

Econ 4211 Fall 2008
Homework Assignment 6
Due Fri Dec 5

December 12, 2008

Problem 1 *A businessmen consumes all his earned income. His utility is $u(R, C) = R^{3/4}C^{1/4}$, where R is leisure in hours and C is consumption in dollars, so $MRS_{R,C}(R, C) = \frac{3C}{R}$. He gets \$100 per hour and has choose the time to devote to work every week. Assume that he faces the following tax schedule (on weekly earnings):*

	Earnings, in \$	Income tax rate, in %
1	0-100	0
2	100-600	15
3	600-1500	25
4	1500-3000	28
5	3000-7000	33
6	7000-	35

1. Draw the before and after tax budget constraint of the businessman.
2. Write down the budget constraint for each of the four cases corresponding to the four tax brackets (as he can choose to earn any amount.)

Solution 2 *See class notes*

3. How many hours per week (out of 168) will the businessmen choose to work? (Hint: guess first that the businessman's pre-tax earning will fall into, say, the second bracket. Write his utility maximization problem

with the corresponding budget constraint you found in the previous question. Solve the problem, i.e., find C , R that will be optimal. Will the pre-tax earnings fall into the second bracket, i.e., is it true that given the optimal R , the earnings, $100(168 - R)$ are above 100 and below 400? If yes, your guess was correct and you have found a solution, if not, continue with another guess, say, bracket 3, etc.)

Solution 3 *Optimality conditions for the 5th tax bracket*

$$\begin{aligned}\frac{3C}{R} &= 67 \\ C &= 100 + 85 * 5 + (15 - 6) * 75 + 15 * 72 + 67(168 - 30 - R)\end{aligned}$$

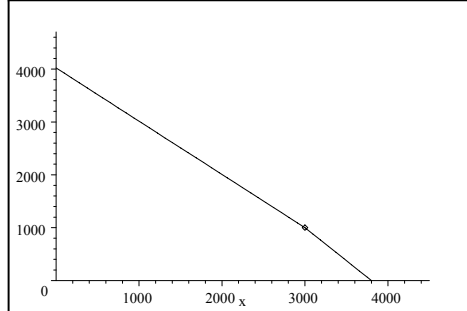
Solution is: $R = \frac{17289}{134} = 129.02$, which falls into the range consistent with this tax bracket, $[98, 138]$. $C = \frac{5763}{2} = 2881.5$

1. The businessman faces retirement next year. He expects to receive a third of the after-tax income in the working years in retirement benefits next year. Assume for simplicity the answer you got in 3. is representative for all his working years. Retirement benefits are taxed according to the same schedule (see the table above). Calculate the after-tax retirement benefit for the next (retirement) year. What is his tax bracket for the retirement year?

Solution 4 $2881.5/3 = 960.5$, tax bracket 3.

Problem 5 (See chapter 22) *Assume you start with an economy where any interest derived from savings is subject to tax (capital gains tax). Assume a retiree gets $\frac{1}{3}$ of working age income when retired. Assume also, for simplicity, the interest payments on loans are not subject to tax deduction.*

1. Draw a budget constraint of an individual with c_1 , consumption in the working years, on the vertical axis; and c_2 , consumption in the retirement years, on the horizontal axis. Assume an individual can borrow against future income.



If the individual is not saving and not borrowing, he can consume his income, or endowment. (the point on the graph). On the horizontal axis we measure consumption during working years, and on the vertical axis, the consumption during retirement. The interest on savings is taxed (at rate t) that is why the upper portion of the graph is flatter, i.e., the after-tax return on investment is lower than the market return rate (r). The slope above the endowment point is $-(1 + r(1 - t))$, the slope below that point is $-\frac{1}{1+r}$.

2. Suggest a retirement savings plan that will encourage savings. Analyze a possible effect of introducing your plan on individual savings using its effect on the budget constraint in part 1.

Solution 6 *Reducing the tax on savings might encourage more savings, though there are two effects: substitution (save more, as consumption tomorrow is cheaper) and income (consume more, save less), and they work in the opposite directions. The upper portion of the budget constraint will be steeper.*

Problem 7 *Assume Ceasar is facing a 31% federal income tax bracket on additional income and Brutus faces a 15% tax rate. The city of Happyville plans to issue bonds (borrow from the public) and the return on these bonds is not subject to income tax. The market rate of return on taxable bonds is 15%.*

What is the lowest rate of return that the city of Happyville should offer to induce both Ceasar and Brutus to buy its bonds?

Assume the city borrows \$100 from Brutus and Ceasar. How much will the city of Happyville gain from the tax exemption? (Hint: compare the interest payments of the city with and without the tax exemption.)

What is the cost of the tax exemption of the bonds from the federal taxes to the federal government (how much in tax revenues does it loose)?

What is your conclusion from comparing the answers to the previous two questions?

Solution 8 *Solved in class.*