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 Econ 812

HW #6 Answer Key

1. Consider the following gambles:

- Gamble 1: 50% chance of \$100, 50% chance of \$0.
- Gamble 2: 10% chance of \$50,000, 40% chance of \$10,000, 50% chance of \$1.
- Gamble 3: Equal chances of \$100, \$1000, \$10,000, \$100,000, and \$1,000,000.

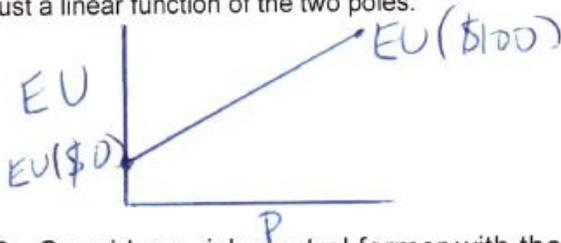
Fill in the certainty equivalents:

Just calculate the EU, then take the inverse of the utility function to find the wealth level necessary to reach that utility level. Ex: in the first row, the first gamble's $EU = .5 * 100^{.5} + .5 * 0 = 5$. If $x^{.5} = 5$, then $x = 25$.

EU	Gamble 1	Gamble 2	Gamble 3
$x^{.5}$	\$25	\$3951	\$85,013
x	\$50	\$9000.50	\$222,220
x^2	\$70.71	\$17,029	\$449,467

2. An EU maximizer gets \$100 with probability p and \$0 with probability $(1-p)$. Graph EU as a function of p .

When $p=1$, he just gets $EU(\$100)$. When $p=0$, he just gets $EU(\$0)$. The EU of the gambles is just a linear function of the two poles.



3. Consider a risk-neutral farmer with the cost function $TC = q^2$. The market price is 10 with $p = .5$, and 1 with $p = .5$. If the farmer has RE, what is his profit-maximizing output level? If the farmer believes do not satisfy RE (he thinks $p = a$), solve for lost profit as a function of a .

The farmer maximizes $.5 * 10q + .5 * q - q^2$. $q^* = 2.75$. Expected profits are therefore $5.5 * 2.75 - 2.75^2 = 7.5625$. If the farmer instead maximizes $a * 10q + (1-a)q - q^2$, $q^* = (9a+1)/2$, and profits are $5.5 * (9a+1)/2 - [(9a+1)/2]^2$. Lost profits are therefore $7.5625 - \{5.5 * (9a+1)/2 - [(9a+1)/2]^2\}$.

4. Suppose your probability of finding a job is given by $p = f^{-5}$, where f is the fraction of your time that you devote to job search. Your gross EU of getting a job is 10; your gross EU without a job is 0. Your net $EU = EU(\text{job outcome}) - b * f^2$. Solve for your optimal f .

$EU = p \cdot 10 + (1-p) \cdot 0 - bf^2$. Subbing in and simplifying:

$$EU = f^{-5} \cdot 10 - bf^2$$

Taking the derivative wrt f :

$$5f^{-6} - 2bf = 0. \quad f^* = (.4b)^{-2/3}$$

5. Suppose your $EU = w^{-.5}$, and insurance is sold at twice the actuarially fair rate. Your uninsured income is \$40,000 with $p = .9$, and \$10,000 with $p = .1$. Solve for your optimal quantity of insurance.

If insurance is sold at twice the actuarially fair rate, then getting \$ i in the bad state costs $2 \cdot .1 \cdot i$. Thus, the problem requires us to:

$$\max_i .9(40,000 - .2i)^{-.5} + .1(10,000 - .2i + i)^{-.5}$$

simplifying:

$$\max_i .9(40,000 - .2i)^{-.5} + .1(10,000 + .8i)^{-.5}$$

Thus:

$$.9 \cdot .5 \cdot -.2 \cdot (40,000 - .2i)^{-1.5} + .1 \cdot .5 \cdot .8(10,000 + .8i)^{-1.5} = 0$$

$$(40,000 - .2i)^{-1.5} = .444(10,000 + .8i)^{-1.5}$$

$$40,000 - .2i = 5.0625 \cdot (10,000 + .8i)$$

$$i^* = -2500$$

Thus, with a sufficiently high price of insurance, a risk-averse agent is still willing to SELL insurance.

6. Do your beliefs about your overall academic performance satisfy RE? (1 paragraph)

I would say that mine do, at least roughly. I did not expect undergraduate studies at UC Berkeley to be much harder than high school, and they were not. I did expect graduate studies at Princeton to be markedly harder than undergrad, and it was. But I did expect to pass all of my exams the first time, and I did.

7. Use search theory to explain optimal test-taking strategy. (1 paragraph)

You should equate the marginal point gain of a minute of time, so that working one more minute along any margin has the same expected points. Thus, the more points a problem is worth, ceteris paribus the more time you should devote to it. If there are problems where the total point benefit is less than the total point cost, you should skip them. If you find yourself unable to make

progress on a question, you should give up and switch to some other problem where your time earns you points.

8. After reading Caplan's *Economic Journal* piece, pick the belief typical of economists that you agree with the least. Where are your fellow economists going wrong? Is this systematic or random error? (half a page)

Most economists doubt that high taxes are a problem and tax cuts are economically beneficial. I disagree. I think, though, that this difference arises because most economists assume that spending remains constant. If it did remain constant, I believe that the expert consensus is correct: Cutting taxes while maintaining spending implies increased borrowing, which probably has about the same effects as taxation. I, in contrast, envision tax cuts as part of an overall program of privatization and service cuts. The main systematic error I would attribute to other economists is in underestimating the benefits of a general reduction in government activity.