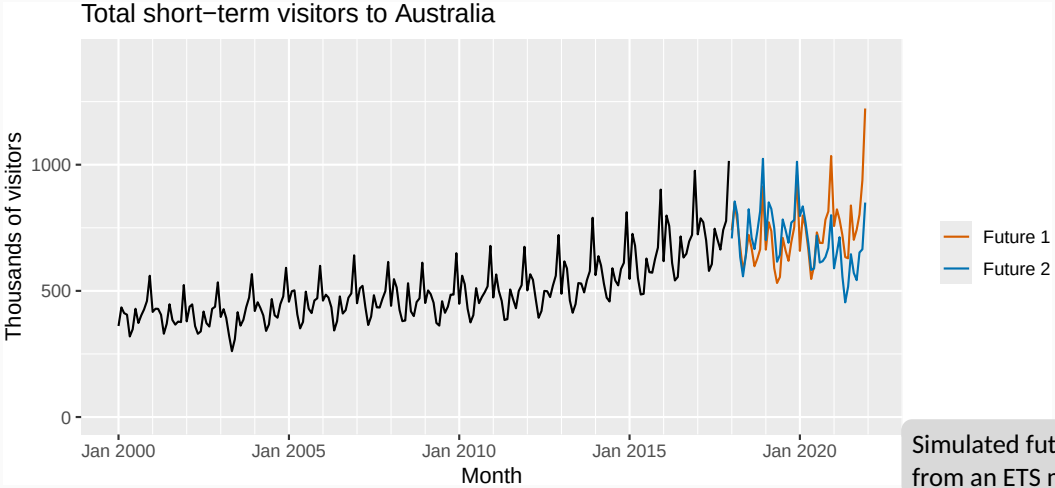

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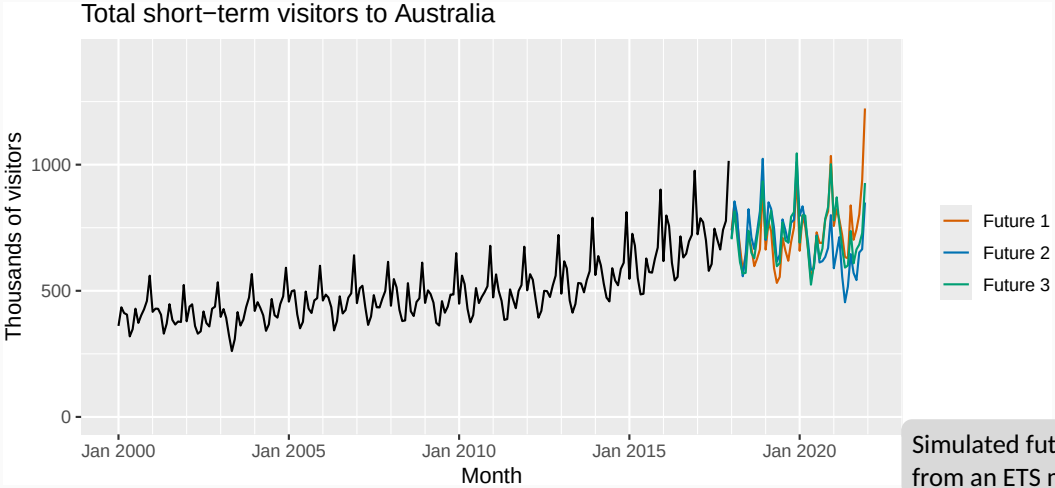

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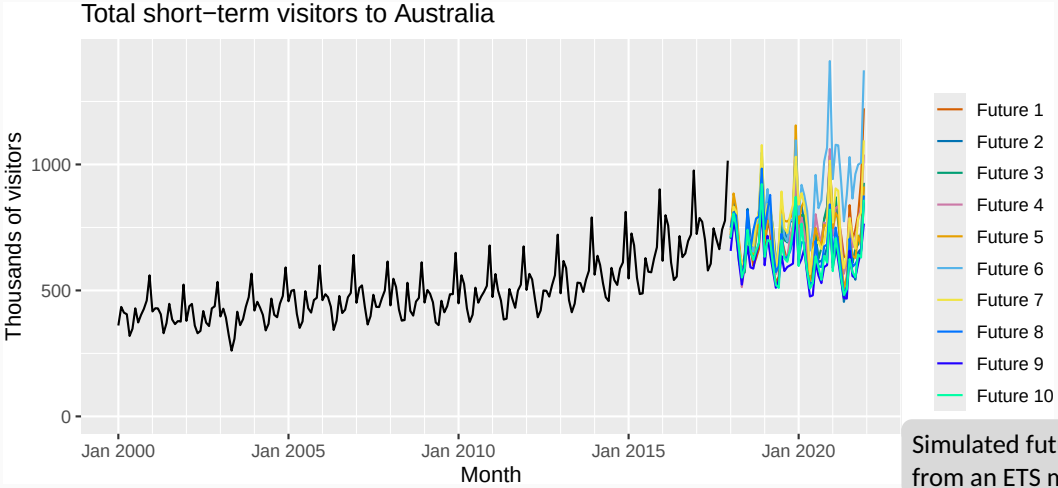

