

GS/ECON 5300 Assignment 2  
due : Wed. March 15 before class

do all 5 questions : all count equally

1. What should the tax rate  $\tau$  on the return to saving be, if the government must raise some given revenue  $R$  by taxation of labour income at the rate  $t$ , and of the return to saving at the rate  $\tau$ , if the economy consists of identical people with the following characteristics? People live for two periods, and work only in the first period. Their preferences can be represented by the utility function

$$U(L, c_1, c_2) = \alpha \ln(1 - L) + \beta \ln c_1 + \gamma \ln c_2$$

where  $L$  is work done in period 1,  $c_i$  is consumption in period  $i$ , and  $\alpha + \beta + \gamma = 1$ . The wage rate  $w$  is exogenous, as is the return  $r$  to saving.

Since savings tax revenue is collected in the second period, the government revenue requirement is that the **present value** of revenue from the two taxes (wage tax revenue collected in period 1 and savings tax revenue collected in period 2) equal  $R$ . The government can borrow and lend at the same rate  $r$  as individuals.

2. How should a firm finance its investment if it faces a corporate income tax rate of 40 percent, if the personal income tax rate applicable on interest income is 50 percent, and the effective personal income tax rate on the return to equity is 20 percent?

3. What is the cost of capital on an asset with a true (exponential) depreciation rate of 20 percent, if the corporate income tax rate were 50 percent, the required rate of return of investors were 10 percent, the depreciation rate allowed on the asset for tax purposes were 40 percent, and the firm financed half of its investment by borrowing? (None of the costs of investment can be written off immediately.)

4. How would the price of houses vary with the Canadian income tax rate, in a simple world (no uncertainty, no inflation, only one tax bracket), if the interest rate in Canada were exogenously determined on world markets?

**continued**

5. Suppose an asset goes up each year at the same rate, that the inflation rate is constant (and less than the rate at which the asset's nominal price rises), and that the individual sells the asset after  $T$  years. She must pay income tax on a fraction  $\alpha$  of the nominal realized capital gain when she sells the asset.

Derive an expression for the “equivalent” tax rate on real, accrued capital gains. That is, find a tax rate  $\tau$  which, if it were levied on real capital gains as they accrued, left the owner of the asset exactly as well off as under the “actual” tax (in which a fraction  $\alpha$  of nominal gains are taxed on realization).

How does this effective tax rate vary with the rate of inflation?