Unit 11 - Week 8: Optimal Portfolio and Consumption

Assignment 8

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

1) Consider a portfolio consisting of 1 bond and 1 stock, whose prices at time $t=0$, are 10 and 30 respectively.
   (a) If the total wealth available at time $t=0$, $W(0)=30$, then the consumption $c(t)$ at time $t=0$.
   (b) What is the portfolio's expected self-financing, equal?

2) Which of the following gives self-financing condition, before consumption at time $t=1$:
   (a) $X(t) - c(t) = \sum_{i=1}^{n} \Delta H_i(t)$
   (b) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t)$
   (c) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t) + \Delta H_i(t)$
   (d) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t) - \Delta H_i(t)$
   (e) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t)$
   (f) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t) + \Delta H_i(t)$
   (g) $X(t) - c(t) = \sum_{i=1}^{n} \Delta S_i(t) - \Delta H_i(t)$

3) Consider an investment opportunity which pays 100 with probability $\frac{1}{2}$ or pays 150 with probability $\frac{1}{2}$.
   If an investor has the utility function $U(x) = \frac{x^{0.5}}{0.5}$, then the expected utility for the investor in this investment opportunity equals:

4) Consider two opportunities over a single period ($t=0$ and $t=1$):
   (1) Opportunity 1: The invested money earns 0% interest rate.
   (2) Opportunity 2: The invested money doubles or halves each with equal probabilities.
   If an amount of 40 is invested in Opportunity 1 and an amount of 60 is invested in Opportunity 2, with the utility function $U(x) = x^{0.5}$, then the expected utility at time $t=1$, equals:

5) Suppose that we have an amount of 100 for investment, for a single period.
   We invested 5 units of each stock at time $t=0$ at a price of $S(t) = 100$, per stock, with the remaining amount being invested at the risk-free rate of 10% per period. If the stock is modeled using the binomial model with
   
6) Consider a binomial model with $E(U) = 100$, $u = 1.3$, $d = 0.9$, $p = \frac{1}{2}$ and $q = \frac{1}{2}$
   (a) the expected utility at time $t=1$, for $U(x) = x^{0.5}$.

7) State whether the following is TRUE or FALSE:
   (a) The Dynamic Programming Principle approach for portfolio optimization is used in the discrete-time setting.
   TRUE
   FALSE

8) Suppose that the stock price follows a binomial model where the stock price grows up by $a$ with probability $p$ or goes down by a factor $d$ with probability $1-p$.
   For an investor with $r^{t+1} = (1-a)$, if $r^{t+1} = (1-d)$, which means a fraction of the wealth $r^{t+1}$ at stock-free rate and the remaining wealth in the stock, the Dynamic Programming Principle between times $F^{-1}$ and $T$ is given by:
   (a) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (b) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (c) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (d) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (e) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (f) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (g) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$
   (h) $V(T-1, r) = \max_{E(r^{T,H}) \in \mathbb{R}} \left[ r^{T-1} \left( \frac{1}{1-r} \right) \right]$

Due on 2020-11-11, 23:59 (UTC)