

Econ 100B (Grossman)—Winter 2010
Midterm 1
January 26, 2010

Blue-book – 20 points (2 questions, 10 points each)

1. You rent a room with a nice ocean view in a house on Del Playa. Last week's storms severely eroded the sea cliffs and your friend (the engineering major) estimates that there is a 50% chance that they will collapse and you will lose *all* of your possessions, valued at \$100. You can sell off some of your belongings to buy some insurance against this risk, for the price of p dollars for every dollar of insurance.

- (a) Let c_c denote your wealth if the cliffs collapse and c_{nc} denote your wealth if they do not collapse. Write the equation of your state-contingent budget constraint, with c_{nc} alone on the left-hand side of the equation.

answer: $c_{nc} = 100 - \frac{p}{1-p}c_c$

- (b) If your utility of wealth is given by $u(c) = \sqrt{c}$, what is your *MRS*? (Express your answer as if c_{nc} is on the y -axis.)

answer: $MRS = -\frac{\sqrt{c_{nc}}}{\sqrt{c_c}}$

- (c) Write down a condition that characterizes the optimal consumption bundle, i.e. that you could use to solve for (c_c^*, c_{nc}^*) . How much should you spend on insurance when $p = .5$?

answer: You would spend \$50 (because $c_{nc} = c_c$)

- (d) Now suppose that your utility of wealth is given by $u(c) = c$. Write your new *MRS*. How much insurance would you buy if $p = .4$? If $p = .6$?

answer: $MRS = -1$. If $p = .4$, you spend all your money on insurance, meaning buy \$250 of insurance ($k = 250$). If $p = .6$, you won't buy any insurance ($k = 0$).

- (e) Explain what is interesting about your answer to the previous part, and why it happens.

answer: When $u(c) = c$, you are risk neutral, which means that your consumption levels in the two states are perfect substitutes and you simply want to maximize your *expected* consumption. Having \$1 of insurance gives you an expected payout of \$0.50, because there is a 50% chance of the collapse. If it costs less than \$0.50 to buy a dollar of insurance, e.g. when $p = 0.4$, you will buy as much as you can, because each dollar of insurance increases your expected c . On the other hand, if it costs more than \$0.50, e.g. when $p = 0.6$, you won't buy any, because each dollar of insurance lowers your expected c .

2. The inverse demand function for monster burritos at Freebirds is $p = 35 - \frac{q}{4}$ and the supply function is $q = 20p - 100$.

- (a) What is the equilibrium price and quantity?

answer: $p = 10$ and $q = 100$

- (b) What is the consumer surplus, producer surplus and total welfare?

answer: $CS = 1250$, $PS = 250$, $W = 1500$

- (c) The city has wants to reduce the number of people that go to Freebirds after 2am and considers a tax of \$15 per burrito. In the new equilibrium, how much would consumers have to pay for a burrito, how many would they buy, and how would this affect total welfare?

answer: $p_d = 22.5$, $q = 50$, welfare drops by 375, to 1125

- (d) Suppose that instead of a tax, the city is considering a price floor. At what level should it set the price floor to achieve the same quantity as the tax? How does the total welfare from the price floor compare to that from the tax?

answer: The price floor should be 22.5. This will lead to the same (total) welfare as tax.

- (e) If the Freebirds had to choose between the tax and the price floor, which would they choose? What about the consumers?

answer: Freebirds prefers the price floor, consumers are indifferent.