AS/ECON 4070 3.0AF : F2008 Assignment 2 due : Wednesday November 19

Do **all 5** questions. All count equally

1. Suppose that a person's compensated demand functions for three goods were

$$X = \frac{60}{P_X}$$

$$Y = 120\frac{P_Z}{P_Y - P_Z}$$

$$Z = \frac{120}{P_Z(P_Y - P_Z)}$$

where X, Y and Z are the quantities demanded of the three goods, and P_X, P_Y and P_Z are the prices — including any taxes — paid by the consumer for the goods.

(This consumer does consume more goods than just X, Y and Z : but these other goods cannot be taxed.)

If the world prices of goods X, Y and Z were 4, 12 and 4 respectively, then what would the optimal tax rates be if the government needed to raise revenue of 160, and could tax only goods Y and Z?

2. Suppose that the consumer's demands were the same as they were in question #1 above, but that the government could tax only goods X and Y (but not good Z).

If the tax rates on X and Y were set optimally, and if the tax on good Y (expressed per unit) were \$4 per unit (that is, 25%, expressed as a fraction of the tax–included price), then what must the tax rate be on good X?

3. Suppose now that the consumer's demands were still the same as in question #1 above, but now the government can tax all 3 goods X, Y and Z.

If the tax rates on X and Y were set optimally, and if the tax on good Y (expressed per unit) were \$4 per unit (that is, 25%, expressed as a fraction of the tax–included price), then what must the tax rates be on good X and Z?

4. In an imaginary country, people all have the same preferences, which can be represented by the utility function

$$u(x, h) = x - \frac{1}{2}h^2$$

where x is the dollar amount of the person's weekly consumption expenditure, and h is the number of hours she works per week.

People differ only in the wage w, which they can earn (before any taxes are deducted) per hour. People can choose how many hours h they work, and make this choice so as to maximize their utility, given that the value x of their consumption depends on how much they work. The value x of their consumption equals their wage income, net of any taxes, plus any money they get from the government.

In this economy, (*i*) the mean (average) value of the hourly wage $\bar{w}$ is 30, (*ii*) the variance of the hourly wage is 300, and (*iii*) the mean (average) value of w^2 is 1200. (This third number follows from the fact that, for any random value, the expected value of w^2 equals $[\bar{w}]^2$ plus the variance of w.)

The government is considering a negative income tax scheme, in which each person will pay taxes of $\tau y - T$, if her gross weekly earnings are y. (So a person whose earnings are so low that $\tau y < T$ would actually get a cheque of $T - \tau y$ from the government.

If the government has no outside revenue requirements, so that the only constraint on its negative income tax is that the tax collect a total revenue from all people which is greater than or equal to zero, how does T vary with the tax rate τ?

5. In the economy described in question #4 above, what tax rate τ would be best for a person whose hourly wage w was 30?