Uncertainty and Information

MULTIPLE CHOICE

1. Probability is sometimes defined as
   a. the expected profit of a fair bet.
   b. the most likely outcome of a given experiment.
   c. the outcome that will occur on average for a given experiment.
   d. the relative frequency with which an event will occur.

   ANS: D
   The probability of an event happening is, roughly speaking, the relative frequency with which it occurs.

   PTS: 1 REF: 516

2. Expected value is defined as
   a. the profit on a fair bet.
   b. the most likely outcome of a given experiment.
   c. the outcome that will occur on average for a given experiment.
   d. the relative frequency with which an event will occur.

   ANS: C
   The expected value of an experiment with a number of uncertain outcomes is the size of the outcome that the player will win on average.

   PTS: 1 REF: 517

3. If a fair game is played many times the monetary losses or gains will
   a. approach zero.
   b. be negative.
   c. be positive.
   d. result in an outcome that cannot be determined without more information.

   ANS: A
   The expected value of a fair game is zero, which means that if the game is played many times the payoffs will be equal to the costs of the game.

   PTS: 1 REF: 517

4. People who choose not to participate in fair games are called
   a. risk takers.
   b. risk averse.
   c. risk neutral.
   d. broke.

   ANS: B
   Risk averse persons are unwilling to accept fair games. People who are risk neutral or risk takers choose to participate in fair games.

   PTS: 1 REF: 519

5. A game can be described as “fair” if the expected value of the game (including any costs of play) is
   a. positive.

b. zero.
c. negative.
d. one.

ANS: B
Fair games are games for which the costs are equal to the expected gains, i.e. games with an expected value (including any costs of play) of zero.

PTS: 1 REF: 517

6. Risk aversion is best explained by
a. timidity.
b. increasing marginal utility of income.
c. constant marginal utility of income.
d. decreasing marginal utility of income.

ANS: D
Risk averse people are unwilling to accept fair gambles because the utility associated with the payoffs in a risky situation increases less rapidly than the dollar value of these payoffs.

PTS: 1 REF: 519

7. An individual will never buy complete insurance if
a. he or she is risk averse.
b. insurance premiums are unfair.
c. he or she is a risk taker.
d. insurance premiums are fair.

ANS: C
Risk-averse individuals will buy complete insurance, and some individuals will purchase insurance even when premiums are unfair, as long as this provides a higher utility level than facing the world uninsured. On the other hand, if an individual is a risk taker, the gains from a risky option are worth more in utility terms than the losses, and this individual will not be willing to give up some amount of income (by purchasing insurance) to completely avoid taking a risk.

PTS: 1 REF: 522

8. With moral hazard fair insurance contracts are not viable because
a. individuals' aversion to risk is reduced.
b. insurance company's administrative costs are increased.
c. individuals fear unscrupulous agents.
d. probabilities of loss are increased over what is expected.

ANS: D
When people purchase insurance they tend to change their behaviour, which makes them more likely to incur losses. If the insurance is fair, which means that the premium is equal to the expected value of the loss, and this expected value does not take into account moral hazard, insurance contracts are not viable. This happens because the payments the insurance company would have to make would be larger than the amount they collect through insurance premiums.

PTS: 1 REF: 525

9. Risk-averse individuals will diversify their investments because this will
a. increase their expected returns.
b. provide them with some much-needed variety.

c. reduce the variability of their returns.
d. reduce their transactions costs.

ANS: C
By reducing the variability of investment returns, diversified strategies reduce the risk an individuals is exposed to. This increases the utility of a risk-averse individual, so risk-averse will diversify their investments.

PTS: 1 REF: 525

10. An individual is willing to pay something for information because
a. information is costly.
b. it is always better to know than not to know.
c. this allows him or her to increase utility.
d. information is a public good.

ANS: C
If an individual is better informed about the likelihood of an event, he can make a better informed choice, i.e. a choice that will increase his level of utility. The monetary value of this increase in utility is the maximum the individual is willing to pay for information.

PTS: 1 REF: 533

11. An individual may choose to acquire less than all available information because
a. that level of information would maximize utility given his or her budget constraint.
b. that would violate the assumption of risk aversion.
c. there are increasing returns to additional information.
d. there are decreasing marginal costs to acquiring information.

ANS: A
Information is costly, and individuals will choose to acquire more only as long as this increases their utility. They will stop when acquiring more information starts to be detrimental to their utility. An individual will choose to acquire the amount of information which would maximize his utility subject to his budget constraint, and this amount could be lower than the available maximum

PTS: 1 REF: 534

12. Adverse selection arises because
a. insurance buyers have more information than insurance sellers.
b. insurance sellers have more information than insurance buyers.
c. individuals can select which insurance company to patronize.
d. insurance companies can exercise too much control over who they insure.

