

Nanyang Technological University
HE2001 Microeconomics II

Tutorial 3

1. Mario has a small garden where he raises eggplant and tomatoes. He consumes some of these vegetables, and he sells some in the market. Eggplants and tomatoes are perfect complements for Mario, since the only recipes he knows use them together in a 1:1 ratio. One week his garden yielded 30 pounds of eggplant and 10 pounds of tomatoes. At that time the price of each vegetable was \$5 per pound.
 - (a) What is the monetary value of Mario's endowment of vegetables?
 - (b) Draw Mario's budget line. How many pounds of tomatoes and eggplant will he consume? Draw the indifference curve through the consumption bundle that Mario chooses and label this bundle A.
 - (c) Suppose that before Mario makes any trades, the price of tomatoes rises to \$15 a pound, while the price of eggplant stays at \$5 a pound. What is the value of Mario's endowment now? Draw his new budget line. What is his consumption bundle now?
 - (d) Suppose that Mario had sold his entire crop at the market for a total of \$200, intending to buy back some tomatoes and eggplant for his own consumption. Before he had a chance to buy anything back, the price of tomatoes rose to \$15, while the price of eggplant stayed at \$5. Draw his budget line. How many pounds of tomatoes and eggplant will he consume now?
 - (e) Assuming that the price of tomatoes rose to \$15 from \$5 before Mario made any transactions, what is the change in the demand for tomatoes due to the substitution effect? What is the change in the demand for tomatoes due to the ordinary income effect? What is the change in the demand for tomatoes due to the endowment income effect? What is the total change in demand for tomatoes?
2. Lucetta consumes only two goods, A and B . Her only source of income is gifts of these commodities from her many admirers. She doesn't always get these goods in the proportions in which she wants to consume them, but she can always buy or sell A at the price $p_A = 1$ and B at the price $p_B = 2$. Lucetta's utility function is $U(a, b) = ab$, where a is the amount of A she consumes and b is the amount of B she consumes.
 - (a) Suppose that Lucetta's admirers give her 100 units of A and 200 units of B . Draw her budget line. Label her initial endowment E .
 - (b) What are Lucetta's gross demands for A ? And for B ?
 - (c) What are Lucetta's net demands?
 - (d) Suppose that before Lucetta has made any trades, the price of good B falls to 1, and the price of good A stays at 1. Draw Lucetta's budget line at these prices on your graph.
 - (e) Does Lucetta's consumption of good B rise or fall? By how much? What happens to Lucetta's consumption of good A ?
 - (f) Suppose that before the price of good B fell, Lucetta had exchanged all of her gifts for money, planning to use the money to buy her consumption bundle later. How much of good B will she choose to consume? How much of good A ?
 - (g) Explain why her consumption is different depending on whether she was holding goods or money at the time of the price change.

3. Wendy and Mac work in fast food restaurants. Wendy gets \$4 an hour for the first 40 hours that she works and \$6 an hour for every hour beyond 40 hours a week. Mac gets \$5 an hour no matter how many hours he works. Each has 80 hours a week to allocate between work and leisure and neither has any income from sources other than labor. Each has a utility function $U = cr$, where c is consumption and r is leisure. Each can choose the number of hours to work.
 - (a) How many hours will Mac choose to work?
 - (b) Wendy's budget "line" has a kink in it. Where is this kink? Draw her budget line and use solid line for the segment where she does not work overtime and dashed line for the segment where she works overtime.
 - (c) Write down the equations for the two lines that the solid segment and the dashed segment lie on respectively.
 - (d) If Wendy was paid \$4 an hour no matter how many hours she worked, how many hours would she work and how much would she earn in a week? Draw her indifference curve through this point (i.e., this leisure-consumption combination).
 - (e) Will Wendy choose to work overtime? What is the best choice for Wendy from the dashed line segment? How many hours a week will she work?
 - (f) Suppose that the jobs are equally agreeable in all other respects. Since Wendy and Mac have the same preferences, they will be able to agree about who has the better job. Who has the better job? (Hint: Calculate Wendy's utility when she makes her best choice. Calculate what her utility would be if she had Mac's job and chose the best amount of time to work.)
4. Dudley's utility function is $U(C, R) = C - (12 - R)^2$, where R is the amount of leisure he has per day. He has 16 hours a day to divide between work and leisure. He has an income of \$20 a day from nonlabor sources. The price of consumption goods is \$1 per unit.
 - (a) If Dudley can work as many hours a day as he likes but gets zero wages for his labor, how many hours of leisure will he choose?
 - (b) If Dudley can work as many hours a day as he wishes for a wage rate of \$10 an hour, how many hours of leisure will he choose? How many hours will he work? (Hint: Write down Dudley's budget constraint. Solve for the amount of leisure that maximizes his utility subject to this constraint. Remember that the amount of labor he wishes to supply is 16 minus his demand for leisure.)
 - (c) If Dudley's nonlabor income decreased to \$5 a day, while his wage rate remained at \$10, how many hours would he choose to work?
 - (d) Suppose that Dudley has to pay an income tax of 20 percent on all of his income, and suppose that his before-tax wage remained at \$10 an hour and his before-tax nonlabor income was \$20 per day. How many hours would he choose to work?