

Bayes, HW 4, Due February 16

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1. Parameter Posterior for the American Returns

Previously we did inference for $\mu|\sigma, y$ and $\sigma|\mu, y$

for the American returns and the model $Y_i \sim N(\mu, \sigma^2)$ iid.
where y denotes the vector of observed monthly returns.

Use the Gibbs sampler:

$$\mu|\sigma, y, \quad \sigma|\mu, y$$

To get MCMC draws from the joint posterior of $(\mu, \sigma)|y$.

How does the burn-in look?

How does the autocorrelation look?

2. Another problem.

Get draws from the predictive distribution

$$p(y_f|y) = \int p(y_f|\mu, \sigma) p(\mu, \sigma|y) d\mu d\sigma$$

All you have to do is draw from $N(y|\mu, \sigma)$ for each of your (μ, σ) draws!!!!!!

This is fantastic !!!!!

Use qqnorm to assess the normality of the predictive distribution.

3. Another problem.

Suppose you invest w of your wealth in the American stock market and the remaining $(1 - w)$ in very low risk government bonds.

As a not unreasonable approximation, we will say that the government bonds pay $r_f = .02/12$ for sure over the next month.

Then for any choice of w the return on your portfolio next month is

$$R_w = (1 - w)r_f + wY_f$$

where Y_f is the same random variable we studied in the previous question.

As an investor, you get to choose w .

Graphically present R_w for a range of w so that you can understand the implications of your choice!