AS/ECON 4080MW      Assignment 2      due : Wed. April 25, before class

All questions count equally.

Questions 1–3 deal with the choice of income tax rate in a country with the following characteristics. The country's income tax base is less than people's ( exogenous ) incomes. ( This is due to the excess burden of taxes, discussed in AS/ECON 4070, but that fact is not needed in these questions. ) Specifically, the income tax base is a fraction

$$1 - \frac{1}{2}t$$

of people's incomes, where $t$ is the income tax rate, so that the higher the tax rate, the lower the tax base is as a fraction of total income. There are many people in the country in question, and many different income levels $y$. The people in the country get to choose a proportional income tax rate $t$, with the revenue collected by the tax being distributed equally to all the people. ( The tax revenue is the tax base, times the tax rate. ) Each person cares only about what she receives, her income, minus the taxes she pays, plus the share she gets of the net tax revenues.

$1(a)$ If the mean ( average ) income in the country is $\bar{y}$, how does what a person receives depend on the tax rate $t$?

$(b)$ Show that each person's preferences over tax rates are single–peaked.

2. If the median income in the country is $\tilde{y}$, what tax rate will be selected, if people in the country choose their tax rate directly, using pairwise majority rule?

3. Some macroeconomists have found that there exists an inverse relationship between the degree of income inequality in a country, and the rate of economic growth in the country. Is this finding consistent with the model in questions 1 and 2? Explain briefly.

Questions 4 and 5 both concern the choice of expenditure on education and on health, in a country with three different types of people. Each person in the country has the same income, 30 ( measured in thousands of dollars per year ). Unlike questions 1–3, the tax base here is exogenous, and not affected by government policies. Each person will pay an equal share of the cost of education and of health, so that a person's disposable income $x$ available for spending is

$$x_i = 30 - E - H$$

where $E$ is expenditure per person on education, and $H$ is expenditure per person on health.

There are equal numbers of three types of people, whose preferences over private spending $x$, education expenditure per person, and health expenditure per person can be represented

$$U^1(x, E, H) = x + 2E + 3H - \frac{1}{2}E^2 - \frac{1}{2}H^2$$

for one type of person,

$$U^2(x, E, H) = x + 4E + 2H - \frac{1}{2}E^2 - \frac{1}{2}H^2$$

for the second type of person, and

$$U^3(x, E, H) = x + 3E + 4H - \frac{1}{2}E^2 - \frac{1}{2}H^2$$

for the third.

4. If education and health expenditure were chosen by separate committees, what can you say about the likely choice, if each committee had equal numbers of representatives of each of the three types of people, and if each committee made decisions using pairwise majority rule? ( That is, any member of the education committee could propose a change to the level $E$ of education spending, but any changes to the level of health spending would be decided by the health committee. A person's private spending $x$ would be her income of 30, minus the level of education expenditure chosen by the education committee, minus the level of health expenditure chosen by the health committee. )

5. If one single legislative body chose education and health expenditure simultaneously, by pairwise majority rule, what can you say about the levels chosen if the body had equal numbers of representatives of each type? ( In this case, any legislator could introduce a bill changing both the level of education expenditure and the level of health expenditure. Again, a person's private spending would be her income, minus the per capita cost of the education and health spending chosen by the legislative body. )