1. Suppose that households have the following utility function:

\[ U = \ln(C) + \mu \ln(l) + \gamma \ln(g) \]

where they value consumption, leisure and government spending (output) respectively. As always, households have 1 unit of time to spend between work and leisure. Government uses a lump-sum tax to finance its production, such that \(\tau = g\).

Households budget constraint becomes \(c = w(1 - l) + d - \tau\)

We assume the simplest case for the business sector such that \(d^* = 0\) and \(w^* = z\).

Solve for the equilibrium levels of leisure and consumption and discuss how they depend on the lump-sum tax choice of the government.

2. Now assume that the government switches from lump-sum tax to income tax. Households’ budget constraint changes to \(c = (1 - \theta)w(1 - l)\) and government’s tax revenue becomes \(g = \theta(1 - l)w\). Everything else is the same as the first question.

Solve for the equilibrium levels of leisure and consumption. Discuss how they depend on government’s tax rate, \(\theta\).

3. Solve households’ demand for real money balances for the two following utility functions\(^1\):

\[ U(c, l) = (c)^2 + \beta(l)^2 \]
\[ U(c, l) = \ln(c) + \beta \ln(l) \]

Assume the economy is setup as it is described in chapter 8. Also show that monetary equilibrium yields zero inflation for any real money demand.

4. As a follow-up to the previous question, assume that government decides to acquire seigniorage revenue by expanding the money supply at a constant rate of \(\mu\). Find the \(\mu\) that maximizes government’s seigniorage revenue for the two different utility functions described in the previous question.

\(^1\) You can follow the solution we have done for exercise 8.2 in the book.