

Intermediate Micro

MIDTERM EXAM

March 2, 2004

You have 75 minutes to answer the following questions. Each of the first five questions is worth 15 points. The five remaining questions are worth 5 points apiece. There is one bonus question at the end worth 10 points. The test is thus out of 100 with 10 possible bonus points. Allocate your time accordingly. You must show your work! Good luck!

When you are done you must place this test paper in your exam booklet!

1. Income vs. Leisure (15 points)

Yoko Kubota is the head ramen chef at Yokohama's most elite ramen restaurant ("Ti Li Ramen"). Ms. Kubota has 60 hours of personal time that she can use to either work or pursue leisurely activities (singing in a karaoke bar). Currently she earns a wage of \$10/hour and works 25 hours per week. Assume that leisure is a normal good.

- Sketch Yoko's budget line (BL), where we measure the number of hours singing on the x -axis, and her money consumption of all other goods on the y -axis, and show her optimal bundle (label it "A") on the BL. Label your diagram explicitly.
- Trying to keep Yoko from bolting to a rival restaurant ("Ramen Desu Gohan"), her boss doubles her wage. At this higher wage she works 30 hours (call the new optimum "B"). Sketch the new BL and clearly label the graph.
- What can you say about the sizes of the income and substitution effects of leisure for Yoko?

2. Price Subsidy vs. Cash (15 points)

(i) Draw and label the BL for a starving student (Thijs van Rens, a.k.a., "Blondie") who has a weekly income of \$200 but spends only \$50 on foodstuffs. (Label the y -axis as money spent on all other goods, and the x -axis as money spent on food.)

(ii) Consider a subsidy program undertaken by the government to help starving university students (and possibly newly appointed assistant professors). With valid identification, students can now buy food at half the store price. (Note that this differs from the example in your homework, which was an in-kind transfer. The subsidy is a change in price of food.) At the discounted prices he buys \$100 worth of food (at a cost of \$50). Draw Thijs' new BL, and include another BL that shows how much this program is worth to Thijs in dollar terms. (Hint: What point must this "dollar-value" BL pass through?)

(iii) Would giving Thijs the dollar amount you found above make him better off? Explain. (Assume that Blondie has smooth, convex preferences.)

3. Utility & Preferences (15 points)

Giorgio Primeceri loves spaghetti (good 1) and cannelloni (good 2). His utility function is $u(x_1, x_2) = x_1 + (3/2)x_2$.

- Rank (\succ) the following bundles, (x_1, x_2) , for Giorgio: $A = (6, 6)$, $B = (12, 1)$, $C = (3, 7)$, $D = (1, 9)$, $E = (4, 5)$.
- What is the ratio of marginal utilities (i.e., MU_1/MU_2)?
- Now suppose that his utility function is $u(x_1, x_2) = \sqrt{x_1 + (3/2)x_2} + 100$. Rank the bundles again with this utility function.

4. MRS and the Shape of Indifference Curves (15 points)

Peter (“Professor”) Bondarenko spends all his income on Smarties (good 1) and Twix (good 2). His MRS between Smarties and Twix is 3 when he has sufficiently many Twix, and his MRS between Smarties and Twix is 1/3 when he has sufficiently many Smarties.

- Sketch a typical indifference curve of Professor Bondarenko
- Under what conditions will he buy only Twix? That is, at what price for Twix (relative to Smarties) will he buy only Twix?
- Under what conditions are we assured that he will buy positive quantities of both?

5. Decomposing Income and Substitution Effects (15 points)

Dave (“Toothpick”) Biderman is trying to beef up (“Je veux être un gâteau à la viande!”) with the help of Weight Gain 4000. His demand for WG4000 is given by $x_1 = 10 + m/(10p_1)$. Originally his income is \$120 (per week) and the price of WG4000 is \$4 per serving.

