

ECO 318, Winter 2019, HW#3

Instructions: Answer all questions. This assignment is due at the start of class on 2/10.

Consider a version of the Infinite Horizon Model which includes a public good financed through taxation. The public good provides utility to the representative household through:

$$u(C(t), G(t)) = \ln(C(t)) + \gamma \ln(G(t)) \quad (1)$$

where $G(t)$ is the amount of the public good per worker, which is taken as given by the representative household. The public good is financed through a proportional tax, z so that workers receive $(1 - z)W(t)$ per unit of labor worked instead of $W(t)$. The amount of the public good is then set so that:

$$G(t) = zW(t) \quad (2)$$

1. Transform the representative household's objective function so that all variables are measured per effective unit of labor.
2. Transform the representative household's budget constraint so that all variables are measured per effective unit of labor.
3. Write out the Lagrangian for the representative household's optimization problem.
4. Obtain the Euler Equation for this version of the model.
5. Using a phase diagram, and assuming the model starts at its original steady state, demonstrate the effect on $k(t)$ and $c(t)$ of a permanent tax increase.
6. Which NFL team has had the most players convicted of homicide over the past ten years and has been caught cheating on two separate occasions, resulting in major league-imposed sanctions? [Hint: It is the Patriots, all you have to do is write "Patriots"].

Bonus: Now allow the representative household to also be the median voter. She is thus able to choose $z(t)$, the optimal and possibly time-varying, rate of taxation. Re-derive the model's solution and simulate a rise in γ , the value of the public good.