

Midterm I.

Econ 101
Professor Guse

Monday October 16, 2006.

Instructions. You have 55 minutes to complete the exam. There are 55 points available. Please write your responses on the exam itself in the space provided. If you require additional space, write on the back of the page. You may refer only to your own handwritten, two-sided, “cheat sheet”. Calculators and all other references materials are *not* allowed. If a question asks for a numeric quantity you may leave your answer in expression form for full credit. (e.g. “ $\frac{40-30}{5}$ ” would be perfectly acceptable in place of “2”.) Be sure to label any diagrams you draw, to show your work and to explain your reasoning. Please turn in your cheat sheet with your exam. Thank you and good luck!

Name:

Pledge:

1. SHORT ANSWER (10 Points).

- (a) (4 points) In a classical short-run total product curve, if output is increasing at an increasing rate then
- i. marginal product is **increasing**.
 - ii. average product is **increasing**.
 - iii. marginal cost is **decreasing**.
 - iv. average variable cost is **decreasing**.

GRADING: 4 Points for selecting all the right directions. 0 otherwise. (Note any other combination has good chance of being selected randomly.)

- (b) (2 points) Johanna is willing to accept a loss of not more than 5 Republican seats in the House of Representatives for a gain of 2 Republican seats in the Senate. Johanna's _____ of House seats for Senate seats is $\frac{5}{2}$.

ANSWER: Marginal Rate of Substitution

GRADING: 1 Point awarded for closely related notion of “marginal willingness to pay”. Though this is not exactly correct, since what is being given up here is another good, not money.

- (c) (4 points) It takes Elisa 1 hour to bake a loaf of bread and 3 hours to catch a fish. Jane takes 2 hours to make a loaf of bread. Jane has *comparative advantage* over Elisa in bread making. What can you say about Jane's fishing?

ANSWER: Since Jane has a comparative advantage in bread making, it means that fewer caught fish are given up when she bakes a loaf of bread. Note that Elisa must give up $\frac{1}{3}$ of a fish to bake a loaf. Jane therefore gives up less than $\frac{1}{3}$ of a fish to bake a loaf. Since it takes Jane 2 hours to bake a loaf, this translates to *at least* 6 hours for Jane to catch of fish.

GRADING: 2 Points awarded for reasonable and correct discussion of comparative advantage without specifically mentioning the fact that we know it takes Jane at least 6 hours to catch a fish.

2. (20 points) Scrooge has wealth equal to \$2000 which he can spend on two goods, *current consumption* and *savings*. The price of current consumption is \$1. The price of savings is \$1.
- (a) (5 Points) In a diagram with current consumption on the horizontal axis and savings on the vertical axis, draw Scrooge's budget line. Label it "(a)".
 - (b) (10 Points) The government decides to tax current consumption over \$1000 at a rate of \$1 per \$1. That is, Scrooge will not owe any tax if he spends \$1000 or less in current consumption. However, if, for example, Scrooge spends \$1060 in current consumption, he would have to pay a tax of \$60. Draw his new budget line. Label it "(b)".
 - (c) (5 Points) **Difficult.** It turns out that under the new tax, Scrooge lowers his current consumption to exactly \$1000. Moreover, the tax rate imposed was the *lowest* tax rate that induces Scrooge to do this. Carefully draw Scrooge's indifference curve running through the point (1000,1000). What is Scrooge's MRS of savings for consumption at that point? **ANSWER.** MRS = 2 dollars in savings per dollar in current consumption at (1000,1000).

