1. What is ‘monetary economics?’

2. Consider the simple OLG model with fiat money.
   a. What is the optimal monetary policy if the population is constant? What is the optimal monetary policy if the population (and hence the economy) is growing?
   b. What is the rate of return on money if the population is growing at rate \( n \) and the money supply is growing at rate \( z \)?
   c. What is the inflation rate if the population is growing at rate \( n \) and the money supply is growing at rate \( z \)?
   d. What is a ‘monetary equilibrium?’
   e. What is ‘seigniorage?’
   f. Is there a limit to the amount of seigniorage revenue the government can collect? Explain.

3. Let \( N_t = n N_{t-1} \) and \( M_t = z M_{t-1} \) for every period \( t \), where \( z \) and \( n \) are both greater than 1. The money created each period is used to finance a lump-sum subsidy of \( a_t \) goods to each young person.
   a. Find the equation for the lifetime budget set of an individual in a monetary equilibrium. Graph the budget set. Show an arbitrary indifference curve tangent to the budget set and indicate the levels of \( c_1 \) and \( c_2 \) that would be chosen by an individual in this equilibrium.
   b. Find the feasible set. Draw the feasible set on the graph you drew in part a. Label your graph carefully, distinguishing between the budget and feasible sets.
   c. Does the monetary equilibrium maximize the utility of future generations? Support your answer with references to the graph you drew as well as to the budget and feasible sets.

4. Consider an economy with a constant population and a constant supply of fiat money. Suppose that utility equals \( c_{1,t}^{1-\gamma} + \frac{c_{2,t+1}^{1-\gamma}}{1-\gamma} \).
   a. Find the rate of return on fiat money. (For full credit, show your work.)
   b. Specify the agent’s utility maximization problem.
   c. Find an individual’s lifetime consumption pattern, \( c_{1,t}^* \) and \( c_{2,t+1}^* \).

5. Consider an international OLG economy with foreign currency controls and flexible exchange rates.
   a. How is the exchange rate determined in such an environment? (Please explain in words and using an equation.) What is the time path \( (e_{t+1}/e_t) \) of the exchange rate?
   b. The Fed has been increasing the money supply in the US over the course of the past year. Based on your answer to part (a), what would you expect to be happening to the value of the dollar relative to the Euro?

6. Consider an international OLG economy with no foreign currency controls.
   a. If people are free to hold the money of any country the exchange rate is indeterminate. In such an environment, the exchange rate may be very volatile. In order to protect citizens from the costs associated with exchange rate fluctuations, government may wish to intervene to stabilize the exchange rate. Briefly discuss two potential impediments to stabilization policy. (We discussed several difficulties with stabilization policy in class. You need only discuss two.)