ANS: A
Potential insurance buyers who know that an unfortunate event is likely to happen will purchase insurance in larger proportions than potential buyers who do not. Thus insurance sellers will end up with a set of clients for which the likelihood of the unfortunate event is higher than it is for a random sample of the population. This results in the insurer paying out more in losses than expected, unless the insurer finds a way to control who buys the policies offered.

PTS: 1 REF: 525

13. Adverse selection in competitive insurance markets harms
a. high risk individuals.
b. low risk individuals.

c. owners of insurance companies.
d. everyone.

ANS: B
Adverse selection leads to an increase in insurance premiums, which might deter low-risk individuals from purchasing insurance.

PTS: 1 REF: 525 | 539

14. One way the "lemons problem" in the used-car industry can be mitigated is by
a. raising the price of used cars.
b. hiring auto experts to sell used cars.
c. requiring sellers to guarantee trouble-free cars.
d. allowing owners to trade in their own cars when they purchase a used car.

ANS: C
Assume used cars are of two types (good cars and lemons) and only the owner of a car knows for certain into which category that vehicle falls. If buyers cannot differentiate between good cars and lemons, all used cars sell for the same price, somewhere between the true worth of the two types. In this case only lemons will be traded on the used-car market. One way to mitigate this problem is by requiring sellers to guarantee trouble-free cars. In this situation, good cars will also be traded on the market, since owners have a way to signal their quality.

PTS: 1 REF: 541

15. An example of adverse selection is
a. purchasing a new car based on the recommendation of a neighbour.
b. high health insurance premiums resulting from the poor health of people who buy policies.
c. suppliers who charge more for better quality clothing than for lower quality clothing.
d. being talked into buying a low-quality item because the price is lower.

ANS: B
Adverse selection occurs when one of the parties involved is better informed, and this results in distortions. This is a problem in health insurance, since people with poor health are more inclined to purchase insurance than healthier people. Since an actuarially fair insurance which does not take this aspect into account is not viable, insurance companies have to increase the insurance premiums, which might deter relatively healthy people from purchasing insurance at all.

PTS: 1 REF: 541

16. If markets are perfect, a rational actor may reasonably conclude from the high price of a good that the good
a. is produced by a monopoly.
b. is a better quality.
c. only has a few consumers.
d. is not known about by other consumers.

ANS: B
There is no asymmetry of information between buyers and sellers in perfect markets, so when the buyers purchase a product they cannot be misled about its quality. Thus a higher-price good must be a good of a better quality.

PTS: 1 REF: 540

17. In volatile markets, "speculators" would be expected to provide some stability because

a. they will be required to do so by the government.
b. they will use current price moves to predict future moves.
c. they will buy when price is below equilibrium and sell when it is above equilibrium.
d. they will buy when price is above equilibrium and sell when it is below equilibrium.

ANS: C
The actions of speculators could be viewed as a signal for the future evolution of the market, contributing to the information available to market participants. Speculative purchases at a price below equilibrium will eventually drive the price up. The presence of numerous suppliers willing to sell at a high price will eventually drive the price towards the equilibrium price.

PTS: 1 REF: 542

18. A market participant who obeys the principles of rational expectations will base his or her expectations of market price on
a. all possible information about supply and demand curves.
b. all possible information about the history of price movements.
c. rational behaviour by other market participants.
d. rational behaviour by government regulators.

ANS: A
Individuals obeying the principles of rational expectations will use all available information on supply and demand to determine the equilibrium price. The expected value of the price is equal to the value determined by supply and demand plus a random error with an expected value of zero. This is in contrast to individuals obeying the principle of adaptive expectations, who base their expectations of market price on the history of price movements.

PTS: 1 REF: 540

19. The "lemons model" predicts quality deterioration in the used car market because
a. used cars require increasing maintenance.
b. suppliers and demanders have different information about cars' quality.
c. used cars are generally of a lower quality than new cars.
d. people will usually buy new cars if they are available.

ANS: B
The "lemons model" predicts that, when owners cannot signal the quality of their cars and all used cars sell at the same price, only bad used cars will be sold in the market. This happens because of the asymmetric information available to buyers and sellers.

PTS: 1 REF: 541

20. A market characterized by imperfect information will have an equilibrium price if at that price
a. quantity demanded equals quantity supplied when all participants have the same information.
b. quantity demanded equals quantity supplied given prevailing information levels.
c. quantity demanded equals quantity supplied under perfect information.
d. quantity demanded exceeds quantity supplied if suppliers are better informed (and vice versa).

ANS: B
Asymmetric information may result in economically inefficient allocations, but this does not mean that an equilibrium price does not exist. This price is given by the supply-demand equality, given prevailing information levels.

