

Quiz: Probability and Expected Utility

Econ 155, Spring 2008

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Answer each question listed below. Partial credit will be rewarded, so *show all work*.

Question 1

Suppose a household with constant absolute risk aversion faces a Bernoulli risk—that is, with probability $0 < p < 1$, the household suffers a disaster and loses $d > 0$ dollars, and with probability $(1 - p)$, loses nothing.

- Derive the expected value and variance of the risk faced by the household in terms of p and d .
- Using these expressions and the Arrow-Pratt equation derived in class, provide the household's willingness to pay for insurance against a disaster in terms of p and d .

Question 2

You are (hypothetically) an insurer, and you provide medical insurance. After years of hard work and steady research, you have discovered that the CDF of medical risk of those you insure is *always* characterized by an exponential distribution. That is, the probability that someone's annual medical expenditures are less than $\$T$ is:

$$\Pr(\tilde{t} < T) = 1 - e^{-\lambda T},$$

where λ is that person's risk parameter.

- What is the pdf of the risk faced by the person in question?
- Would you expect a young person to have a larger λ than an old person? (Hint: the expectation of an exponential random variable is λ^{-1} .)
- A colleague of yours claims that medical risks can *always* be described by the normal distribution. Why might your colleague be wrong?