

ECON2103 Microeconomics

Chapter 5 Exercises

1. You are an insurance agent who must write a policy for a new client named Sam. His company, Society for Creative Alternatives to Mayonnaise (SCAM), is working on a low-fat, low-cholesterol mayonnaise substitute for the sandwich-condiment industry. The sandwich industry will pay top dollar to the first inventor to patent such a mayonnaise substitute. Sam's SCAM seems like a very risky proposition to you. You have calculated his possible returns table as follows:

Probability	Return	Outcome
0.999	-\$ 1,000,000	(he fails)
0.001	\$ 1,000,000,000	(he succeeds and sells his formula)

- a. What is the expected return of Sam's project? What is the variance?
- b. What is the most that Sam is willing to pay for insurance? Assume Sam is risk neutral.
- c. Suppose you found out that the Japanese are on the verge of introducing their own mayonnaise substitute next month. Sam does not know this and has just turned down your final offer of \$1000 for the insurance. Assume that Sam tells you SCAM is only six months away from perfecting its mayonnaise substitute and that you know what you know about the Japanese. Would you raise or lower your policy premium on any subsequent proposal to Sam? Based on his information, would Sam accept?
2. Suppose that Natasha's utility function is given by $u(I) = \sqrt{10I}$, where I represents annual income in thousands of dollars.
- a. Is Natasha risk loving, risk neutral, or risk averse? Explain.
- b. Suppose that Natasha is currently earning an income of \$40,000 ($I = 40$) and can earn that income next year with certainty. She is offered a chance to take a new job that offers a 0.6 probability of earning \$44,000 and a 0.4 probability of earning \$33,000. Should she take the new job?

- c. In (b), would Natasha be willing to buy insurance to protect against the variable income associated with the new job? If so, how much would she be willing to pay for that insurance? (*Hint*: What is the risk premium?)
3. Suppose that two investments have the same three payoffs, but the probability associated with each payoff differs, as illustrated in the table below:

Payoff	Probability (Investment <i>A</i>)	Probability (Investment <i>B</i>)
\$300	0.10	0.30
\$250	0.80	0.40
\$200	0.10	0.30

- a. Find the expected return and standard deviation of each investment.
- b. Jill has the utility function $U = 5I$, where I denotes the payoff. Which investment will she choose?
- c. Ken has the utility function $U = 5\sqrt{I}$. Which investment will he choose?
- d. Laura has the utility function $U = 5I^2$. Which investment will she choose?