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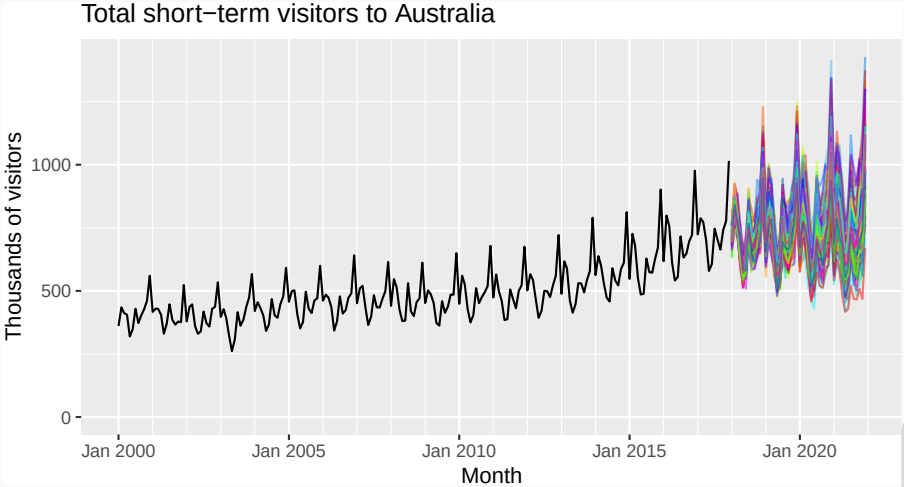

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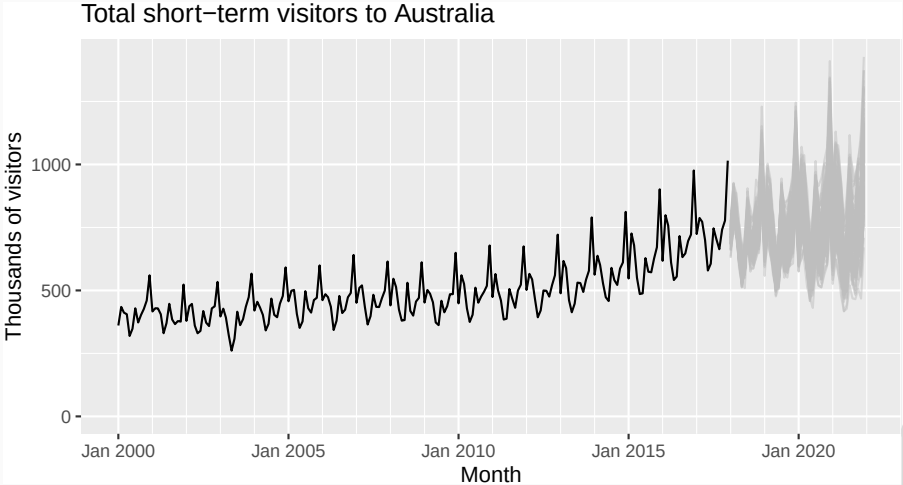

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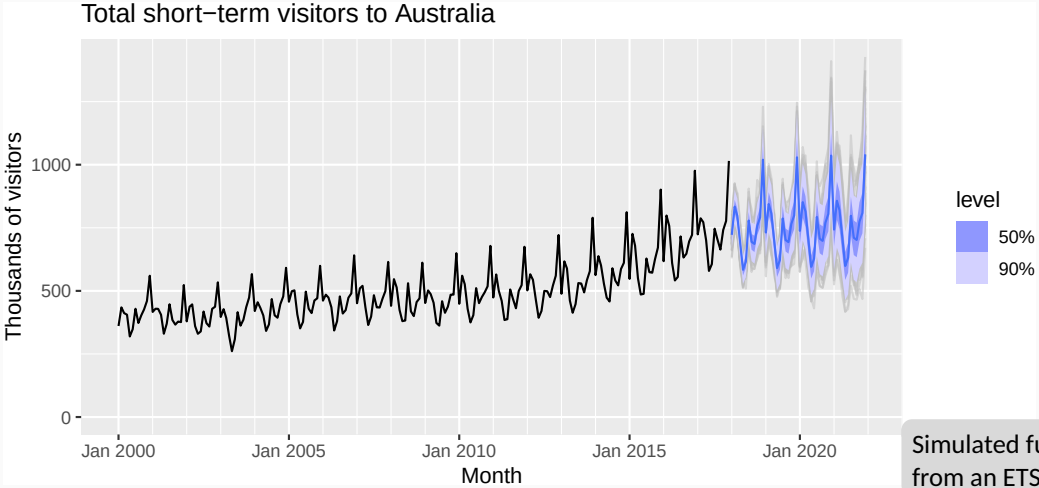

