Homework 5 report

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Problem 1

a

Buy-and-hold strategy:

Rebalancing strategy: Parameters:

- S_0: initial stock price.
- S_t: stock price at time t.
- x_t: number of stock shares at time t.
- C_t: cash held at time t in dollar.

Use the Monte Carlo to simulate the stock price to get all S_t, and then update all all C_i and x_i:

$$C_{t+1} = \frac{x_t S_{t+1}}{2}$$
$$x_{t+1} = \frac{C_1}{S_1}$$

Monte Carlo simulations:

- $u = 2$
- $d = 0.5$
- $p_u = p_d = 0.5$

Running the attached code, we can get,

$$E(U) = \quad var(U) =$$
$$E(V) = \quad var(V) =$$

To get 95% confidence interval, we should $\delta = 0.05$, $z_{1-\delta/2} = 1.96$, then the confidence interval become

$$[\hat{Y} - 1.96\frac{\sigma}{\sqrt{n}}, \hat{Y} + 1.96\frac{\sigma}{\sqrt{n}}][,]$$

Problem 2

Problem 3

Problem 4