Idea for a trading strategy – back testing sampling from the posterior distribution

**Big Picture:** Use Jacquier’s Bayesian sampling framework and access it’s accuracy on predicting the future

**Acceptance Criteria? :** A distribution of distances from the median/ mean, the *location* on the empirical distribution

**Details:**

The project was a Bayesian Monte Carlo simulation using VIX data. We used an AR(3) model with weekly VIX data to find the posterior distribution of the next VIX return.

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I computed this AR(3) process using 200 (numb\_obs) observations of the log return per prediction. To calculate the distribution of the betas, we sampled 50,000 (nsim) times from a multivariate normal distribution with 0 mean and covariance matrix X’X-1. To find the actual value of the β, we multiplied the betas by the variance of the draws and the added the MLE average to create the normal distribution for the betas.

Once we obtained the betas we calculated the noise. The noise is the product of the variance of the draws and a standard normal. We then multiplied the distribution of the betas by the returns and added the noise to find the posterior distribution of the noise. We raised the distribution to the power e.

We then found the location of the actual VIX on that distribution. The main function returns that empirical location of the VIX and several parameters of the posterior distribution as well, such as the mean and 5 quantiles.

We repeat this process for a continuous 200 day rolling window of the fix. We found the model mean overestimated the VIX 83% of the time by an average of 0.3 and underestimated 27% by 0.13 on average.