Macroeconomic Policy
Exercise set 7

1. Suppose money demand is given by the quantity theory equation (4) in the lecture notes. The economy is in long-run equilibrium with the money supply growing at a constant 5% rate and output growing at a constant 3% rate. Velocity is a stable function of the nominal interest rate. At time t real balances and real output equal respectively 600 billion and 1,000 billion units of the consumption good.

    1. What is the value of velocity at time t? Derive the rate of inflation and the evolution of velocity, real balances, real seignorage and the inflation tax from time t onwards. How does seignorage as a proportion of GDP change over time?
    2. Derive the same quantities for an economy with the same data as the one above but in which the money supply grows at 7%.
    3. Compare velocity in the two economies. What can you conclude about the relative willingness to hold money of the agents in the two economies?

2. Consider an economy in which money demand is given by

$$L^d = Y\left[a - b\left(r + \pi^e\right)\right] \tag{1}$$

    with $a = b = 0.5$, $r = 3\%$. Write down the money market equilibrium condition. Government solvency requires a long run seignorage/GDP ratio equal to 3/32 (it looks weird, but it is to make your life easier!). Write down the expression for seignorage as a proportion of GDP.
    Assume that output grows at a constant rate of 3%. Derive the long run rate of money growth consistent with the required seignorage/GDP ratio (hint: use the graph in the lecture notes to understand what you have to look for).
    Derive the rate of money growth that maximizes the share of seignorage in GDP and work out the corresponding maximum seignorage/GDP ratio.