PTS: 1 REF: 540

21. Which of the three following games is fair?
I. Win \$150 with probability 1/2, lose \$150 with probability 1/2.
II. Win \$150 with probability 3/5, lose \$225 with probability 2/5.
III. Win \$150 with probability 2/3, lose \$120 with probability 1/3.
a. I
b. only I and II
c. only I and III
d. I, II, and III

ANS: B
A game is fair if its expected value is zero. As shown below, only the first two games are fair.

$$I.\$150\frac{1}{2}-\$150\frac{1}{2}=0$$

$$II.\$150\frac{3}{5}-\$225\frac{2}{5}=0$$

$$III.\$150\frac{2}{3}-\$120\frac{1}{3}=\$60$$

PTS: 1 REF: 517

22. Kyle's utility function from winning prizes (x) is x^2, and his marginal utility is $MU_x = 2x$. What is his attitude towards risk?
a. He is risk-neutral.
b. He is risk-averse.
c. He is risk-loving.
d. None of the above.

ANS: C
We need to determine whether prizes have a constant, decreasing or increasing marginal utility for Kyle. If x =1, $MU_x = 2$, and if x=2, $MU_x = 4$, which shows that the marginal utility of prizes is increasing. This means that Kyle is a risk-loving person, since his utility increases more rapidly than the dollar value of prizes.

PTS: 1 REF: 519

23. Stephanie's utility from a certain level of income, x, is given by $U(x) = \sqrt{x}$. She may (1) retain her current level of income (\$650) without taking any risk; (2) take a fair bet with a 50-50 chance of winning or losing \$250; (3) take a fair bet with a 50-50 chance of winning or losing \$350. Which of the following statements is true?
a. She is indifferent between the three choices.
b. She would rather retain her current level of income, but if she had to take one of the two fair bets, she would take the \$250 bet.
c. The \$350 bet is preferred to the \$250 bet, which is preferred to having \$650 for sure.
d. She would rather retain her current level of income, and she is indifferent between the two bets.

ANS: B
We need to calculate the expected utilities of the three options.
(1) the utility receive from \$650 is $\sqrt{650} \approx 25.5$.

(2) the expected utility from taking a fair bet with a 50-50 chance of winning or losing $250 is given by $0.5\sqrt{650-250}+0.5\sqrt{650+250}=10+15=25$.
(3) the expected utility from taking a fair bet with a 50-50 chance of winning or losing $350 is given by $0.5\sqrt{650-374}+0.5\sqrt{650+374}=8.31+16=24.31$.

We can see that her utility from having $650 for certain is higher than her utility from the $250 bet, which is higher than the utility of the $350 bet.

PTS: 1 REF: 520

24. Stephanie's utility from a certain level of income, x, is given by $U(x)=\sqrt{x}$. What is her expected utility from a bet in which she could win $675 with an 80% chance, and lose $675 with a 20% chance, given that she currently has $4,900?
a. 36.36.
b. 72.73.
c. 66.93.
d. 95.85.

ANS: B
If she wins, she gets $4,900 + $675 = $5,575, and if she loses, she gets $4,900 - $675 = $4,225. Since the probability of winning is 80% and the probability of losing is 20%, her expected utility from this bet is $0.8\sqrt{5,575}+0.2\sqrt{4,225}=59.73+13=72.73$.

PTS: 1 REF: 520

25. Stephanie's utility from a certain level of income, x, is given by $U(x)=\sqrt{x}$, and she currently has $1,000. What is the certainty equivalent of a gamble in which she would be risking an equally probable gain or loss of $156?
a. 0.
b. 31.53.
c. 994.14.
d. 1000.

ANS: C
We first need to calculate the expected utility of the $156 gamble:
$U=0.5\sqrt{1156}+0.5\sqrt{844}=17+14.53=31.53$.
The certainty equivalent of this gamble is the certain amount of money which has the same utility as the expected utility of the gamble. We know that $U(x)=\sqrt{x}=31.53\Rightarrow x=994.14$. Stephanie is indifferent between having $994.14 with certainty, and taking the gamble in which she could either win or lose $156 with equal probability.

PTS: 1 REF: 521

26. Stephanie's utility from a certain level of income, x, is given by $U(x)=\sqrt{x}$. She can either receive $900 for certain, or take a bet in which she could receive $400 with probability *p* or $1,400 with probability *(1-p)*. What value of *p* would make her indifferent between these two options?
a. 0.5.
b. 0.57.
c. 0.43.
d. 0.27.