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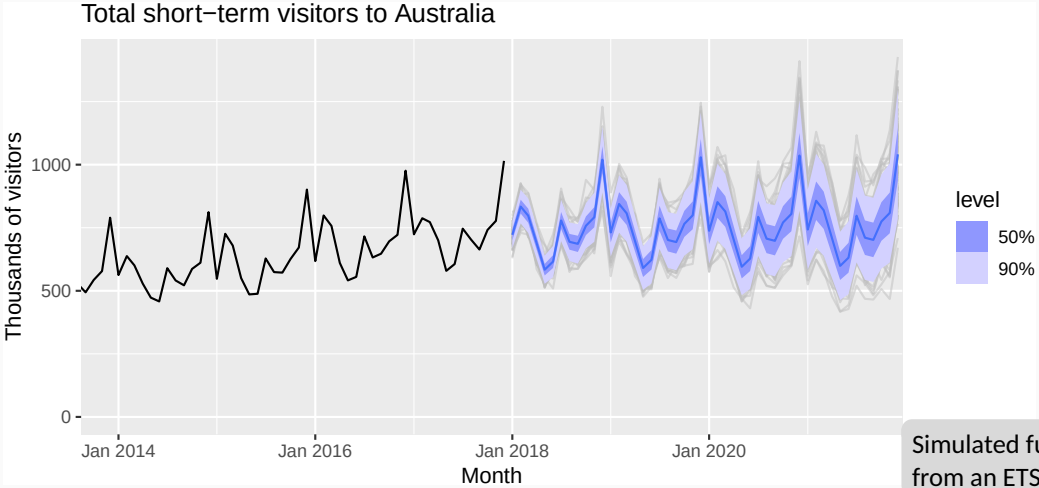

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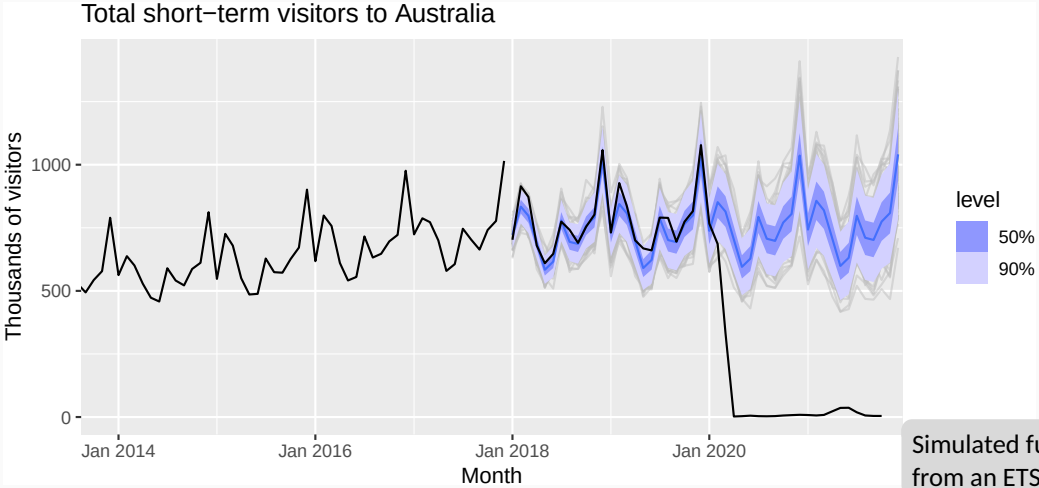

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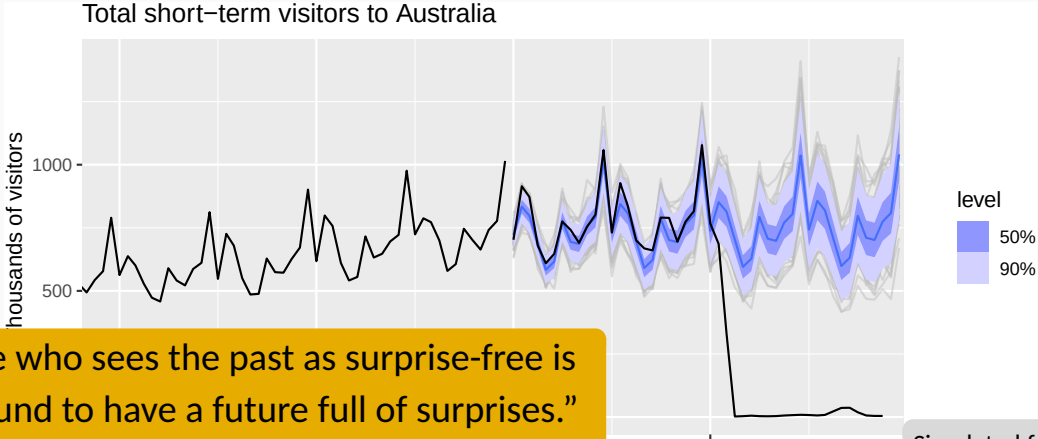

"He who sees the past as surprise-free is bound to have a future full of surprises."

(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 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, $y_{t|t-1} = y_t|\{y_1, y_2, \ldots, y_{t-1}\}$.
- $\hat{y}_{T+h|T} = \mathrm{E}[y_{T+h}|y_1, \ldots, y_T]$ (an h-step forecast taking account of all observations up to time T).