

Math 420, Spring 2013

Fourth Group Homework

due Monday, 1 April, 2013

In the following exercises consider the risky assets in groups (A) and (B) of your final project.

Exercise 1. For each asset consider its daily return rate history $\{(d, r(d))\}_{d=1}^{D_h}$ over the six year period starting July 1 of 2006. Use plots of these histories to explain when each of these assets is a good candidate to be mimiced by an IID model.

Exercise 2. Consider one-year histories of daily share price data for each asset over the years ending June 30 of 2007-2012. Use the unbiased estimators $\hat{\mu}$, $\hat{\xi}$, $\hat{\gamma}$, and $\hat{\theta}$ given by

$$\hat{\mu} = \frac{1}{D} \sum_{d=1}^D r(d), \quad \hat{\xi} = \frac{1}{D-1} \sum_{d=1}^D (r(d) - \hat{\mu})^2,$$
$$\hat{\gamma} = \frac{1}{D} \sum_{d=1}^D x(d), \quad \hat{\theta} = \frac{1}{D-1} \sum_{d=1}^D (x(d) - \hat{\gamma})^2,$$

to estimate μ , ξ , γ , and θ given the share price history $\{s(d)\}_{d=0}^D$ with

$$r(d) = D \left(\frac{s(d)}{s(d-1)} - 1 \right), \quad x(d) = D \log \left(\frac{s(d)}{s(d-1)} \right).$$

How do $\hat{\mu}$ and $\hat{\gamma}$ compare as measures of reward over the years considered? How do $\hat{\xi}$ and $\hat{\theta}$ compare as measures of risk?