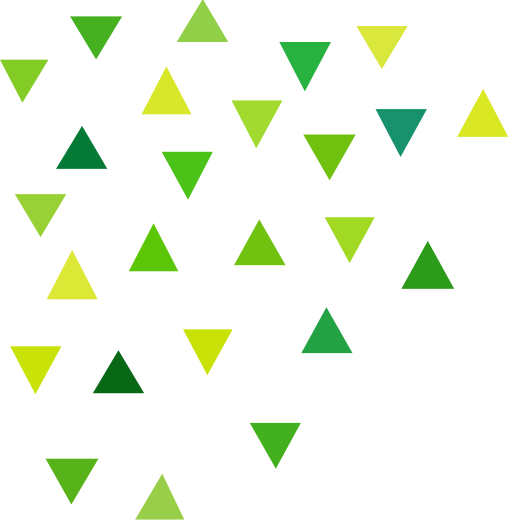

Cannlytics

# Saturday Morning Statistics #19

April 9th, 2022

# The 10 Commandments of Forecasting

1. Know what you are forecasting.
2. Understand the purpose of forecasting.
3. Acknowledge the cost of the forecast error.
4. Rationalize the forecast horizon.
5. Understand the choice of variables.
6. Rationalize the forecasting model used.
7. Know how to present the results.
8. Know how to decipher the forecast results.
9. Use recursive methods.
10. Understand that forecasting models evolve over time.

# Forecast Evaluation

The root mean squared error is defined as

$$RMSE = \sqrt{\frac{1}{T}\sum_{t=0}^{T}(Y_{t+1} - \hat{Y}_{t+1})^2}$$

and can be used to compare forecasts.

# VAR Models

Assume the following system of linear equations for output, $y$, inflation, $\pi$, and the interest rate, $i$.

$$
\begin{aligned}
y_t &= \alpha_y + \cdots + \beta_j y_{t-j} + \cdots + \gamma_j \pi_{t-j} + \cdots + \delta_j i_{t-j} + \mu_t^y \\
\pi_t &= \alpha_\pi + \cdots + \theta_j y_{t-j} + \cdots + \phi_j \pi_{t-j} + \cdots + \lambda_j i_{t-j} + \mu_t^\pi \\
i_t &= \alpha_i + \cdots + \psi_j y_{t-j} + \cdots + \kappa_j \pi_{t-j} + \cdots + \rho_j i_{t-j} + \mu_t^i
\end{aligned}
$$

# VAR Model in Matrix Form

Assume a system of linear equations for output, $y$, inflation, $\pi$, and the interest rate, $i$,

$$
\begin{aligned}
y_t &= \alpha_y + \cdots + \beta_j y_{t-j} + \cdots + \gamma_j \pi_{t-j} + \cdots + \delta_j i_{t-j} + \mu_t^y \\
\pi_t &= \alpha_\pi + \cdots + \theta_j y_{t-j} + \cdots + \phi_j \pi_{t-j} + \cdots + \lambda_j i_{t-j} + \mu_t^\pi \\
i_t &= \alpha_i + \cdots + \psi_j y_{t-j} + \cdots + \kappa_j \pi_{t-j} + \cdots + \rho_j i_{t-j} + \mu_t^i,
\end{aligned}
$$

that can be written in matrix form as

$$
\begin{pmatrix} y_t \\ \pi_t \\ i_t \end{pmatrix} = \begin{pmatrix} \alpha_y \\ \alpha_\pi \\ \alpha_i \end{pmatrix} + A_1 \begin{pmatrix} y_{t-1} \\ \pi_{t-1} \\ i_{t-1} \end{pmatrix} + \cdots + A_j \begin{pmatrix} y_{t-j} \\ \pi_{t-j} \\ i_{t-j} \end{pmatrix} + \begin{pmatrix} \mu_t^y \\ \mu_t^\pi \\ \mu_t^i \end{pmatrix}.
$$

# 🙏 Thank you for coming.

## Insights of the Day

- Now is better than never.
- Record your predictions.
- Evaluate your predictions to make even better forecasts in the future!