1. Consider an economy with a constant population of $N = 100$. Individuals are endowed with $y = 20$ units of the consumption good when young and nothing when old.

a. What is the equation for the feasible set of this economy? Portray the feasible set on a graph. With arbitrarily drawn indifference curves, illustrate the stationary combination of $c_1$ and $c_2$ that maximizes the utility of future generations.

b. Now look at a monetary equilibrium. Write down equations that represent the constraints on first- and second-period consumption for a typical individual. Combine these constraints into a lifetime budget constraint.

c. Suppose that the initial old are endowed with a total of $M = 400$ units of fiat money. What condition represents the clearing of the money market in an arbitrary period 0? Use this condition to find the real rate of return of fiat money.

For the remaining parts of this exercise, suppose that preferences are such that individuals wish to hold real balances of money worth

$$\frac{y}{1 + v_t / v_{t+1}}$$ goods.

d. What is the value of money in period $t$, $v_t$? Use the assumption regarding preferences and your answer in part c to find an exact numerical value. What is the price of the consumption good, $p_t$?

e. If the rate of population growth increased, what would happen to the rate of return of fiat money, the real demand for fiat money, the value of a unit of fiat money in the initial period, and the utility of the initial old? Explain your answers. *Hint:* Answer these questions in the order asked.

f. Suppose instead that the initial old were endowed with a total of 800 units of fiat money. How do your answers to part d change? Are the initial old better off with more units of fiat money?