- How many servings of WG4000 does Dave buy in a week?
- Find the change in demand if price falls to \$3
- How much does income have to change to keep Dave at his original consumption? (Hint: $\Delta m = x_1 \Delta p_1$.)
- Now use the fact that $m' = m + \Delta m$ to find the substitution effect of the price change. (Hint: Substitution effect is defined as $\Delta x_1^s = x_1(p_1', m') - x_1(p_1, m)$.)

6. Nation of Second Guesses (5 points)

What is the principle thesis of the article “Nation of Second Guesses” (Barry Schwartz, NY Times, 2004)? Do you think his arguments are valid?

7. Pareto Efficiency (5 points)

Define and state the significance of Pareto efficiency.

8. Inefficiency of Taxation? (5 points)

Evaluate the following statement:

“Sales taxes always generate a deadweight loss (as long as we ignore the cases which are perfectly inelastic). Therefore it is a bad policy for governments to raise revenues through sales taxes. Instead, governments should look to other ways of raising revenues (such as selling lotteries, auctioning mining rights, creating for profit crown corporations, head taxes, etc.).”

9. Producer’s Surplus (5 points)

Suppose a firm’s supply curve is described by the function $p_S(y) = (1/10)y^2$. Find the change in producer’s surplus when price changes from \$12.10 to \$14.40.

10. The Debate Surrounding Trade (5 points)

There is a great debate about the merits of trade and globalisation (c.f. the articles on trade posted on the course webpage). Why do economists generally support free trade? Why are some people opposed to trade liberalisation?

Bonus. (10 points) Suppose you have the utility function that depends on two time periods:

$$U = u(C_1) + \beta u(C_2)$$

where C_i is consumption in time period i and $0 \leq \beta \leq 1$ is a personal discount factor. The consumer’s budget constraint is that the present value of consumption cannot exceed the present value of income:

$$C_1 + C_2 / (1 + r) \leq Y_1 + Y_2 / (1 + r)$$

where r is the interest rate and Y_i is period i income. Thus the consumer’s problem is to choose consumption to maximise overall utility U . Find the condition that defines the consumer’s optimal choice – this is known as the Euler equation for consumption. (Hint: You can assume that the budget constraint is binding.)

Super Bonus. (5 points) When Gilligan’s Island first appeared critics didn’t give the show much chance of lasting beyond the first season. Needless to say, the show with the seven castaways stole the hearts of North Americans. What was the name of Gilligan’s favourite rock group? (And how in the world can one have such a string of bad luck every time they are about to be rescued from the island?!!)

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1. Utility & Preferences (15 points)

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- Rank (\succ) the following bundles, (x_1, x_2) , for Giorgio: $A = (7, 6)$, $B = (10, 1)$, $C = (3, 9)$, $D = (9, 2)$, $E = (5, 5)$.
- What is the ratio of marginal utilities (i.e., MU_1/MU_2)?
- Now suppose that his utility function is $u(x_1, x_2) = \sqrt{3x_1 + 2x_2} + 100$. Rank the bundles again with this utility function.

2. Income vs. Leisure (15 points)

Yoko Kubota is the head ramen chef at Yokohama's most elite ramen restaurant ("Ii Ii Ramen"). Ms. Kubota has 60 hours of personal time that she can use to either work or pursue leisurely activities (singing in a karaoke bar). Currently she earns a wage of \$15/hour and works 30 hours per week. Assume that leisure is a normal good.

- Sketch Yoko's budget line (BL), where we measure the number of hours singing on the x -axis, and her money consumption of all other goods on the y -axis, and show her optimal bundle (label it "A") on the BL. Label your diagram explicitly.
- Trying to keep Yoko from bolting to a rival restaurant ("Ramen Desu Gohan"), her boss doubles her wage. At this higher wage she works 25 hours (call the new optimum "B"). Sketch the new BL and clearly label the graph.
- What can you say about the sizes of the income and substitution effects of leisure for Yoko?

