

Midterm Exam

*Directions: Answer all questions; the questions are weighted equally. For full credit, you must provide **complete** explanations for your answers.*

1. Provide the dates (roughly) of three post-World War II recessions. Compare and contrast features of post-WWII and pre-WWI features of the business cycle as detailed in C. Romer's article. In your discussion, relate these features to M. Goodfriend's "Go-Stop" characterization of monetary policy.
2. When studying policy without a commitment mechanism, Fischer solved for the indirect utility for both the government and households. Describe verbally the nature of the indirect utility function for the government and the problem that it is solving: that is, what are the choice variables for the government and what is taken as exogenous. Provide the same description for the household's maximization problem. Include in your analysis a discussion of the two functions that result from both optimization problems and how these were used to solve for equilibrium.
3. Assume that a household lives for two periods and has preferences given by

$$U(c_0, c_1) = \ln c_0 + \beta \ln c_1$$

where c_0 denotes first period consumption, c_1 is second period consumption, and $0 < \beta < 1$ represents the time discount factor. The household receives income Y_0 in the first period and nothing when old. Consumption in the second period is financed out of savings - the interest rate on savings is constant so that the return on savings is $(1 + r)$.

- (a) Set up the household's maximization problem as a Lagrangian and show that the intertemporal marginal rate of substitution is equal to $(1 + r)$. (Do **not** assume $\beta(1 + r) = 1$.) Interpret this result.
 - (b) Derive the household's savings function; i.e. the demand for savings. How responsive are savings to a change in r ? Interpret your result.
 - (c) Solve for the household's indirect utility function.
4. The California government is faced with the Ramsey problem of choosing a sequence of excise taxes so that the utility of its citizens is maximized. It uses this revenue to pay for a new economics professor that the UC system plans to hire in the second period of the economy. The government knows that households' optimal consumption is given by:

$$c_t^* = \frac{\frac{r}{1+r} \left(\sum_{t=0}^{\infty} \frac{Y_t}{(1+r)^t} \right)}{1 + \tau_t} \quad (1)$$

Y_t denotes income and it is assumed that $Y_t = \$100,000$ in every period. The government plans to hire the professor by making a one-time payment of $\$110,000$ in the second period and nothing in all other periods; that is, $G_t = 0$ for $t = 0; t \geq 2$. The interest rate is 0.10. Many politicians are saying that taxes need to be raised next period in order to cover the entire cost of this new (and quite expensive) professor. Their argument is that it is unfair to burden future generations with this one-time expense. You have been invited to give your expert opinion on the matter and demonstrate that the optimal tax (note, this is not the tax rate) is simply $\$10,000$ every period. Present your proof and demonstrate that it is optimal for $\tau^* = r$. (Hint: Use the conditions that the tax smoothing hypothesis implies taxes are constant, $\tau_t = \tau^*$, and the government's intertemporal budget constraint implies that the present discounted value of tax revenues (given by $c_t \tau_t$ in every period) equals the present discounted value of government expenditures. You do not have to solve for the indirect utility function.)

5. What is Ricardian equivalence and what distinguishes this from the “tax-smoothing” hypothesis?