Midterm Exam

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

1. Roughly, what is the current federal budget deficit as a percentage of GDP? Roughly, what are defense expenditures as a percentage of GDP? Roughly, what are expenditures on Social Security and Medicare as a fraction of GDP?

2. In his model of optimal taxes without a commitment mechanism, S. Fischer solved the economy backwards in time. That is, he first solved for optimal choices in the last period of the economy and then solved for optimal choices in the first period. The time consistent equilibrium was characterized by the intersection of two functions that summarized this procedure. Explain what these functions describe and why their intersection implies a time-consistent equilibrium. (It is not necessary to write down the functions - simply give a verbal description of the relationships represented by the two functions.)

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 no income in the first period and an income of \( Y_1 \) in the second period. Consumption in the first period must be financed by borrowing - the interest rate 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 demand function for \( c_1 \). How responsive is \( c_1 \) to a change in \( r \)? Interpret your result.

(c) Solve for the household’s indirect utility function.

4. In studying how households optimally choose their path of consumption over time, the consumption function was shown to be

\[ c^* = \frac{r}{1 + r} \left( \sum_{t=0}^{\infty} \frac{Y_t}{(1 + r)^t} - \sum_{t=0}^{\infty} \frac{T_t}{(1 + r)^t} \right) \]  

\[ (1) \]

(This was derived under the assumption of logarithmic preferences, lump-sum taxes, and that \( \beta (1 + r) = 1 \). The relationship between consumption and income implied by eq. (1) is often characterized as the Permanent Income Hypothesis. Contrast this relationship to that assumed in the simple Keynesian consumption function. What is the relevance for economic policy?)
5. Many scholars of fiscal policy object to the Ricardian Equivalence Hypothesis because of the assumptions used in the analysis. Discuss these assumptions and provide some explanation as to why they are critical for the hypothesis to hold.