ANS: C

The utility from receiving \$900 for certain is $U(900) = \sqrt{900} = 30$. The expected utility from receiving \$400 with probability *p* or \$1,400 with probability *(1-p)* is $U(bet) = p\sqrt{400} + (1-p)\sqrt{1400} = 20p + 37.42(1-p) = 37.42 - 17.42p$. We need to find the value of *p* for which these two utilities are equal: $37.42 - 17.42p = 30 \Leftrightarrow 17.42p = 7.42 \Leftrightarrow p = 0.43.$

PTS: 1 REF: 520

27. Stephanie's utility from a certain level of income, x, is given by $U(x) = \sqrt{x}$. She can either receive \$10,000 for certain, or take a bet in which she could receive \$14,000 with probability *p* or \$6,000 with probability *(1-p)*. What is the excess in winning probability over the fair odds that would make her indifferent between the two options?
a. 1%.
b. 5%.
c. 7%.
d. 10%.

ANS: B

The utility of having \$10,000 with certainty is $U(10,000) = \sqrt{10,000} = 100$. The expected utility from receiving \$14,000 with probability *p* or \$6,000 with probability *(1-p)* is $U(bet) = p\sqrt{14,000} + (1-p)\sqrt{6,000} = 118.32p + 77.46(1-p) = 77.46 + 40.86p$. Stephanie would be indifferent between these two options if $77.46 + 40.86p = 100$, or $p \approx 0.55$. The excess in winning probability over the fair odds is 5%.

PTS: 1 REF: 520

28. Ryan's utility from a certain level of income, x, is given by $U(x) = \sqrt{x}$. He currently has \$5,000, and he has a 50% chance of winning or losing \$1,000. What is the (approximate) maximum amount he would be willing to pay to avoid the risk?
a. \$50.
b. \$100.
c. \$200.
d. \$400.

ANS: A

The expected utility of the two possible outcomes is $U = 0.5\sqrt{4,000} + 0.5\sqrt{6,000} \approx 70.35$. The certainty equivalent of this risky situation is the amount of money (c) which would make Ryan equally happy if received with certainty: $U(c) = \sqrt{c} \approx 70.35 \Rightarrow c = 4,949.49$. This amount of money has the same utility as the risky situation, which means that the maximum he would be willing to pay to avoid the risk is the difference between \$5,000 and \$4,949.49, i.e. approximately \$50.

PTS: 1 REF: 522

29. Kate, an undergraduate student with a \$15,000 annual income, faces a 50-50 chance of incurring \$1,000 in dentist bills. What premium would she have to pay for an actuarially fair full insurance policy?
a. \$250.
b. \$500.
c. \$700.

d. $1,000.

ANS: B
An actuarially fair insurance premium has to be equal to the expected value of the loss. In this case, the expected value of the loss is 0.5x$1,000 = $500, so the premium should be set at $500. After paying the premium, Kate would have $14,500 left, whether she has to incur the dentist expense or not.

PTS: 1 REF: 523

30. Your current annual income is $30,000 and there is a 50% chance that your home will be flooded and you will have to pay $5,000 to have it repaired. If you have an insurance policy, the insurance company will reimburse your $5,000 expenses in case the flood happens. What is the maximum amount you would be willing to pay for full insurance, given that your utility from how much you can spend is $U(x) = \ln x$?
a. $5,000.00.
b. $2,365.42.
c. $2,500.00.
d. $2,613.87.

ANS: D
If you do not purchase insurance, there is a 50% chance that you will have $25,000 and a 50% chance that you will have $30,000 at the end of the year. Your expected utility is $U = 0.5\ln(25,000) + 0.5\ln(30,000) = 0.5(10.13 + 10.31) = 10.22$. You could reach the same level of utility by having an amount of money for certain. Let c be the certainty equivalent: $U(c) = \ln(c) = 10.22 \Rightarrow c = e^{10.22} = 27,386.13$. The maximum amount you would be willing to pay for an insurance policy would be $30,000 - $27,386.13 = $2,613.87. Any insurance premium higher than $2,613.87 and your utility from having full insurance falls short of what would be obtained when facing the world uninsured.

PTS: 1 REF: 524

31. Your current annual income is $30,000 and there is a 50% chance that your house will be affected by a hurricane and you will have to pay $10,000 for the repairs. If you have an insurance policy, the insurance company will reimburse your $10,000 expenses if your house is damaged by a hurricane. Your utility function is $U(x) = 2x$. What is the maximum amount you would be willing to pay for the insurance premium?
a. the actuarially fair insurance premium.
b. $100 above the actuarially fair insurance premium.
c. $500 below the actuarially fair insurance premium.
d. none of the above.

ANS: A
The expected value of the loss is 0.5 x $10,000 = $5,000, and this is the actuarially fair insurance premium.
The maximum you would be willing to pay is given by the difference between your annual income and the certainty equivalent of this risky situation. The expected utility from facing the hurricane uninsured is $0.5U(30,000) + 0.5U(20,000) = 0.5x60,000 + 0.5x40,000 = 50,000$. The same level of utility can be reached by having $25,000 with certainty, since U(25,000) = 50,000. The difference between $30,000 and the certainty equivalent is $5,000, which is equal to the actuarially fair insurance premium.