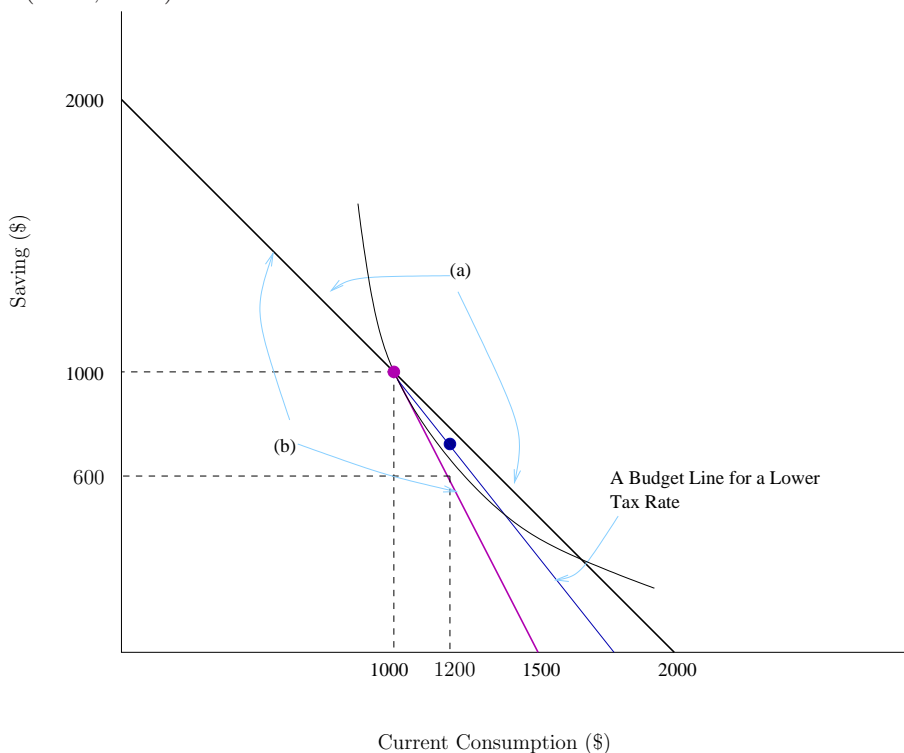


Figure 2. The Purple Line is the budget line from (b). The Blue Line is the budget line that would result if the tax rate were lower than 100%. Since the MRS at (1000,1000), we see that setting the tax any lower than 100% (such as the blue line) would induce Scrooge to consume more current consumption (and less savings). If the tax were higher than 100% (not shown), Scrooge would still choose (1000,1000). The bundle (1200,600) on budget line (b) is for illustration purposes only to verify the how the line was constructed; If Scrooge spends \$1200 in current consumption under the tax, his tax bill would be \$200, leaving only $\$2000 - \$1200 - \$200 = \600 for savings.

3. (25 Points) Virginia receives \$350 each month to spend on pizza and beer. Her preferences from month to month never change. Her budget lines and choices for July and August are shown below in Figure 1.

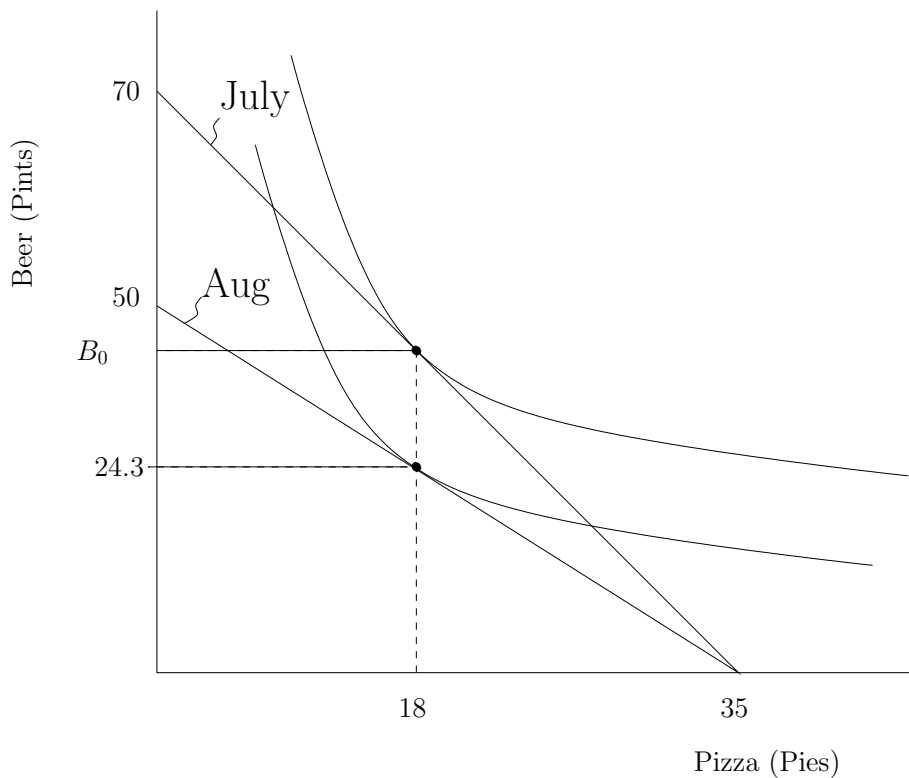


Figure 1. Virginia's budgets and choices for pizza and beer in July and August.

