

U8216 Microeconomics and Policy Analysis
Fall 2000
Problem Set 2

1. Grete, Mary, and Dan are a family that does everything together, including making decisions. They have to decide what to do for their vacation. There are three possibilities: stay at home, sit on the porch and watch birds and squirrels (call this “home”); make a pilgrimage to Fatima (call this “Fatima”); or visit the Power Tool Hall of Fame (call this “buzz”). Their preferences are:

Grete: Home is best, Buzz is next, Fatima is worst.

Mary: Fatima is best, Home is next, Buzz is worst.

Dan: Buzz is best, Fatima is next, Home is worst.

- a. Suppose they use the following decision making procedure: each writes down (truthfully, since they are all very sincere creatures, especially Grete) their ranking (1 for the best, 2 for next, 3 for worst). The scores for each option are added up, and the family goes to the one with the lowest score. In the event of ties, what Grete wants prevails, since she’s the furriest and can jump the highest. If they use this procedure, what will there decision be?
 - b. After they make up their minds, they find out that the Power Tool Hall of Fame has been closed for the season. They re-vote, but without Buzz. What will they do now?
 - c. Does decision-making by this household, using this procedure, obey the assumptions that economists make about rational preferences? Why or why not?
 - d. What does this tell you about saying that universities, clubs, households, corporations, Congress, or society has preferences?
2. Each day Paul, who is in third grade, eats lunch at school. He likes only Twinkies (t) and Orange Slice (s), and these provide him with a utility of $U = ts$.
- a. If Twinkies cost a dime each, and Slice costs a quarter per cup, how should Paul spend the dollar his mother gives him to maximize his utility?
 - b. If the school tries to discourage Twinkie consumption by raising the price to $40¢$, by how much will Paul’s mother have to increase his lunch allowance to provide him with the same level of utility he had in part (a)? How many Twinkies and cups of Slice will he buy now (the school allows fractional purchases)? Suppose that prices are as in (b), that Paul’s mother in fact gives him the extra allowance, but that the school now prohibits fractional purchases. Will this encourage or discourage Paul’s Twinkie purchases? Will it make students better off?
 - c. Suppose that all is as in part (b), but that the school now prohibits fractional purchases. Will this encourage or discourage Paul’s Twinkie habit?

3. Every evening JP enjoys the consumption of cigars (c) and brandy (b) according to the function:

$$U(c,b) = 20c - c^2 + 18b - 3b^2.$$

a. How many cigars and glasses of brandy does he consume during an evening? (Cost is no object to JP.)

b. Lately, however, JP's doctors have advised him to limit the sum of brandy and cigars consumed to 5. How much of each will he consume under these circumstances?

4. Ms. Caffeine enjoys coffee (c) and tea (t) according to the function $U(c,t) = 3c + 4t$. If coffee and tea cost \$3 each and she has \$12 to spend, how much coffee and tea will she buy to maximize her utility? Draw the graph of her indifference curves and the budget constraint, and show that the utility-maximizing point is a boundary solution at which the usual utility-maximizing condition does not hold. Under what prices would the usual condition hold? Would the maximizing point be unique under these circumstances?

5. David gets an allowance of \$3 per month as an allowance to spend any way he pleases. Since he likes only peanut butter and jelly sandwiches, he spends the entire amount on peanut butter (at a nickel an ounce) and jelly (at a dime an ounce). Bread is provided free of charge by a concerned neighbor. David is a particular eater and makes his sandwiches with exactly 1 oz of peanut butter and 2 oz of jelly. He is set in his ways and will never change these proportions.

a. How much peanut butter and jelly will David buy with his \$3 allowance in a week?

b. Suppose the price of jelly were to rise to 15¢ an ounce. How much of each commodity would be bought?

c. By how much should David's allowance be raised to compensate him for the rise in the price of jelly?

d. In what sense does this problem involve only a single commodity: peanut butter and jelly sandwiches?

6. "As far as charities in this country are concerned, raising income tax rates on upper-income families would be the worst possible way to close the deficit. Charities depend on rich people for their support; taking money away from rich people will drastically curtail the amount they give to charity. That's why we need to cut income tax rates by 15%." Think about charitable contributions as a good for the donor – if they are not a good, no one would make them. Recall that charitable contributions are tax deductible, while other expenditures aren't. Think about the "price" of a charitable contribution, and Mr Slutsky. Under what circumstances is the speaker right? Wrong?

7. Remember Bill Clinton University from Problem Set 1? It turns out that the people who run the university act as if they were maximizing the “university utility function”:

$$U(f,i) = .4 \ln i + .6 \ln f$$

Where i denotes number of interns hired and f denotes number of fellowships awarded.

- a. Before the donor appears on the scene and BCU has only a million a year, how many fellowships does it award? How many interns are hired?
 - b. If the donor gives an unrestricted grant that generates an additional \$500,000 a year in income for BCU, how many fellowships will it award? How many interns will be hired?
 - c. If the donor explicitly states that BCU must use all of her money for fellowships, how many fellowships will it award? How many interns will be hired?
 - d. Suppose the donor states that she will match \$5 for every \$11 that BCU spends on fellowships, but that the donation will be unrestricted: the university can do whatever it wants with the money. How many fellowships will BCU offer? How much will it cost the donor per year?
 - e. Suppose the donor gets more enthusiastic about matching grants and promises to match whatever BCU spends on fellowships at a rate of \$2 for every dollar BCU spends, but only up to a maximum of \$500,000 a year. How many fellowships will BCU offer?
 - f. All the donor cares about is the number of fellowships that BCU students receive. She has never taken micro, though, and so she doesn't know what to do. She calls you for advice. If you are really her friend, what advice will you give her? If you are really an undercover operative working for the administration of BCU, what will you tell her?
8. (*optional*) Giuseppe owns a vineyard in northern Italy. He provides food and shelter for the grape growers, who make the wine and pay Giuseppe a fixed amount of wine. The worker's rent is Giuseppe's only source of income. Giuseppe consumes some of the wine and sells the rest for income to purchase a second good, good 2 (whose price is 1). Suppose that the price of wine, P_w , rises. Will Giuseppe consume less wine? Explain, using diagrams.
9. (*optional*) In July 1990, the Czechoslovakian government reduced agricultural subsidies and allowed food prices (which were still state-controlled) to rise. It used the entire amount of money it saved on subsidies to increase family allowances. Assume that all Czechoslovakian families are the same. Did the combination of the two changes make the representative Czechoslovakian worse off, better off, or leave her indifferent? Explain.

10. (*optional*) Rufus lives in a small town and buys everything through mail order, everything being food and clothes. Initially one jumpsuit costs \$1 and one loaf \$1. He consumes 7 loaves and 3 jumpsuits. Now there is a cloth shortage and the government issues 5 clothing coupons to each individual. With the coupon, the price of jumpsuits remains \$1, but without the coupon the price rises to \$1.50. Rufus's friend George tells him that for the right bribe, he can get Rufus 5 more coupons. How much is Rufus willing to pay for each extra coupon?

11. (*optional*) Assume that consumers are choosing between housing services measured in square feet and consumption of other goods aggregated and measured in dollars.

- a. Show the utility-maximizing position in a diagram.
- b. Now, suppose the government agrees to subsidize consumers by paying 50% of their housing costs. How will the budget line change? Show the new utility-maximizing point.
- c. Show in the diagram the minimum amount of income support the government would have to give to make consumers just as well off as they were in situation (b) without the housing subsidy.
- d. Show that this is less than the housing subsidy the government is paying in situation (b).