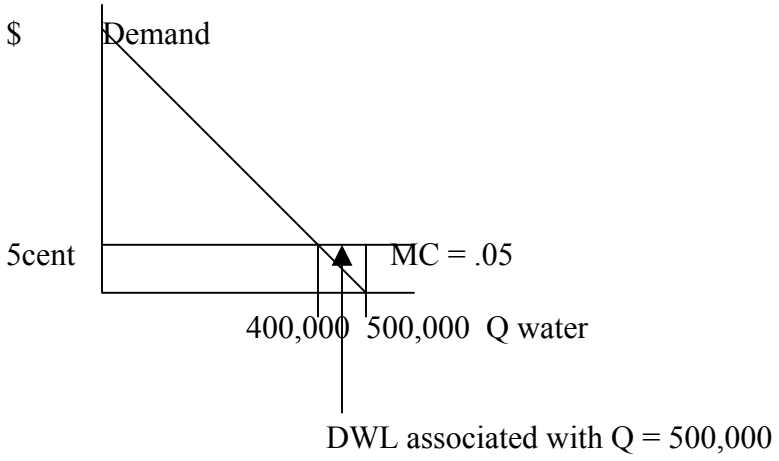
FE431: PUBLIC FINANCE
Fall 2006
Professor Schmitt
Homework 6 – due October 13th

1. A large city currently provides free water service to residents. The marginal social cost of making a gallon of water available per month is estimated to be 5 cents no matter how much water is used. Currently, city residents consume 500,000 gallons of water per month. The costs of making the water available are financed by a local tax on city residents.

a) Draw this graphically – discuss if this is an efficient or inefficient situation.
b) Show the net gains in well-being possible by applying a user charge of 5 cents per gallon to residential users. Assume that monthly consumption declines to 400,000 gallons after the user charge is imposed. Calculate the tax revenues that can be freed for other uses each month after the user charge is imposed.



DWL = ½ b*h = ½ 100,000*0.05 = 2,500

Tax revenues of $5000 per month will be freed because water production will fall by 100,000 gallons per month. In addition, the user charge will collect $20,000 monthly from sale of 400,000 gallons of water each month. A total of $25,000 in tax revenue will therefore be freed as a result of the user charge.

2. Suppose there are five people – 1, 2, 3, 4, and 5 – who rank projects A, B, C, and D as follows:

	Person 1	Person 2	Person 3	Person 4	Person 5
1^{ST}	A	A	D	C	B
2^{ND}	D	C	B	B	C
3^{RD}	C	B	C	D	D
4^{TH}	B	D	A	A	A

Assuming the different projects correspond to different levels of a public good (where A is the lowest and D is the highest level), answer the following questions:

a) Will any project be chosen by a majority-rule vote? If so, which one?
b) Are each individual's preferences "single-peaked"? Which ones, if any, are not single-peaked? What problem potentially arises when preferences are "double-peaked" and majority-rule is the decision-making mechanism?
c) Is the **median voter theorem** applicable in this case?

Notice that project C will defeat any other project (A, B, or D) in a pairwise vote 3 to 2. Therefore, project C is the project that will be chosen by majority rule voting. This is despite the fact that many individual's preferences are double-peaked.

This means that double-peaked preferences MAY lead to cycling in the voting, but will not ALWAYS lead to cycling.

Median voter theorem is not applicable because some individuals have double-peaked preferences.

3. Suppose that you currently earn taxable income of $100,000 per year. You are subject to a marginal tax rate of 50%. Currently your average tax rate is 35%. Calculate your annual tax. Calculate the extra tax you would pay per year if you income increased to $110,000. What is your average tax rate when you annual income is $110,000?

Since ATR is 35%, then annual taxes at $100,000 is $35,000.
Extra tax is 50% of then additional $10,000, so additional $5,000 in taxes.
The ATR at $110,000 is $35,000 + $5000 = $400,000/$110,000 = 36.36%