

U8216 Microeconomics and Policy Analysis (Sections 2 and 3 only)
Fall 2000
Problem Set 3

Secure a good supply of graph paper.

1. Draw the budget constraint on an Income/Leisure diagram for Poor Sam who earns \$5.00 an hour and has no unearned income. Assume there are 240 hours a month to allocate to work or leisure.
2. Add an indifference curve consistent with a choice of 200 hours of work per month.
3. Indicate how the budget line would change if a "flat tax" of 20% were applied to all income. How would that affect the labor supply? Net income (after tax)?
4. What if the "flat tax" exempted the first \$1000 of monthly income? Discuss the difference in work and income outcomes.
5. On a new diagram indicate how a "Social Security Contribution" of 10% of the first \$2000 of monthly earnings (none on unearned income) would affect the initial budget constraint. Explain its effect on labor supply and net income.
6. Consider a "Credit Income Tax" (on a new diagram) that provides a \$50 per month refundable credit toward a "flat tax" of 25% on all income. Compare the likely work and income consequences with the alternatives in 3 and 4 above.
7. Like most of us non-time travelers, Joe has $24 \times 7 = 168$ hours per week to either work or not work. Joe earns \$16 per hour if he chooses to work. His decision to work is derived by maximizing his utility function of weekly income (Y) and leisure (L), and this function is:

$$U = Y^2 + 80L^2$$

Solve for Joe's weekly income, Y .

8. Clinton and Putin are negotiating to reduce the number of nuclear warheads that they have. Each of them has one good negotiator and one bad negotiator. The results of sending the good and bad negotiators are the follows:
 - If both send good negotiators, both will end up with 500 warheads.
 - If both send bad negotiators, both will end up with 200 warheads.
 - If Clinton sends the good and Putin sends the bad negotiator, the US will end up with 1000 warheads and Russia with 195 warheads.
 - If Clinton sends the bad and Putin sends the good negotiator, the US will end up with 195 warheads and Russia with 1000 warheads.

- a. Suppose each President's goal is to maximize the number of warheads that he has. Each takes the other's action as given. What is the equilibrium?
- b. Suppose each President's goal is to maximize the difference between the number of warheads he has and the number that the other has. What is the equilibrium now?
- c. Suppose each President's goal is to minimize the total number of warheads in the world (forget about everybody else). What is the equilibrium?

9-14. (*optional*) Repeat questions 1-6 for Young Mary who earns \$25 per hour, chooses to work 160 hours a month and has no unearned income.

15-20. (*optional*) Repeat questions 1-6 for Widow Jane who has \$2000/month of unearned income, could earn only \$5 per hour and chooses no to work.

21-26. (*optional*) Repeat questions 1-6 for Marvelous Marvin who earns \$25 per hour, chooses to work 120 hours per month and collects \$2000 of unearned income per month.

27. (*optional*) What lessons can you draw from these examples about how different tax systems affect different groups?

28. (*optional*) Sally earns \$10/hr "straight time" and \$15/hr for overtime (more than 8 hours a day). She consistently works 10 hours a day. When her employer considers raising the straight time wage to \$15/hr with no overtime premium she plans to work only 8 hours a day.

- a. Can you explain this, or is she crazy?
- b. Is it possible that no straight time wage would entice Sally to work 10 hours a day?

29. (*optional*) A worker is currently earning \$6 per hour and is working 40 hours per week.

- a. Use indifference curves and budget constraints for the labor-leisure trade-off to illustrate this worker's optimizing decision.
- b. If the worker is offered an overtime wage of \$9 per hour for all hours worked over 40, will she increase her hours worked? Explain, using a diagram.

30. (*optional*) The income (point) elasticity of demand for bread is 1.0 and the own price (point) elasticity is -0.4. The price of bread is \$2, and income is \$100. If price rises to \$3, what level of income would leave the quantity demanded approximately unchanged?

31. (*optional*) Consider the extract from William Butler Yeats' poem "The Three Beggars" (attached).

- a. Assume King Guaire wanted to give the beggars some money, or didn't mind doing so. Was the outcome Pareto optimal?
- b. Given the actions of the others, would you advise any particular beggar to act differently? Was the outcome an equilibrium?
- c. What advice would you give to the beggars collectively after King Guaire has explained the proposition to them? Is your proposal enforceable?

32. (*optional*) Consider a town in which:

- Everybody, whether or not she carries a gun, always prefers that everybody else not carry a gun;
- Everybody will prefer to carry a gun of her own, for self-defense, if gun-carrying is widespread;
- Everybody will prefer to go without a gun, in the interest of comfort and personal safety, if hardly anyone carries a gun; and
- Guns are bulky and cannot be concealed.

Sketch the Schelling curves for carrying and not carrying a gun. Indicate the equilibria and how they might come about. Discuss how satisfactory these outcomes are.



“The Three Beggars”
Responsibilities and Other Poems
by William Butler Yeats (1865–1939)

...King Guaire walked amid his court
The palace-yard and river-side
And there to three old beggars said: 10
‘You that have wandered far and wide
Can ravel out what’s in my head.
Do men who least desire get most,
Or get the most who most desire?’
A beggar said: ‘They get the most 15
Whom man or devil cannot tire,
And what could make their muscles taut
Unless desire had made them so.’
But Guaire laughed with secret thought,
‘If that be true as it seems true, 20
One of you three is a rich man,
For he shall have a thousand pounds
Who is first asleep, if but he can
Sleep before the third noon sounds.’
And thereon merry as a bird, 25
With his old thoughts King Guaire went
From river-side and palace-yard
And left them to their argument.
‘And if I win,’ one beggar said,
‘Though I am old I shall persuade 30
A pretty girl to share my bed’;

The second: ‘I shall learn a trade’;
The third: ‘I’ll hurry to the course
Among the other gentlemen,
And lay it all upon a horse’; 35
The second: ‘I have thought again:
A farmer has more dignity.’
One to another sighed and cried:
The exorbitant dreams of beggary,
That idleness had borne to pride, 40
Sang through their teeth from noon to noon;
And when the second twilight brought
The frenzy of the beggars’ moon
They closed their blood-shot eyes for naught.
One beggar cried: ‘You’re shamming sleep.’ 45
And thereupon their anger grew
Till they were whirling in a heap.

They’d mauled and bitten the night through
Or sat upon their heels to rail,
And when old Guaire came and stood 50
Before the three to end this tale,
They were commingling lice and blood.
‘Time’s up,’ he cried, and all the three
With blood-shot eyes upon him stared.
‘Time’s up,’ he cried, and all the three 55
Fell down upon the dust and snored....