PTS: 1 REF: 524

32. Dave's utility from a certain level of income, x, is $U(x) = \sqrt{x}$. He currently has $30,000 and there is a 50% chance that he will contract a debilitating disease and will suffer a loss of $5,000. Suppose two types of insurance policies were available: a fair policy covering the complete loss and a fair policy covering only half of the loss incurred. Which policy should he choose?
a. full insurance, because his expected utility is larger than with a partial insurance policy.
b. partial insurance, because his expected utility is larger than with a full insurance policy.
c. full insurance, because the premium is cheaper.
d. partial insurance, because the premium is cheaper.

ANS: A
If he is uninsured, he expects a loss of 0.5 x $5,000 = $2,500. This is the premium for a fair policy covering the complete loss. If he purchases this policy, his expected utility is
$0.5U(30,000-2,500)+0.5U(30,000-2,500-5,000+5,000)=U(27,500)=165.83$
If the policy only covers half of any loss incurred, the fair premium is 0.5 x 0.5 x $5,000 = $1,250. Dave's expected utility is
$0.5U(30,000-1,250)+0.5U(30,000-1,250-5,000+2,500)=$
$=0.5U(28.750)+0.5U(26,250)=165.79$
Since his expected utility from the full insurance is slightly higher, he prefers it to the fair policy which covers only half of his loss, so he should purchase full insurance.

PTS: 1 REF: 523

33. Dave's utility from a certain level of income, x, is $U(x) = \sqrt{x}$. He currently has $40,000 and there is a 10% chance that he will contract a debilitating disease and incur a $20,000 loss. He can purchase an actuarially fair insurance, which will cover 18,000 of his loss. What is his expected utility given this insurance policy?
a. 173.21.
b. 194.93.
c. 194.94.
d. 181.85

ANS: B
There is a 10% chance that the insurance company will have to pay $18,000, so the actuarially fair insurance premium is 0.1 x $18,000 = $1,800. Dave's expected utility is

$0.9U(40,000-1.800)+0.1U(40,000-1,800-20,000+18,000)=$
$=0.9U(38,200)+0.1U(36,200)=194.93.$

PTS: 1 REF: 523

34. What are the factors that make some risks uninsurable?
a. the very low frequency and the unpredictability of some events.
b. adverse selection.
c. moral hazard.
d. all of the above.

ANS: D

Three types of factors may cause some risks to become uninsurable. Extremely rare and unpredictable events are uninsurable because it is hard to determine the expected value of the loss and it is difficult for an insurance company to cover the losses from premiums, which might induce them to charge premiums that are so high that nobody will purchase insurance. If insurance companies cannot control for adverse selection or moral hazard, they might find it unprofitable to offer insurance policies (see discussion on page 525).

PTS: 1 REF: 524

35. Chris has $20,000 and he wishes to invest $6,000 of this income in risky assets. Assume he can buy shares of stock in company A or company B: each of these companies has a 50% chance of doing well. One share of stock in either company costs $1, and Chris believes that the stock will rise to $2 if the company does well. If the company does poorly, the stock will be worthless. Assume Chris buys 3,000 shares of each stock. What are the four possible outcomes of the game?
    a. poor performance of Company A and Company B $14,000
    good performance of Company A and poor performance of Company B $20,000
    poor performance of Company A and good performance of Company B $20,000
    good performance of Company A and Company B $26,000
    b. poor performance of Company A and Company B $17,000
    good performance of Company A and poor performance of Company B $20,000
    poor performance of Company A and good performance of Company B $20,000
    good performance of Company A and Company B $23,000
    c. poor performance of Company A and Company B $14,000
    good performance of Company A and poor performance of Company B $17,000
    poor performance of Company A and good performance of Company B $17,000
    good performance of Company A and Company B $26,000
    d. poor performance of Company A and Company B $17,000
    good performance of Company A and poor performance of Company B $14,000
    poor performance of Company A and good performance of Company B $14,000
    good performance of Company A and Company B $23,000

    ANS: A
    If both companies have a bad year, Chris will end up with $20,000 - $3,000 - $3,000 = $14,000. If one of them does well and the other one does poorly, Chris will have $20,000 + - $3,000 - $3,000 + $6,000 = $20,000. If both companies do well, Chris will have $20,000 - $3,000 - $3,000 + $6,000 + $6,000 = $26,000.

