Macroeconomics I: Mid-Term Exam

Robustness of Ricardian Equivalence in Two-period endowment model

Time: discrete, two periods.

Demography: There is one representative (i.e. price taking) household of each of two types who differ according to their endowments. We will label then E for "early" and L for "late". Both households live for both periods.

Preferences: Both household types have the same preferences:

$$U(c_1^i, c_2^i) = u(c_1^i) + \beta u(c_2^i)$$

where c_t^i is consumption by type $i = E, L$ in period $t = 1, 2$. The function $u(.)$ is increasing, strictly concave, $\lim_{c \to 0} u'(c) = \infty$.

Endowments: The Early household has an endowment of the non-storable consumption goods in period 1 of $e + d$ and in period 2 of e. The Late household has endowment e in the first period and $e + d$ in the second.

Institutions: there is a government which has to make expenditures $2g_t$ where $g_t < e$, in period $t = 1, 2$. The government can issue bonds, b, and can tax individuals, τ_t in period $t = 1, 2$. (Taxes do not depend on the household type.) Because there is no way to enforce loan contracts between individuals, there is **no** market for inside money.

1. First assume $d = 0$ so there is no difference between the two household types. Furthermore, assume that the government cannot issue bonds (i.e. $b = 0$) Write down the government and households' budget constraints for each period. Write down the allocation for each type in terms of exogenous variables.

2. Now, still with $d = 0$ we will allow b to be positive. To focus on a particular example set $\tau_1 = 0$.

   (a) Write down and solve the problem faced by the households. Write down the government budget constraint and all market clearing conditions. Define a competitive equilibrium and solve for a characterization.

   (b) Does Ricardian equivalence hold? Briefly explain.

3. Now we will set $d > 0$ and repeat the exercises in parts 1. and 2.

   (a) With $b = 0$ write down the allocation for each type in terms of exogenous variables.

   (b) With $\tau_1 = 0$ and $b > 0$: write down and solve the households' problem for each type (assume that there are no corner solutions), write down the government budget constraints and market clearing conditions. (No need to redefine equilibrium or characterize it.)

   (c) With $d > 0$ does Ricardian equivalence hold? (Hint: is $s_E = s_L$?) Briefly compare your answer to that in part 2b.

4. How do you think the results would differ if inside money was able to circulate? Briefly explain your answer.