Report I - SF2980 Risk Management

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Project − Total Returns

Objectives

(*Instructions: give the project formulation and highlight the objectives*)
In this project we consider a 5-year investment in a portfolio of dividend-paying stocks. The yearly portfolio returns given by S_{t+1}/S_t and the dividends D_{t+1} paid at time $t+1$ are modeled as

$$\frac{S_{t+1}}{S_t} = e^{\mu + 0.2X_{t+1}}, \qquad \frac{S_{t+1}}{S_t} = 0.05 e^{-0.05^2/2 + 0.05Y_{t+1}},$$

where $X_1, \ldots, X_5, Y_1, \ldots, Y_5$ are independent standard normally distributed random variables.

The investment strategy is to start at time 0 with an initial capital of 1 million dollars and to reinvest all dividend payments in the stock portfolio. The objectives are to

(a) determine the function f such that the value V_5 after five years can be written as

$$V_5 = f(\mu, X_1, \ldots, X_5, Y_1, \ldots, Y_5),$$

(b) simulate independent outcomes of the random vector $(X_1, \ldots, X_5, Y_1, \ldots, Y_5)$ and determine the empirical distribution of V_5. We will investigate how the distribution varies with μ and determine the smallest value of μ for which the probability that V_5 exceeds the value of a risk free investment of 1 million dollars in a 5-year zero-coupon bond with zero-rate 5% per year, is 0.75.

Mathematical Background

(*Instructions: provide a mathematical background by explaining the concept of the empirical distribution and explain how to decide the sample size*)

The empirical distribution

The empirical distribution of a sample $Z_1, \ldots, Z_n$ of independent and identically distributed random variables or vectors is. . .

Selecting the sample size

(*Explain how to select the sample size used in this project.*)

...other relevant topics...

Results

(*Explain your derivation of the objective (a) and display and comment on your simulation results in (b). Include tables and figures as needed and refer to them as follows. In Table 1 we see an example of a sample table. In Figure 1 we see an example of sample graphics with a single plot, whereas in Figure 2 we see an example with two plots.*)

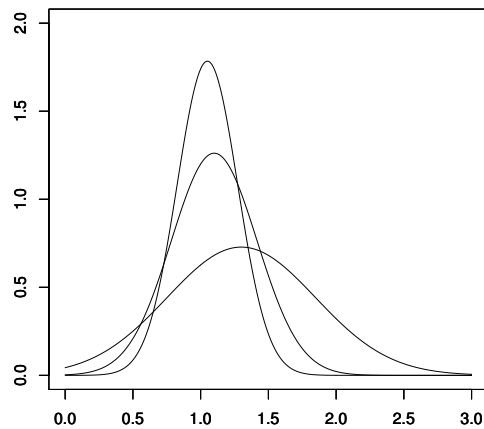| Name	Street	Number	Phone
Henrik	Lindstedtsv.	25	790 6911
Björn	Lindstedtsv.	25	790 7316

Table 1: Sample table. Use informative captions.

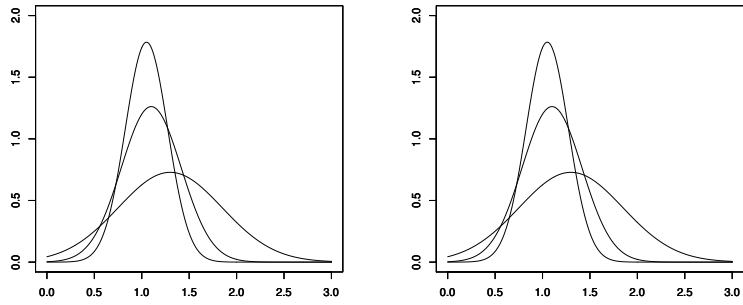Figure 1: Sample graphics. Use informative captions

Figure 2: *Left:* Sample graphics 1. *Right:* Sample graphics 2.

Summary

(Summarize your results and state your conclusions.)

Project – Pension Savings

Objectives

(*Instructions: give the project formulation and highlight the objectives*)

Mathematical Background

(*Instructions: provide a mathematical background by explaining the concept of the empirical distribution, explain how to decide the sample size. You may cut and paste from Project 7*)

Results

(*Explain your derivation of the objective (a) and display and comment on your simulation results in (b)*)

Summary

(*Summarize your results and conclusions.*)