Economics of Finance

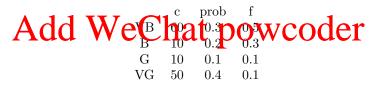
Tutorial 5

1. Two securities X and Y make the following payments (for each dollar invested) in the good and bad weather states:

$$\begin{array}{cccc} & X & Y \\ B & 1.10 & 0.80 \\ G & 1.00 & 1.50 \end{array}$$

Suppose the good outcome occurs with probability 0.6 and the bad outcome with probability 0.4.

- (i) Compute the expected rate of return on securities X and Y.
- (ii) Compute the atomic security prices.
- (iii) Compute the risk-free rate of return. Construct a portfolio of securities X and Y that pays the same amount in the good and bad states.
- (iv) Compute the expected rate of return and risk premia of the atomic securities.
- (v) Compute the forward prices of the atomic securities (risk neutral probabilities)
- (vi) Compare the coward price of each atomic security with the probability of that state being observed. Why are the forward prices and associated probabilities not equal?
- 2. Consider the portotic part of the probabilities of the probabilities and forward prices (risk neutral probabilities) of each state



Suppose the risk-free rate of return is 5 percent.

- (i) Compute the risk premium of portfolio Z.
- (ii) Compute the risk premia of the four atomic securities.
- (iii) Will the *market* portfolio pay a risk premium in this case? Explain.
- 3. (Expected utility) Suppose you are faced with the following gamble scenario:
 - Consume 6000 with probability 0.4
 - Consume 3000 with probability 0.6.

Suppose further that your utility function is:

$$u(c) = \frac{c^{1-\gamma}}{1-\gamma},$$

where $\gamma = 1/2$. (Later will learn that γ is the coefficient of relative risk aversion. The higher γ , the more you dislike risk)

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- (a) What is your expected utility?
- (b) What is your expected consumption?
- (c) What is your attitude towards risk?
- (d) Certainty equivalent, CE, refers to the guaranteed amount of consumption that an individual would view as equally desirable as a risky gamble, that is, $EU_{\text{gamble}} = u(CE)$. Compute the certainty equivalent of the gamble.
- (e) Suppose now that the coefficient of relative risk aversion is $\gamma = 2$. Answer to the questions (a)–(d) above for with $\gamma = 2$. Are agents more or less tolerant to risk than before?
- 4. (The Role of Finance) Consider an economy in which a representative agent lives for two periods, year 0 and year 1. The representative agent derives utility from consumption and their time discount rate is β . Suppose there is no uncertainty. The agent life-time utility is given by:

$$U(c_0, c_1) = \ln(c_0) + \beta \ln(c_1),$$

The agent receives an initial endowment, e, at time zero and receives income (say from labor) in period zero and one, y_0 and y_1 , respectively. The agent can save, s, or borrow (negative s) money at interest rate i.

- (a) Write down the maximization problem in detail.
- (b) Write down the Lagrangian that represents the maximization problem.
- (c) DAssignment Project Exam Help
- (d) Interpret the trade-offs you find.
- (e) Solve for equilibrium consumption, and saving/borrowing.
- (f) Suppose $y_0 = 0.4$, e = 0.6 and $y_1 = 3$, $\beta = 0.98$ while i = 0.05. Compare the welfare (utility) of equilibrium with financing options (saving/borrowing available) and without. Comment on your result.

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