

Supplement Questions: Preference toward Risk and Insurance Premium

1. Consider two investment opportunities in assets: Asset A and Asset B. Asset A will generate a payoff of 0.50 million THB with probability of 30 percent, a payoff of 1 million THB with probability of 40 percent, and a payoff of 1.5 million THB with probability of 30 percent. For asset B, it might generate a payoff of 0.5 million THB with 20 percent probability, a payoff of 1 million THB with 60 percent probability, and 1.5 million THB with 20 percent probability.
 - a. Show that the two assets generate the same expected value, but the first one has higher variance. Hence, show that the first lottery is riskier than the second. **(Ans.: Both EV = 1 million THB, Asset A's variance is 0.15 and Asset B's variance is 0.1)**
 - b. A risk-averse investor has utility function $U = \sqrt{21I}$ where I denoted the payoff of the lottery (in Million THB). Which lottery does decision maker prefer? – That is, which one has the bigger expected utility? **(Ans.: Expected Utility for Asset A is 4.898 and for Asset B is 4.932)**
2. Using the information in 1, if an investor is risk neutral, with utility function $U = 21I$ while the other is risk loving, with utility function $U = 25I^2$ where I denoted the payoff of the lottery in million THB.
 - a. Which lottery does the risk- neutral investor prefer? **(Ans.: Indifferent, both same expected utility)**
 - b. Which lottery does the risk- lover investor prefer? **(Ans.: Asset A with expected utility of 28.75)**
3. Sketch the graphs of the following utility function as I (income) varying over the range 0 to 100. Based on these graphs, indicate whether the investor is risk-averse, risk-neutral, or risk-lover.
 - a. $U = 10I - \left(\frac{1}{8}\right)I^2$ **(Ans.: Risk-Averse)**
 - b. $U = \left(\frac{1}{8}\right)I^2$ **(Ans.: Risk-Lover)**
 - c. $U = \ln(I + 1)$ **(Ans.: Risk-Averse)**
 - d. $U = 5I$ **(Ans.: Risk-Neutral)**
4. Given Utility function: $U = \sqrt{100I}$, the start-up job offer lottery: one payoff is \$104,000, and the other payoff is \$4000. The probability of each payoff is 0.5.
 - a. Find the risk premium associated with the start-up company's salary offer. **(Ans.: Risk Premium is \$16,801)**
 - b. Suppose that the start-up company offered you a zero salary but a bonus of \$108,000 if the company meets its growth targets. (This has the same expected value but a higher variance than the initial offer, as you can easily verify) Given the same probability, what is the risk premium associated with this offer? **(Ans.: Risk Premium is \$27,000)**
5. Your current disposable income is 90,000 THB. Suppose there is a 1 percent chance that your house may burn down, and if it does, the costs of repairing will 80,000 THB, reducing your disposable income to 10,000 THB. Suppose, too, that your utility function is $U = \sqrt{100I}$.
 - a. Would you be willing to spend 500 THB to purchase an insurance policy that fully insures you against you loss? **(Ans.: Without insurance, your expected utility is 2,980. With insurance, your expected utility is 2,991.70. So you will prefer having insurance)**
 - b. What is the highest price that you would be willing to pay for an insurance policy that fully insures you in the event that your house burns down? **(Ans.: The most you'd be willing to pay is \$1,196)**