    PTS: 1 REF: 524

36. Chris has $20,000 and he wishes to invest $6,000 of this income in risky assets. Assume he can buy shares of stock in company A or company B: each of these companies has a 50% chance of doing well. One share of stock in either company costs $1, and Chris believes that the stock will rise to $2 if the company does well. If the company does poorly, the stock will be worthless. Assume Chris can either (1) buy shares of stock in company A exclusively, or (2) buy 3,000 shares of each stock. Given that his utility function from a certain level of income is $U(x) = \ln x$, what are the expected utilities of these two strategies? Does diversification increase his expected utility?
    a. 9.66 from strategy (1), 9.60 from strategy (2); diversification does not increase expected utility.
    b. 9.95 from strategy (1), 9.43 from strategy (2); diversification does not increase expected utility.
    c. 8.21 from strategy (1), 8.33 from strategy (2); diversification increases expected utility.
    d. 9.86 from strategy (1), 9.88 from strategy (2); diversification increases expected utility.

    ANS: D

Strategy (1): Chris will end up either with \$14,000 or with \$26,000 with equal probability, so the expected utility is $0.5U(14,000)+0.5U(26,000)=0.5\ln 14,000+0.5\ln 26,000=9.86$.
Strategy (2): Diversification will bring the following possible outcomes:

		Company B's Performance	
		Poor	Good
Company A's Performance	Poor	\$14,000	\$20,000
	Good	\$20,000	\$26,000

Chris will end up with \$14,000 with a 25% probability, with \$26,000 with a 25% probability, and with \$20,000 with 50% probability. His expected utility is
$0.25U(14,000)+0.25U(26,000)+0.5U(20,000)=$
$=0.25\ln 14,000+0.25\ln 26,000+0.5\ln 20,000=9.88.$
The second strategy (diversification) has a higher expected utility, so Chris should choose it over the first strategy.

PTS: 1 REF: 525

37. When we analyze market options for investors, we use a market line. How is this line constructed?
    a. by the horizontal summation of investment demand curves.
    b. by the horizontal summation of investment supply curves.
    c. by mixing various risky assets with the risk-free asset.
    d. by simultaneously mixing all the risky assets available on the market.

    ANS: C
    The market line shows the possible combinations of risk and return, and it is constructed by mixing various risky assets with the risk-free asset.

    PTS: 1 REF: 530

38. Historical Canadian data show that common stocks have had higher returns than long-term government bonds to compensate for the difference in their respective risks. What is the equity premium puzzle?
    a. The fact that returns on stocks and bonds have been very similar lately, despite the difference in risk.
    b. The fact that bonds have started to have much higher returns recently, despite the risk difference.
    c. The fact that higher returns have persisted for stocks even during a period when the difference in their risk has largely disappeared.
    d. none of the above.

    ANS: C
    The equity premium puzzle refers to the fact that the excess returns on stocks have persisted even when stocks and bonds have had similar risk levels.

    PTS: 1 REF: 531

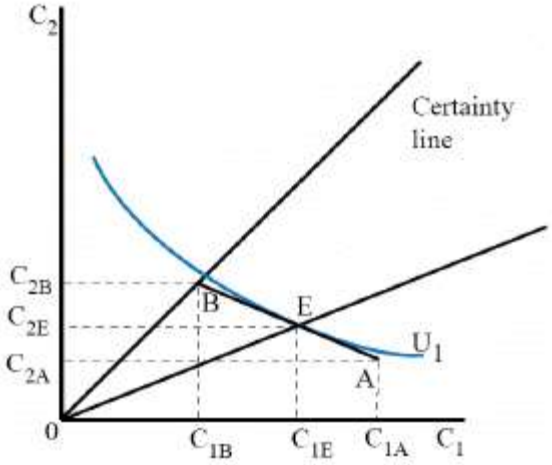
39. The risk of an asset is measured by
    a. the variance of returns.
    b. the standard deviation of returns.
    c. comparing the expected return on this asset with the return on the risk-free asset.
    d. none of the above.

    ANS: B

The standard deviation is used as a measure of risk.

PTS: 1 REF: 531

40. An individual is assumed to face two states of the world, but does not know which state will occur. The individual's consumption in the two states is denoted by C_1 and C_2, and possible values for these are recorded on the axes in the following figure. Point A in the figure promises C_{1A} if state 1 (good) occurs, and C_{2A} if state 2 (bad) occurs if the individual does not have insurance. By paying an insurance premium, this person reduces C_1 in order to increase C_2. What will this person do, given that the terms at which insurance can be bought are reflected by the AB line?

