MIDTERM EXAM: MACROECONOMICS II

1. Consider a model with a representative consumer (no population growth) with preferences as:

$$\sum_{t=0}^{\infty} \beta^t \left[ln c_t + \gamma ln\left(1 - \ell_t\right)\right]$$

Here c_t denotes consumption per person, and ℓ_t is the fraction of time devoted to market work. The production function is given by $y_t = g_t^{\upsilon} k_t^{\alpha} \ell_t^{1-\alpha}$, with $\upsilon, \alpha \in (0,1)$. Capital depreciates at a constant rate δ. There exists a government that imposes taxes (τ_t^l, τ_t^k), on labor and capital income respectively. With these resources it finances a level of public expenditure, g_t (notice it enters into the production function), and can issue government debt b_t.

(a) Define a competitive equilibrium.

(b) Characterize the competitive equilibrium as much as you can. Write the steady state as a function of fiscal policies.

(c) Set up the social planner's problem.

(d) Characterize the planner's solution as much as you can, and also write the steady state conditions.

2. Consider an overlapping generations model where preferences are given by $log(c_t^t) + log(c_{t+1}^t)$. Population does not grow. Every generation born has an endowment of ω units of the consumption good in the first period and 0.5ω in the second. Let p_t denote the price of the consumption good in period t.

(a) Define an Arrow-Debreu equilibrium.

(b) Characterize the competitive equilibrium as much as you can.

(c) Define Pareto efficiency.

(d) Suppose now that there is a social security system that taxes young workers at rate τ, and redistributes the revenues to the old. Discuss the relationship between the generosity of the social security system (as measured by τ) and the Pareto efficiency of the competitive equilibrium.