

**Econ 230B**

**Spring 2011**

**FINAL EXAM: 2 Hours**

**True/False Questions: 25 points**

Answer 10 out of 12 questions (2.5 pts each). Explain your answer fully, since all the credit is based on the explanation.

1. In a basic 2-period OLG model (working when young and retired when old), there should be no taxes on savings if the government can use a non-linear tax on labor income.

2. The Tax Reform Act of 1986 led to a substantial increase in incomes reported at the top of the distribution. Therefore, the top marginal tax rate cut allowed the government to collect more tax revenue from the rich.

3. Optimal income tax theory calls for a higher top tax rate if the tail of the earnings distribution is thicker.

4. Taller people earn more, therefore, taxing height is a desirable policy.

5. In the presence of labor supply responses along the extensive margin, traditional welfare programs with high phasing-out rates are not desirable.

6. IRAs and 401(k) have not been successful in encouraging savings because the personal savings rate in the US economy has dropped sharply over the last 20 years at the same time IRAs and 401(k)s grew substantially.

7. Recent studies have shown that default rules in 401(k) plans have a large effect on 401(k) participation. That implies that defaults should be used to increase retirement savings of American families.

8. Two possible Individual Retirement Account schemes are often proposed. The first type, the “front end IRA”, permits IRA contributions to be made with pre-tax dollars (i.e. contributors can deduct contributions from taxable income *at the time of the contribution*), but taxes all withdrawals as ordinary income. The second scheme “back-end IRA” provides no tax deduction for contributions, but allows withdrawals to be made without tax. These two schemes provide equivalent incentives for saving.

9. The social security earnings test does not discourage labor supply of social security recipients because benefits taxed away by the test are credited back in the form of higher benefits later on in an actuarially fair way.

10. Under the accidental model of bequests, taxing inheritances is desirable.

11. The rate of return on the existing social security system is limited to wage and population growth. By investing the money instead in the stock market, we could each earn a much higher rate of return, substantially raising social welfare.

12. Bunching of earnings around the first kink point of the EITC schedule among EITC recipients is evidence of labor supply responses along the intensive margin to the EITC program.

**PROBLEM (25 pts):**

We consider an economy made up of individuals who have identical preferences defined over consumption  $c$  and labor  $l$ , but different wage rates. The utility function takes the simple form:  $u(c, l) = c - l^{1+k}/(k + 1)$  where  $k > 0$  is a given fixed parameter. An individual with wage rate  $w$  supplying labor  $l$ , earns  $z = wl$  and consumes  $c = z - T(z)$  where  $T(\cdot)$  is the (possibly nonlinear) income tax.

We assume that there are 3 types of individuals: disabled individuals unable to work  $w_0 = 0$ , low skilled individuals with wage rate  $w_1$ , and skilled individuals with wage rate  $w_2$ . Obviously, we assume that  $w_1 < w_2$ . We assume that the fractions of disabled, low skilled, and high skilled in the population are  $\lambda_0, \lambda_1, \lambda_2$  (and that  $\lambda_0 + \lambda_1 + \lambda_2 = 1$ ).

We assume that the government imposes the following income tax:  $T(z) = -R + \tau_1 \cdot z$  if  $z \leq \bar{z}$  and  $T(z) = -R + \tau_1 \cdot \bar{z} + \tau_2 \cdot (z - \bar{z})$  if  $z > \bar{z}$ .  $R > 0$  is the demogrant.

(a) (2 pts) Plot the budget constraints on a diagram  $(l, c)$  for low skilled and high skilled workers. From now on, we assume that low skilled workers are always in the first bracket (with marginal tax rate  $\tau_1$ ) and that high skilled workers are always in the top bracket (with marginal tax rate  $\tau_2$ ).

(b) (2 pts) We denote by  $z_1$  and  $z_2$  the earnings of low skilled and high skilled workers respectively. Estimate the uncompensated and compensated elasticities of earnings  $z_i$  with respect to the net tax rate  $1 - \tau_i$  for  $i = 1, 2$ .

(c) (2 pts) Suppose that the government uses a flat tax where  $\tau_1 = \tau_2 = \tau$ . Estimate the tax rate  $\tau^*$  maximizing tax revenue as a function of  $k$  (taking  $R$  as given).

(d) (3 pts) Taking  $R, \tau_1$ , and  $\bar{z}$  as fixed, compute the tax rate  $\tau_2^*$  that maximizes taxes collected from the high skilled. Express  $\tau_2^*$  as a function of  $k, z_2$ , and  $\bar{z}$ .

(e) (4 pts) Taking  $R$  and  $\bar{z}$  as fixed and assuming  $\tau_2 = \tau_2^*$ , compute the tax rate  $\tau_1^*$  that maximizes total taxes collected. Express  $\tau_1^*$  as a function of  $k, z_1, \lambda_1$ , and  $\lambda_2$ , and  $\bar{z}$ . Explain intuitively why  $\tau_2^* < \tau^* < \tau_1^*$ .

(f) (2 pts) Suppose that taxes collected using the tax rates  $\tau_1$  and  $\tau_2$  actually fund the demogrant  $R$ . Will the demogrant be higher when the government uses the flat tax  $\tau^*$  from (c) or the nonlinear tax  $\tau_1^*, \tau_2^*$  from (d) and (e)? What type of social welfare function would lead the government to maximize taxes collected on workers in order to maximize the size of the demogrant?

(g) (3 pts) Suppose now that the government puts some weight on the marginal consumption of low skilled workers (but no weight on the marginal consumption of high skilled workers). How would this affect the optimal choice of  $\tau_1$  and  $\tau_2$  relative to the tax maximization rates  $\tau_1^*$  and  $\tau_2^*$  derived in (d) and (e)? What will happen to the demogrant  $R$ .

(h) (3 pts) Suppose now that disabled workers face a cost of work  $q$  that is distributed according to a cumulated distribution  $P(q)$  with density  $p(q)$ . When a disabled person pays the work cost  $q$ , she becomes like a low skilled worker with wage rate  $w_1$  and utility function  $u = c - l^{1+k}/(1+k) - q$ . Compute the fraction of disabled workers who work as a function of  $w_1$ ,  $\tau_1$ , and the distribution  $P(\cdot)$ .

Under this scenario, how does the tax rate  $\tau_1$  maximizing tax revenue compares with  $\tau_1^*$  from (e) which was derived assuming no disabled person could work (explain the economic intuitions if you cannot do the full math).

(i) (4 pts) Suppose that the government increases  $\tau_2$  from 30% to 40% from period 0 to period 1 and that you have access to two cross sections of earnings data (one for period 0 and one for period 1). Explain how you would estimate the elasticity of earnings with respect to  $1 - \tau_2$  using this reform. Make sure to be precise about the type of estimate and regression you would use. You should also discuss how you could test the robustness of your estimates using the data available.