**Autoregressions: Problems**

Suppose that you estimate the following AR(1) process:

$$y_t = \alpha + \beta y_{t-1} + e_t \tag{1}$$

1. Suppose that you find that $\beta > 1$. Is this suggestive of misspecification?

2. Suppose that you find that $\alpha > 1$. Is this suggestive of misspecification?

3. Obtain a forecast of $y_{t+1}$.

4. Discuss how you would obtain error bands for this forecast.

Suppose that you estimate the following AR(2) process:

$$y_t = \alpha + \beta_1 y_{t-1} + \beta_2 y_{t-2} + e_t \tag{2}$$

5. Obtain a forecast of $y_{t+1}$.

6. How might you decide how many lags to include in an autoregression.

7. Describe the difference between an autoregression and an autoregressive distributed lag model.