

## Econ 580, Homework for Solow Model

Consider a discrete time Solow model with no population growth, production function given by  $Y_t = K_t^\alpha (A_t L)^{1-\alpha}$ , preferences given by  $\sum \beta^t \ln(c_t)$ , depreciation rate  $\delta$ , and  $A_{t+1}/A_t = 1 + g$ .

1. What is the interest rate in steady state?
2. Imagine there is a tax  $\tau$  on the returns from capital. What is the steady state capital-output ratio?
3. Assume  $\alpha = 1/3$ .
  - (a) How much higher is the capital-output ratio if  $\tau = 0.1$  versus  $\tau = 0.5$ ? What are the implications of this for income per worker levels?
  - (b) How much higher is the capital-output ratio if  $\beta = 0.99$  versus  $\beta = 0.9$ ? What are the implications of this for income per worker levels?
4. How do your answers above change if instead  $\alpha = 2/3$ ?
5. Now imagine that instead of  $K_{t+1} = I_t + (1 - \delta)K_t$ , we have  $K_{t+1} = I_t/p + (1 - \delta)K_t$ . How much higher is the capital-output ratio if  $p = 1$  versus  $p = 2$ ? What are the implications of this for income per worker levels?