Sang Hwa Lee

INST 354

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LAB 4

Part I _ Suppose a graduating student is choosing between two jobs:

- Company A offered $50,000 for sure.
- Company B offered different salaries based on the firm's profits; it offered a 49% chance of earning $40,000, a 49% chance of earning $50,000, and a 2% chance of earning $100,000.

1. What is the expected value of Job B? Please show you work.

EV of B

0.49 * (40,000) + 0.49 * (50,000) + 0.02(100,000)

19,600 + 24,500 + 2,000 = 46,100

2. Which job should the student choose, according to the expected value rule.

Expected value of A – 50,000

Expected value of B – 46,100

Then, the student has to choose A, because expected value A is higher than B.

Part II

Now suppose the student focuses on the utility of each salary rather than the dollar amount. Assume the utility associated with earning $40,000 is 0 and the utility associated with earning $100,000 is 1. Also, assume that the probabilities at which the student is indifferent between the two companies is when Company B offers a 48% chance of earning $40,000, a 48% chance of earning $50,000, and a 4% chance of earning $100,000.

1. What is the utility associated with earning $50,000. Please show your work.

1) To get U(50,000), I have to recognized utility of $40,000 and $100,000. “Assume the utility associated with earning $40,000 is 0 and the utility associated with earning $100,000 is 1.”

2) Also, I’ll change U(50,000) to X so that is easy to calculate.

3) Then utility of U(40,000) = 0, U(100,000) = 1, U(50,000) = X

FORMULA

$$U(50{,}000) = .48 \text{ x } U(40{,}000) + .48 \text{ x } U(50{,}000) + .04 \text{ x } U(100{,}000)$$

$$\Rightarrow X = 0.48 * 0 + 0.48 * X + 0.04 * 1$$

$$\Rightarrow X = 0 + 0.48X + 0.04 \qquad \textit{Divide by X}$$

$$\Rightarrow 1 = 0.48 + \frac{0.04}{X} \quad \Rightarrow \quad 1 - 0.48 = \frac{0.04}{X}$$

$$\Rightarrow 0.52 = \frac{0.04}{X} \quad \Rightarrow \quad 0.52X = 0.04 \quad \Rightarrow X = \frac{0.04}{0.52} = 0.076923076\ldots$$

Then, X is 0.077 , U(50,000) = 0.077

2. What the expected utility of each job? Please show your work.

U(40,000) = 0, U(100,000) = 1, U(50,000) = 0.077

EUA = 1 * 0.077 = 0.077

EUB = (0.48 * 0) + (0.48 * 0.077) + (0.04 * 1) = 0 + 0.03696 + 0.04 = 0.7696

Therefore, if I check the value of the expected utility, I can get this calculated value.