

Nanyang Technological University
HE2001 Microeconomics II

Tutorial 1

1. Freddy Frolic consumes only asparagus and tomatoes, which are highly seasonal crops in Freddy's part of the world. He sells umbrellas for a living, which provides a fluctuating income depending on the weather. But Freddy doesn't mind; he never thinks of tomorrow, so each week he spends as much as he earns. One week, when the prices of asparagus and tomatoes were each \$1 a pound, Freddy consumed 15 pounds of each. Show his budget line in a graph. Label Freddy's consumption bundle with the letter A.
 - (a) What is Freddy's income?
 - (b) The next week the price of tomatoes rose to \$2 a pound, but the price of asparagus remained at \$1 a pound. By chance, Freddy's income had changed so that his old consumption bundle of (15,15) was just affordable at the new prices. Draw this new budget line on the same graph. Does your new budget line go through the point A? What is the slope of this line?
 - (c) How much asparagus can he afford now if he spent all of his income on asparagus?
 - (d) What is Freddy's income now?
 - (e) Shade the bundles of goods on Freddy's new budget line that he definitely will not purchase with this budget. Is it possible that he would increase his consumption of tomatoes when his budget changes from the original budget line to the new one?
2. Here is a table of prices and the demands of a consumer named Ronald whose behavior was observed in 5 different price-income situations.

Situation	p_1	p_2	x_1	x_2
A	1	1	5	35
B	1	2	35	10
C	1	1	10	15
D	3	1	5	15
E	1	2	10	10

- (a) Sketch each of his budget lines and label the point chosen in each case by the letters A, B, C, D, and E.
 - (b) Is Ronald's behavior consistent with the Weak Axiom of Revealed Preference?
 - (c) Shade lightly all of the points that you are certain are worse for Ronald than the bundle C.
 - (d) Suppose that you are told that Ronald has convex and monotonic preferences and that he obeys the strong axiom of revealed preference. Shade lightly all of the points that you are certain are *at least as good as* the bundle C.
3. The McCawber family is having a tough time making ends meet. They spend \$100 a week on food and \$50 on other things. A new welfare program has been introduced that gives them a choice between receiving a grant of \$50 per week that they can spend any way they want, and buying any number of \$2 food coupons for \$1 apiece. (They naturally are not allowed to resell these coupons.) Food is a normal good for the McCawbers. As a family friend, you have been asked to help them decide on which option to choose. Drawing on your growing fund of economic knowledge, you proceed as follows.

- (a) On a graph, draw their old budget line and label their current choice C. Now draw the budget line that they would have with the grant. If they chose the coupon option, how much food could they buy if they spent all their money on food coupons? How much could they spend on other things if they bought no food? Draw their budget line if they choose the coupon option.
- (b) Using the fact that food is a normal good for the McCawbers, and knowing what they purchased before, darken the portion of the budget line with the grant where their consumption bundle could possibly be if they chose the lump-sum grant option. Label the ends of this line segment A and B.
- (c) After studying the graph you have drawn, you report to the McCawbers. “I have enough information to be able to tell you which choice to make.” Which option is your suggestion? Why?
- (d) Mr. McCawber thanks you for your help and then asks, “Would you have been able to tell me what to do if you hadn’t known whether food was a normal good for us?” On a different graph, draw the same budget lines you drew previously, but draw indifference curves for which food is not a normal good and for which the McCawbers would be better off with the program you advised them not to take.
4. In 1933, the Swedish economist Gunnar Myrdal (who later won a Nobel prize in economics) and a group of his associates at Stockholm University collected a fantastically detailed historical series of prices and price indexes in Sweden from 1830 until 1930. This was published in a book called *The Cost of Living in Sweden*. In this book you can find 100 years of prices for goods such as oat groats, hard rye bread, salted codfish, beef, reindeer meat, birchwood, tallow candles, eggs, sugar, and coffee. There are also estimates of the quantities of each good consumed by an average working-class family in 1850 and again in 1890. The table below gives prices in 1830, 1850, 1890, and 1913, for flour, meat, milk, and potatoes. In this time period, these four staple foods accounted for about 2/3 of the Swedish food budget.

