

ECO 601
Fall 2002
Problem Set #6

1. TFUE: Jack and Jill purchase a dozen eggs and must take them down the hill to their home. There is a 50% chance that Jack will trip on the way home and break anything he is carrying. Likewise, there is a 50% chance that Jill will trip on the way home and break anything she is carrying. Jack's falling down and Jill's falling down are independent events. They consider two alternative strategies. The first involves either Jack or Jill carrying all twelve eggs, and the second involves Jack carrying six eggs in his basket and Jill carrying the other six in her basket. Since Jack and Jill are risk seekers, they should ignore their mother's advice "never to put all of one's eggs in one basket."
2. In a recent debate involving the two candidates for mayor of Lexington, a difference of opinion arose about how best to curb illegal parking in Lexington. Theresa Crosby suggested that we should double the penalty and hold the probability of detection constant. Scott Isaac argued that we should double the probability of detection and hold the penalty constant. Who has the better approach? Hint: Are parking violators likely to be risk averters or risk seekers?
3. Buffy's current wealth (which includes her car and all of her other assets) is \$100,000. The chance that she will lose her \$20,000 automobile through theft, fire, or accident in the next year is 25%. Buffy's von Neumann-Morganstern utility of wealth function is logarithmic, i.e. $U(W)=\ln(W)$.
 - a) In a world where administrative costs are zero, what would an actuarially fair premium be?
 - b) If Buffy can buy insurance at this price, should she do so? Calculate her utility if she does and if she does not buy insurance for her automobile.
 - c) What is the maximum premium that Buffy would be willing to pay for auto insurance?
4. Billy John Pigskin of Mule Shoe, Texas has a von Neumann-Morganstern utility function of the form $U(c)=c^{-5}$. Billy John also weighs about 300 pounds and can outrun jackrabbits and pizza delivery trucks. Billy John is beginning his fourth year of college football. If he is not seriously injured, he will receive a \$1,000,000 contract for playing professional football. If an injury ends his football career, he will receive a \$40,000 contract as a refuse removal facilitator in his home town. There is a 10% chance that Billy John will be injured badly enough during the season to end his career.
 - a) What is Billy John's expected utility?
 - b) If Billy John pays \$p for an insurance policy that would give him \$1,000,000 if he suffers a career ending injury while in college, then he would be sure to have an income of \$1,000,000 - p no matter what happens to him. Write an equation that can be solved to find the largest price that Billy John would be willing to pay for such an insurance policy.
 - c) Solve this equation for p.