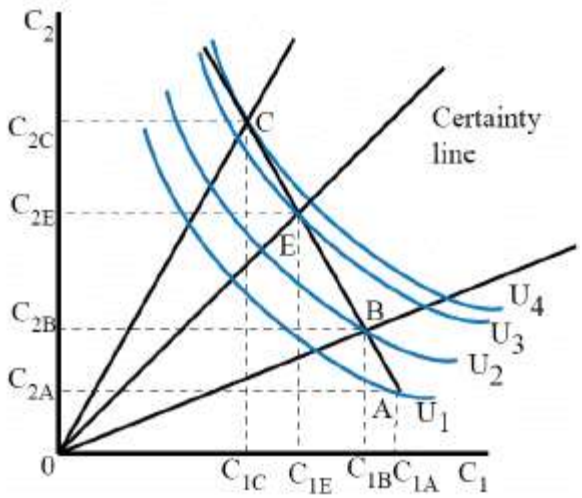


a. overinsure.
b. underinsure.
c. purchase complete insurance.
d. any of the above.

ANS: B
This individual will purchase insurance at the utility maximizing point on line AB (budget line). At point B on the certainty line the individual buys complete insurance, but we notice that this point is not utility maximizing. The individual would be better off by purchasing less than complete insurance and move from point A to point E.

PTS: 1 REF: 534

41. John is assumed to face two states of the world, but does not know which state will occur. His consumption in the two states is denoted by C_1 and C_2, and possible values for these are recorded on the axes in the following figure. Point A in the figure promises C_{1A} if state 1 (good) occurs, and C_{2A} if state 2 (bad) occurs if John does not have insurance. By paying an insurance premium, he reduces C_1 in order to increase C_2. What will he do, given that the terms at which insurance can be bought are reflected by the AC line?

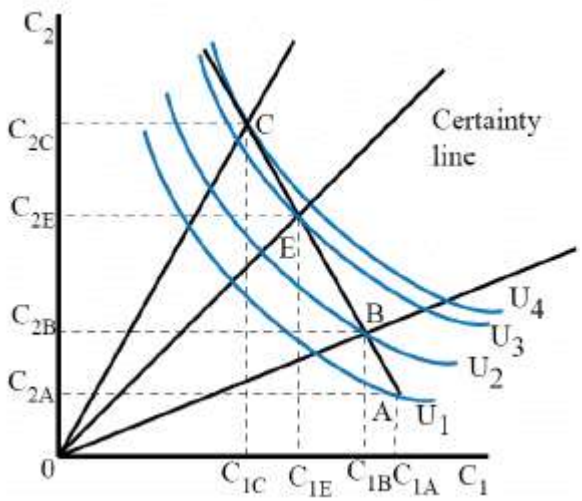


a. underinsure and move to point B.
b. insure completely and move to point B.
c. insure completely and move to point E.
d. overinsure and move to point C.

ANS: D
If he buys partial insurance and moves to point B, his utility increases from U1 to U2. If he moves to point E, his utility increases to U3. At C, he reaches the maximum utility level he can afford. Because insurance is relatively cheap, he chooses to overinsure.

PTS: 1 REF: 534

42. John is assumed to face two states of the world, but does not know which state will occur. His consumption in the two states is denoted by C_1 and C_2, and possible values for these are recorded on the axes in the following figure. Point A in the figure promises C_{1A} if state 1 (good) occurs, and C_{2A} if state 2 (bad) occurs if John does not have insurance. By paying an insurance premium, he reduces C_1 in order to increase C_2. The terms at which insurance can be bought are given by the AC line. Which of the following statements is true?



a. He purchases insurance and moves from point A to point C. If insurance becomes cheaper, he might find it optimal to move on the certainty line.
b. He purchases insurance and moves from point A to point E. If insurance becomes cheaper, he moves to point B.
c. He purchases insurance and moves from point A to point C. If insurance becomes more

expensive, he might find it optimal to move on the certainty line.

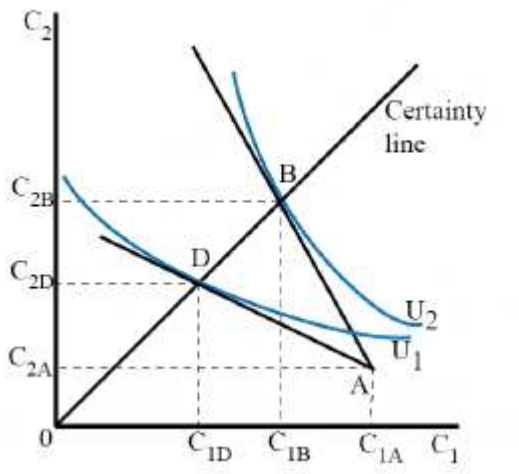
d. He does not purchase insurance and remains at point A.