Prices of Staple Foods in Sweden

Prices are in Swedish kronor per kilogram, except for milk, which is in Swedish kronor per liter.

	1830	1850	1890	1913
Grain Flour	0.14	0.14	0.16	0.19
Meat	0.28	0.34	0.66	0.85
Milk	0.07	0.08	0.10	0.13
Potatoes	0.032	0.044	0.051	0.064

Based on the tables published in Myrdal’s book, typical consumption bundles for a working-class Swedish family in 1850 and 1890 are listed below. (The reader should be warned that we have made some approximations and simplifications to draw these simple tables from the much more detailed information in the original study.)

Quantities Consumed by a Typical Swedish Family

Quantities are measured in kilograms per year, except for milk, which is measured in liters per year.

	1850	1890
Grain Flour	165	220
Meat	22	42
Milk	120	180
Potatoes	200	200

- (a) Complete the table below, which reports the annual cost of the 1850 and 1890 bundles of staple foods at various years' prices.

Cost of 1850 and 1890 Bundles at Various Years' Prices		
Cost	1850 bundle	1890 bundle
Cost at 1830 Prices	44.1	61.6
Cost at 1850 Prices		
Cost at 1890 Prices		
Cost at 1913 Prices	78.5	113.7

- (b) Is the 1890 bundle revealed preferred to the 1850 bundle?
- (c) The Laspeyres quantity index for 1890 with base year 1850 is the ratio of the value of the 1890 bundle at 1850 prices to the value of the 1850 bundle at 1850 prices. Calculate the Laspeyres quantity index of staple food consumption for 1890 with base year 1850.
- (d) The Paasche quantity index for 1890 with base year 1850 is the ratio of the value of the 1890 bundle at 1890 prices to the value of the 1850 bundle at 1890 prices. Calculate the Paasche quantity index for 1890 with base year 1850.
- (e) The Laspeyres price index for 1890 with base year 1850 is calculated using 1850 quantities for weights. Calculate the Laspeyres price index for 1890 with base year 1850 for this group of four staple foods.
- (f) If a Swede were rich enough in 1850 to afford the 1890 bundle of staple foods in 1850, he would have to spend how many times as much on these foods as does the typical Swedish worker of 1850?
- (g) If a Swede in 1890 decided to purchase the same bundle of food staples that was consumed by typical 1850 workers, what is the fraction of the amount that the typical Swedish worker of 1890 spends on these goods?
5. Norm and Sheila consume only meat pies and beer. Meat pies used to cost \$2 each and beer was \$1 per can. Their gross income used to be \$60 per week, but they had to pay an income tax of \$10. Sketch their old budget line for meat pies and beer.
- (a) They used to buy 30 cans of beer per week and spent the rest of their income on meat pies. How many meat pies did they buy?
- (b) The government decided to eliminate the income tax and to put a sales tax of \$1 per can on beer, raising its price to \$2 per can. Assuming that Norm and Sheila's pre-tax income and the price of meat pies did not change, draw their new budget line.
- (c) The sales tax on beer induced Norm and Sheila to reduce their beer consumption to 20 cans per week. What happened to their consumption of meat pies? How much revenue did this tax raise from Norm and Sheila?
- (d) This part of the problem will require some careful thinking. Suppose that instead of just taxing beer, the government decided to tax both beer and meat pies at the same percentage rate, and suppose that the price of beer and the price of meat pies each went up by the full amount of the tax. The new tax rate for both goods was set high enough to raise exactly the same amount of money from Norm and Sheila as the tax on beer used to raise. What are the amounts of taxes collected by this new tax scheme for every bottle of beer sold and for every meat pie sold? (Hint: If both goods are taxed at the same rate, the effect is the same as an income tax.) How large an income tax would it take to raise the same revenue as the \$1 tax on beer? Now you can figure out how big a tax on each good is equivalent to an income tax of the amount you just found.

- (e) Draw the budget line for Norm and Sheila that corresponds to the tax in the last section. Are Norm and Sheila better off having just beer taxed or having both beer and meat pies taxed if both sets of taxes raise the same revenue? (Hint: Try to use the principle of revealed preference.)