

## Macroeconomic Policy Homework II (aka exercise set 8)

*Please write full answers to all the questions and put your homework in the course work post box outside room CB 304 by 5 p.m. Wednesday 29th of November. You are strongly encouraged to work in groups if you so like (you will get full marks anyway). If you do so, please write the names of the other members of the group so that I do not have to mark the same work various times!*

1. (33 points) The classical dichotomy holds. A country's money demand is given by the following equation

$$L^d = Y e^{-\lambda i} \quad (1)$$

where  $Y$  is output,  $i$  is the nominal interest rate and  $\lambda = 2$ . Output grows at a constant rate  $g = 0.03$  and the real interest rate equals zero.

Write down the money market equilibrium condition. Find the maximum seignorage/GDP ratio that the government can achieve in this economy and the long run rate of inflation consistent with it. Derive the rate of growth of real balances in the equilibrium in which the seignorage/GDP ratio is maximum.

2. (12 points) Suppose an economy in which agents live for three years and are born with zero initial wealth. The real interest rate is 0.03. ET, an inhabitant of this economy, at the end of the first year of his life asks for a loan for 100£. His income in the second year of his life is 30£ and he will earn 70£ in year 3. If you were a his bank manager, would you grant him: (a) a one-year loan; (b) a two-year loan?
3. (21 points) The Russian government has an outstanding stock of debt at the end of time  $t$  equal to 1,000b roubles. The real interest rate on its debt is 0.09. Assume seignorage revenue is zero.

- i What will the stock of debt at the end of time  $t + 3$  be if the Russian government runs a deficit equal to 1b roubles in every year between  $t$  and  $t + 3$ .

- ii What is the deficit/surplus it needs to run to stabilize its stock of debt to its current level from time  $t$  onwards?

4. (33 points) Consider an economy in which government expenditure in real terms oscillates between two values  $g$ , in odd periods, and  $g + \Delta$ , in even periods. The government cannot resort to seignorage. Private agents are identical, infinitely-lived and can freely borrow and lend at the same real interest rate  $r$  as the government. The rate of growth of GDP is zero.

Suppose this world comes into being in period 1 with no initial stock of public debt. What is the optimal amount of tax revenue that the government has to raise in each period if:

1. taxes are lump sum;
2. the only available tax is a distortionary tax on labour income. (Hint: in this second case you may think of this economy as a two-period economy that repeats itself every two periods).