ANS: C

If he buys partial insurance and moves to point B, his utility increases from U1 to U2. If he moves to point E, his utility increases to U3. At C, he reaches the maximum utility level he can afford. Because insurance is relatively cheap, he chooses to overinsure and move to point C. If insurance becomes cheaper his budget line will be steeped and he will buy even more and move further from the certainty line. If insurance becomes more expensive, his budget line will be flatter and he would move closer to the certainty line. If his budget line is tangent to an indifference curve at a point situated on the certainty line, he purchases complete insurance.

PTS: 1 REF: 534

43. Trevor is a careful, low-risk driver, and Ann is a careless, high-risk driver. In the following figure, they face identical consumption prospects at A, where they consume C_{1A} if no accident happens, and C_{2A} if an accident occurs. If insurers could distinguish between low and high risk individuals, they would offer the actuarially fair full insurance contract B exclusively to ____, and the actuarially fair full insurance contract D exclusively to ____. If insurers could not distinguish between low- and high-risk drivers and offered both contracts B and D, all drivers would purchase contract ____. In this case insurers would ____.



a. Trevor; Ann; B; lose.
b. Trevor; Ann; D; gain.
c. Ann; Trevor; B; gain.
d. Ann; Trevor; D; lose.

ANS: A

Trevor is a low-risk driver, and if insurers could distinguish between high- and low-risk drivers he should be offered contract B, where insurance is cheaper (in terms of C_1, the insurance premium is given by $C_{1A} - C_{1B}$). Ann should be offered contract D, with a more expensive insurance premium ($C_{1A} - C_{1D}$). If all drivers were offered both contracts, low-risk drivers would choose B, and high-risk drivers would also choose B, since it is cheaper than D and allows them to reach a higher utility level (U_2 instead of U_1). In this case insurers would lose money, since the value of claims would exceed the value of revenues.

PTS: 1 REF: 538

44. Assume there are two types of workers: productive and unproductive. Productivity is assumed to be an innate characteristic, unaffected by education. For productive workers, education costs $C^P(y) = 2y$, where y is the number of years of education, and costs are measured in thousand of dollars. For unproductive workers, education costs are $C^U(y) = 3y$. Employers offer a premium of $48,000 to productive employees. Since they cannot determine whether a worker is productive or unproductive, employers use education as a signal: workers only get the $48,000 premium if they have more than y^* years of education. What conditions must y^* satisfy so that only the productive workers are induced to acquire the education level y^*?

a. $16 < y^* < 24$

b. $y^* > 12$

c. $y^* < 20$

d. both (b) and (c).

ANS: A

y^* must be chosen so that it would be too costly for unproductive workers to acquire this level of education, but not too costly for productive workers. Two conditions must be satisfied: education must be too costly for unproductive employees, and cheap enough so that the productive employees choose to acquire y^* years of education:

$$\begin{cases} C^U(y^*) > 48 \\ C^P(y^*) < 48 \end{cases} \Leftrightarrow \begin{cases} 3y^* > 48 \\ 2y^* < 48 \end{cases} \Leftrightarrow \begin{cases} y^* > 16 \\ y^* < 24 \end{cases} \Leftrightarrow 16 < y^* < 24.$$

PTS: 1 REF: 545

45. Assume there are two types of workers: productive and unproductive. Productivity is assumed to be an innate characteristic, unaffected by education. For productive workers, education costs $C^P(y) = 3y$, where y is the number of years of education, and costs are measured in thousand of dollars. For unproductive workers, education costs are $C^U(y) = 4y$. Employers offer a premium of $36,000 to productive employees. Since they cannot determine whether a worker is productive or unproductive, employers use education as a signal: workers only get the $36,000 premium if they have more than y^* years of education. Employers must choose y^* so that only the productive workers are induced to acquire the education level y^*. What is the socially optimal level of y^*?

a. any $9 < y^* < 12$.

b. $y^* = 9 + \varepsilon$, where $\varepsilon > 0$ is negligibly small.

c. $y^* = 10 + \varepsilon$, where $\varepsilon > 0$ is negligibly small.

d. $y^* = 12 + \varepsilon$, where $\varepsilon > 0$ is negligibly small.

ANS: B

For employers, y^* must be chosen so that education is too costly for unproductive employees, and cheap enough for productive employees:

$$\begin{cases} C^U(y^*) > 36 \\ C^P(y^*) < 36 \end{cases} \Leftrightarrow \begin{cases} 4y^* > 36 \\ 3y^* < 36 \end{cases} \Leftrightarrow \begin{cases} y^* > 9 \\ y^* < 12 \end{cases} \Leftrightarrow 9 < y^* < 12.$$

From society's point of view, since education does not improve productivity, y^* must be as small as possible, subject to $y^* > 9$ (to minimize wasteful expenditure on education). Thus $y^* = 9 + \varepsilon$, where $\varepsilon > 0$ is negligibly small.

PTS: 1 REF: 546