3. Decomposing Income and Substitution Effects (15 points)

Dave ("Toothpick") Biderman is trying to beef up ("Je veux être un gâteau à la viande!") with the help of Weight Gain 4000. His demand for WG4000 is given by $x_1 = 15 + m/(10p_1)$. Originally his income is \$120/week and the price of WG4000 is \$4 per serving.

- e. How many servings of WG4000 does Dave buy in a week?
- f. Find the change in demand if price falls to \$3
- g. How much does income have to change to keep Dave at his original consumption? (Hint: $\Delta m = x_1 \Delta p_1$.)
- h. Now use the fact that $m' = m + \Delta m$ to find the substitution effect of the price change. (Hint: Substitution effect is defined as $\Delta x_1^s = x_1(p_1', m') - x_1(p_1, m)$.)

4. Cobb-Douglas Utility (15 points)

Kazushi Sakuraba's preferences over Asahi (x_1) and wasabe peas (x_2) are described by the utility $u(x_1, x_2) = x_1^{1/3} x_2^{2/3}$. Currently he consumes 10 beer and 40 bags of peas.

- a. If Mr Sakuraba's income is \$300 find the prices for Asahi beer and wasabe peas. (Hint: What kind of preferences does he have?)
- b. Given the prices you found above, what is Sakuraba's marginal rate of substitution between the goods at his optimum?
- c. If Mr Sakuraba's income drops to \$150 what is his new optimal bundle?

5. MRS and the Shape of Indifference Curves (15 points)

Peter ("Professor") Bondarenko spends all his income on Smarties (good 1) and Twix (good 2). His MRS between Smarties and Twix is 4 when he has sufficiently many Twix, and his MRS between Smarties and Twix is 1/4 when he has sufficiently many Smarties.

- d. Sketch a typical indifference curve of Professor Bondarenko
- e. Under what conditions will he buy only Twix? That is, at what price for Twix (relative to Smarties) will he buy only Twix?
- f. Under what conditions are we assured that he will buy positive quantities of both?

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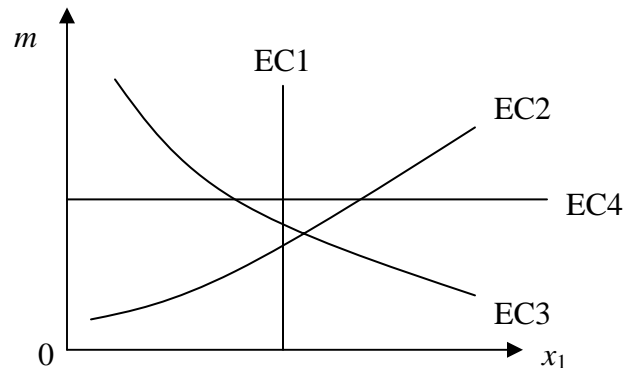
7. Pareto Efficiency (5 points)

Define Pareto efficiency. Are Pareto efficient allocations optimal? Explain.

9. Consumer's Surplus (5 points)

Suppose that (inverse) demand is described by the function $p_D(y) = 20 - (1/10)y^2$. Find the change in consumer's surplus when price changes from \$10 to \$7.90.

8. Inferior & Normal Goods (5 points)



Refer to the diagram above depicting four different Engel curves. Which Engel curve refers to a normal good? And which refers to an inferior good?

10. The Debate Surrounding Trade (5 points)

There is a great debate about the merits of trade and globalisation (c.f. the articles on trade posted on the course webpage). Why do economists generally support free trade? Why are some people opposed to trade liberalisation?

Bonus. (10 points) Suppose you have the utility function that depends on two time periods:

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where r is the interest rate and Y_i is period i income. Thus the consumer's problem is to choose consumption to maximise overall utility U . Find the condition that defines the consumer's optimal choice – this is known as the Euler equation for consumption. (Hint: You may assume that the budget constraint is binding.)

Super Bonus. (5 points) “The Littlest Hobo” (Glen-Warren Productions, 1979-85) epitomised the vagabond lifestyle (and even inspired some to travel outside of their backyard). What was the name of the dog that played that ever-clever canine?

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