- (a) (3 points) What were the prices of beer in July and August?

ANSWER: According to the picture, the most beer Virginia could buy in July and August with her \$350 was 70 and 50 respectively. Therefore prices in July and August must have been such that

$$70 = \frac{350}{p_B^{July}}$$

$$50 = \frac{350}{p_B^{August}}$$

solving for each p_B we get

$$p_B^{July} = \frac{350}{70} = 5$$

$$p_B^{August} = \frac{350}{50} = 7$$

- (b) (2 points) What were the prices of pizza in July and August?

ANSWER: Since income did not change, it is clear from the picture that the price of pizza did not change from July to August. Using the same method as in the previous question, in both months it was \$ $\frac{350}{35}$ or \$10 per pizza.

- (c) (5 points) B_0 was Virginia's level of beer consumption in July. What is B_0 equal to?

ANSWER The consumption bundle $(18, B_0)$ is on Virginia's July budget line. Therefore it must be true that

$$\begin{aligned}m &= p_Z 24 + p_B^{July} B_0 \\350 &= \frac{350}{35} 18 + \frac{350}{70} B_0\end{aligned}$$

Solving for B_0 we get

$$\begin{aligned}B_0 &= \frac{70(350 - \frac{350}{35} 18)}{350} \\&= 24\end{aligned}$$

GRADING: Any equivalent expression acceptable.

- (d) (5 points) Going solely on the one change in price we know about, what is the cross-price elasticity of pizza with respect to the price of beer. Explain.

ANSWER: Since the Virginia's demand for pizza did not change when the price of beer changed, our best guess is that the cross-price elasticity is exactly **zero**.

- (e) (10 points) Sketch a demand curve for beer from the data in Figure 1. Be sure that your diagram is well-labeled.

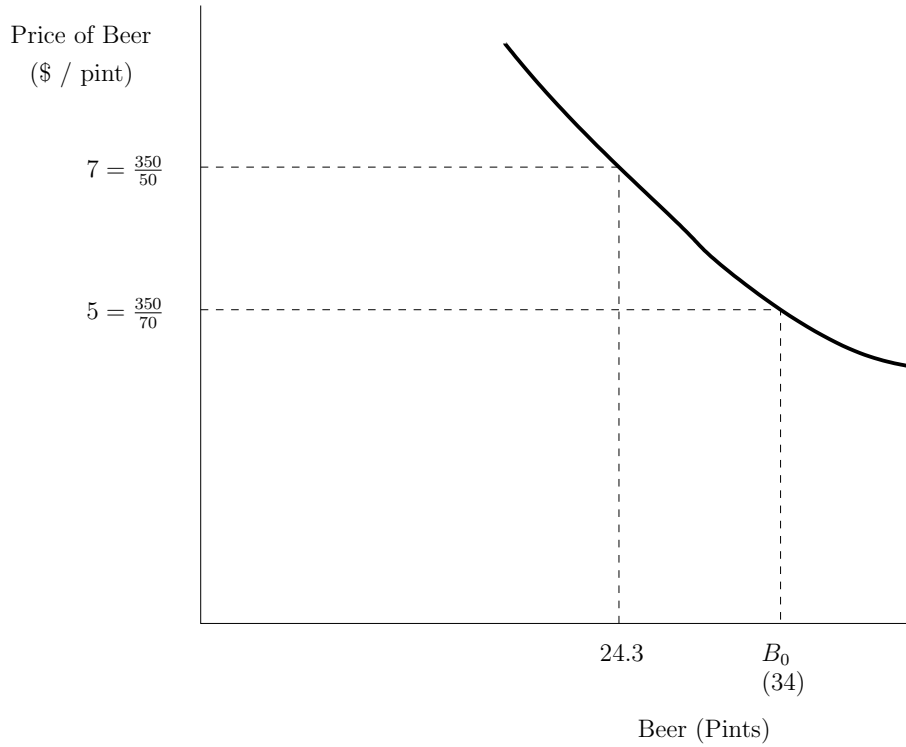


Figure 3. From the choice diagram we know that Virginia's demand for beer is 24.3 when the price of beer is \$7 / pint and the demand for beer is 34 when the price of beer is \$5 per pint holding constant $m = 250$ and $p_z = 10$