Problem set 4, due Monday 11/11/13

1. Taxation, public goods, and optimal government size. Suppose that there is a private good, with a market that is efficient in the absence of taxation, and a public good that can only be provided by the government using revenue from a per-unit tax of τ on the private good. Let the marginal benefit and cost for the private good (with quantity x) be as follows:

$$MB(x) = 150 - 3x \qquad\qquad MC(x) = 30 + x$$

Let the marginal benefit and cost of the public good (with quantity y) be as follows:

$$MB(y) = 160 - 8y \qquad\qquad MC(y) = 48$$

a) As functions of the tax τ, find the quantity of the private good $x(\tau)$, tax revenue $R(\tau)$, and deadweight loss $DWL(\tau)$.

b) Find the optimal tax τ^o, supposing that the shadow value of spending a dollar on the public good is $\lambda = 4/3$. Also, find the resulting tax revenue, $R(\tau^o)$.

c) Using the value of tax revenue that you found, and information about the public goods market above, demonstrate that the shadow value of the last dollar spend on the public good is indeed $4/3$. That is, find the value of y^o that results from spending the revenue $R(\tau^o)$, and use this to calculate the shadow value $\lambda(y^o)$.

d) In the above model, λ represents the shadow value of the last dollar of public spending, and μ represents the shadow cost of the last dollar of tax revenue. In this model, what is the relationship between these variables when government is 'too small', i.e. below its optimal size? Explain your answer clearly.

e) Discuss the Laffer curve in the context of the above example. What levels of taxation are Pareto-dominated regardless of the value of public spending?

2. Simple income tax calculation. Suppose that there is a graduated income tax defined by this table:

income bracket	marginal rate
$0 - $10,000	10%
$10,000 - $20,000	20%
$20,000 - $30,000	30%
$30,000 and above	40%

If your taxable income is $25,000, how much do you pay? _____

If your taxable income is $50,000, how much do you pay? _____

3. Haig-Simons income.

a) Suppose that at the beginning of 2011, my net worth was $10,000, and at the end of 2011, my net worth was $5,000. Suppose also that my consumption expenditure in 2011 was $20,000. What was my income in 2011, according to a Haig-Simons definition? _____

b) Suppose that at the beginning of 2012, my net worth was $5,000, and at the end of 2012, my net worth was $15,000. Suppose also that my consumption expenditure in 2012 was $25,000. What was my income in 2012, according to a Haig-Simons definition? _____

4. Reflection questions.

a) What does it mean for a tax to be "progressive"? Give an example of a progressive US tax, and explain why it fits this definition. What does it mean for a tax to be "regressive"? Give an example of a regressive US tax, and explain why it fits this definition.

b) Name and explain two reasons why it might be justified for two people with the same income to pay different income taxes. Base the first argument on ability to pay, and the second argument on the presence of a positive externality or public good.

c) What are the major differences between the US federal income tax and the FICA (or payroll) tax?

d) Explain roughly how the marginal rates of the US federal income tax changed as a result of the Economic Growth and Tax Relief Reconciliation Act of 2001, and the American Taxpayer Relief Act of 2012.

e) In what ways does capital gains income receive more favorable tax treatment than wage income?

f) Why would a tax on the economic profits of firms be non-distorting? What are the practical difficulties with implementing such a tax?

g) Give two arguments for a tax on the value of land and the use of natural resources: one based on efficiency, and another based on justice.