SUID:

Peter J. Wilcoxen   Department of Public Administration
Economics for Public Decisions   The Maxwell School, Syracuse University

Exam 2
Spring 2017

DO NOT OPEN THIS EXAM UNTIL YOU ARE TOLD TO DO SO.

Instructions

1. Write your SUID in the upper right corner of this exam. Do NOT write your name.

2. SHOW ALL YOUR WORK. Answers without supporting work will receive little or no credit.

3. There are 75 points possible on the exam and you'll have 80 minutes to work on it. Budget your time accordingly.

4. Do all your work on this exam. If you need extra space, write on the backs of the pages. However, if you do write an answer on the back of a page, *be sure you've noted that near the question*.

5. Some formulas for areas:

$$A = \frac{1}{2}bh \qquad\qquad A = \left(\frac{b_1 + b_2}{2}\right)h$$

6. Some algebraic relationships for exponents:

$$(AB)^c = A^c B^c \qquad A^c A^d = A^{c+d} \qquad \frac{1}{\left(\frac{A}{B}\right)^c} = \left(\frac{B}{A}\right)^c \qquad (A^c)^d = A^{cd}$$

7. The general form of the Cobb-Douglas utility function and its demand equations:

$$U = X^g Y^{1-g} \qquad\qquad X = \frac{gM}{P_x} \qquad\qquad Y = \frac{(1-g)M}{P_y}$$

Question 1 (15 points)

A state government is considering imposing a minimum wage. There is no minimum wage in place now and the market is in equilibrium with a wage of $8 and 10 million workers employed. The elasticity of demand for labor is known to be -0.2 and the elasticity of labor supply is known to be 0.4. The government is considering two possible choices for the wage: $10 and $12. It would like to pick the largest it can (of the two) without having more than 7% of workers lose their jobs.

(a)   Please determine: □ which wage the government should choose (be sure to show your work); □ the change in employment it will cause; □ the new number of workers employed after it goes into effect; □ the changes in CS and PS caused by the policy; and □ the DWL it creates.

Question 2 (15 points)

One of the households in the table to the right has Cobb-Douglas preferences. In the remainder of the exam, this will be referred to as the CD household.

(a) Please: □ determine which one is the CD household and calculate its value of g; □ draw a diagram illustrating the CD household's 2016 equilibrium; and then □ *derive* the expenditure function for the CD household. (Be sure to show all the steps, not just the final result.)

HH	Year	Income	Px	Py	X	Y
A	2015	4500	12	12	250	125
	2016	5100	18	15	200	100
B	2015	2880	12	12	120	120
	2016	3600	18	15	90	132
C	2015	1200	12	12	50	50
	2016	1800	18	15	50	60

Question 2, continued

Now suppose that in 2016 the government imposes a $4 subsidy on X and $10 tax on Y. To help mitigate the impact of the tax it also gives the household a lump sum payment of $300 (that is, the household's income rises by $300 under the policy). You may assume the supplies of X and Y are perfectly elastic so Px would fall to $14 and Py would rise to $25.

(b)   Please calculate: □ the new values of X and Y under the policy; □ the overall effect on the government's budget; and □ the CV. Then indicate: □ whether the policy breaks even; and □ whether the household is better or worse off.

Question 3 (15 points)

HH	Year	Income	Px	Py	X	Y
A	2015	4500	12	12	250	125
	2016	5100	18	15	200	100
B	2015	2880	12	12	120	120
	2016	3600	18	15	90	132
C	2015	1200	12	12	50	50
	2016	1800	18	15	50	60

One of the households in the table to the right regards X and Y as perfect complements and always buys d units of good X for each unit of good Y. In the remainder of the exam, this will be referred to as the PC household.

(a)   Please: □ *derive* the PC household's demand equations for X and Y in terms of d, Px, Py and income M (be sure to show the steps involved, don't just write down the demand equations); and □ determine which one of the households in the table has perfect complements preferences and calculate the value of d.

Question 3, continued

Now suppose that in 2016 government imposes a slight variation on the policy from Question 2: a $4 subsidy on X and $10 tax on Y (both the same as before, with Px falling to $14 and Py rising to $25), but now gives the household a lump sum of $94 (slightly different).

(b)   Please compute: □ the PC household's new equilibrium; □ the overall effect on the government's budget; □ the CV; and □ the change in SS. Finally, show the new equilibrium in a well-labeled diagram.

Question 4 (15 points)

A household buys two goods, X and Y, and its preferences can be represented by the utility function shown below. Also shown are the household's demand equations and its expenditure function. Be careful about subscripts: both the numerators and the denominators in the demand equations are different.

$$U = X^{0.5} + Y^{0.5} \quad \bigg| \quad X = \frac{M * P_y}{P_x * (P_x + P_y)} \quad \bigg| \quad Y = \frac{M * P_x}{P_y * (P_x + P_y)} \quad \bigg| \quad M = \frac{U^2 * (P_x * P_y)}{P_x + P_y}$$

Initially, Px=$8, Py=$8 and M=$3600. The government is considering a policy that would place a $4 tax on X. The supply of X is perfectly elastic and its price would rise to Px=$12.

(a)   Please calculate: □ the initial equilibrium before the policy is enacted (both X and Y);   □ the new value of X with the policy in place (it's OK to skip the new value of Y); □ the net tax revenue the household pays; □ the CV for the policy; □ indicate whether the household is better or worse off; and □ the policy's income and substitution effects for the X good.

Question 5 (15 points)

An individual is concerned about consumption in two periods: 0 and 1. In period 0 her income is $80,000 and in period 1 it will be $120,000. However, she also has an opportunity to spend $20,000 on a training program in period 0 that will cause her to get a $48,000 raise in period 1. Her preferences over bundles of consumption in the two periods, C0 and C1, are given by a Cobb-Douglas utility function of the form $U = C0^{0.4} C1^{0.6}$. She can borrow or save at an interest rate of 20%.

(a)   Please determine: ☐ whether or not she should take the training program. Then calculate: ☐ how much she consumes in each period; and ☐ the amount she borrows or saves in period 0. Finally: ☐ illustrate your results with an appropriate diagram showing her intertemporal budget constraint (after accounting for whether or not she takes the training), an indifference curve, and her equilibrium.