Final Exams

Econ 440
Final Exam
Fall 1995

Be sure to read each question very carefully before beginning to write down your answer. If you do not understand the question, ask for help. In addition to algebraic derivation and graphical representation of a model, your answer should include detailed explanation of the economic intuition underlying the model.

1. 60 points total
Consider the following economy. Individuals are endowed with \( y \) units of the consumption good when young and nothing when old. The fiat money stock grows at rate \( z \), and the population grows at the rate \( n \). In each period, the government taxes each young person \( \tau \) goods. The total proceeds of the tax are then distributed equally among the old alive in that period.

a. (15 points)
Write down the first- and second-period budget constraints facing a typical individual at time \( t \). Combine the constraints into a lifetime budget constraint and explain the constraint.

b. (10 points)
Find the rate of return on fiat money in a stationary monetary equilibrium. Explain your answer.

c. (10 points)
Show how the government policy of taxation and redistribution influences an individual's welfare? Explain your answer.

d. (25 points)
Suppose that tax collection and redistribution are very costly, so that for every unit of tax collected from the young, only 0.9 unit is available to distribute to the old. Show how the budget constraint in part (a) changes. Does your answer to part (c) change? Explain your answer.
Short Answer

1. (20 points)
Consider an economy of overlapping generations in which people live for three periods and are endowed with $y$ goods when young but nothing in the other two periods. Let $N_t = n \cdot N_{t-1}$, and $M_t = zM_{t-1}$. Assume that capital, $k_t$, pays a two period rate of return $X > \frac{(n/z)^2}{2}$.

Suppose that the intermediation of capital costs $f$ units of the consumption good for each unit of capital intermediated ($f < \sqrt{X}$). Assume that these transaction costs occur when agents withdraw from banks (when they are middle aged).

What will be the equilibrium rate of return offered by intermediaries if they are the ones who bear the transactions costs? For what values of $f$, $X$, $z$, and $n$ will fiat money be valued in this economy?

2. (20 points)
Describe (with or without a formal mathematical model) the workings of an economy with the following characteristics.

i. $M_1$ and real GNP are positively correlated, but changes in $M_1$ occur before changes in real GNP.

ii. Changes in the real return on capital or the riskiness of capital causes changes in bank lending and deposits before leading to a change in real output.

Be sure to fully explain your answer.
1. Consider an economy with a shrinking stock of fiat money. Let $N_t = N$, a constant, and let $M_t = zM_{t-1}$ for every period $t$, where $z$ is positive but less than 1. The government taxes each old person $t$ goods in each period, payable in fiat money, which it then destroys.

a. Find and explain the rate of return in a monetary economy.

b. Show and explain why the monetary equilibrium does not maximize the utility of future generations. Hint: Follow the steps you would use for a model with a subsidy, realizing that a tax is essentially a negative subsidy.

c. Do the initial old prefer this policy to the policy that maintains a constant stock of fiat money? Explain.

2. Consider an economy of overlapping generations of 2-period-lived people. There are three types of people—workers, entrepreneurs, and bankers. Each of the $i=1,...,N$ workers are endowed with a different number of goods, $y_i$, when young and nothing when old. Because they each receive a different endowment, they will also wish to hold a different number of goods worth of money balances (inside or outside), $s_i$. Entrepreneurs also receive endowments when they are young and are the only persons who can create capital goods. Bankers do not receive an endowment, but they can (1) make loans to entrepreneurs, and (2) accept deposits from workers. Assume that it costs workers $f$ goods to set up a bank account. Bankers are not subject to reserve requirements and operate in a competitive industry.

a) Write down an expression relating the average rate of return banks will pay depositors to the transactions cost, $f$, and the size of an individual’s deposit, $s_i$. Explain this relationship.

b) Suppose that there is an unanticipated permanent decrease in transactions costs, $f$. Find the effect of this decrease on $s^*$ (the minimum size of a bank deposit), the price level, the deposit to currency ratio, the money multiplier, the total money stock, capital, and output. Explain each of these effects.

c) Verify that the model economy displays a correlation between the nominal money stock and real output. Will a one-time increase in the monetary base cause an increase in real output?