

Final examination

Student's name: _____

You have 2 hours and 30 minutes. The exam is worth 40 points, there are 8 questions. You will not need a calculator for this exam. Show your work, but be concise and do not waste your time. Good luck!

Question 1 (6 points)

Consider a 2-period OLG economy with fiat money. Let the number of young people born in each period be constant at N . There is a constant stock of fiat money, M . Each young person born in period t is endowed with y_t units of the consumption good when young and nothing when old. The individual endowment grows over time so that $y_t = \alpha y_{t-1}$, where $\alpha > 1$. For simplicity, assume that in each period t individuals desire to hold real money balances equal to one-half of their endowment, so that $m_t/p_t = y_t/2$. (NOTE that individual consumptions are growing here).

- 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.
- Write down the condition that represents the clearing of the money market in an arbitrary period, t . Use this condition to find the real rate of return of fiat money in a monetary equilibrium.
- Suppose instead that individual endowments are constant $y_t = y$, but that the number of young people born each period is growing at a gross rate α , so that $N_t = \alpha N_{t-1}$. How will your answer in b change? Explain.

Question 2 (6 points)

Consider a 2-period OLG economy with the number of young people born each period growing at a gross rate n , so that $N_t = n N_{t-1}$ and endowments of y units of consumption good for young and 0 units for old. Assume that initial old are endowed with M_0 dollars of fiat money, and that the money stock is growing at a rate μ , so that $M_t = \mu M_{t-1}$ (money stock is increased via lump-sum money transfers to old). For all questions, consider only stationary consumption allocation: $c_{1,t} = c_1$ and $c_{2,t} = c_2$ in all periods t .

- Write down money-market clearing condition and find the inflation rate.

- b) Assume standard preferences (for example, given by the following utility function $U(c_1, c_2) = \ln(c_1) + \ln(c_2)$). For which rate of money growth μ allocation in monetary equilibrium is optimal? What is the rate of inflation in that equilibrium?
- c) Is positive inflation ($\pi > 1$) always inefficient? Explain or provide an example.
- d) Suppose now that there is also capital in this model, which pays the real return of x . Money and capital coexist because capital is illiquid. Find the real and nominal interest rates.
- e) Suppose now that capital is liquid. What should be the nominal interest rate for fiat money to be valued?

Question 3 (4 points)

- A. Rate-of-return equality says that for fiat money to be valued, its real return must be equal to real returns of other assets in the economy.
- B. Most assets provide higher expected real return than fiat money.
- Provide two reasons that can reconcile A and B. Explain or give examples.

Question 4 (4 points)

Why do financial intermediaries (banks) exist? How do they improve allocation of goods in the economy? Explain or provide an example.

Question 5 (6 points)

Use the model with required reserves and central bank borrowing to explain monetary transmission mechanism in the economy:

Assume the demand for deposits equals H_t , goods and the nonborrowed part of the monetary base is M_t . Let the fraction of required cash reserves be γ , and assume that banks borrow the fraction $\delta = 1/2$ of reserves from the central bank. Find the effect of the increase in the bank's target interest rate on the price level, money multiplier, total money stock, total intermediated investment, and output. (HINT: assume that increase in bank's target interest rate decreases the amount of reserves borrowed from the central bank).

Question 6 (6 points)

Suppose a private bank is considering to invest \$10 million in two alternative assets. Asset A pays off \$14 million with probability $\frac{1}{2}$ and \$8 million with probability $\frac{1}{2}$. Asset B pays off \$16 million with probability $\frac{1}{2}$ and \$5 million with probability $\frac{1}{2}$. Which investment will be made (in asset A or B) if the bank's net worth is

- a) \$5 million?
- b) \$2 million?
- c) Use your answers in a and b to explain how capital requirements help reducing excessively risky investment behaviour.

Question 7 (4 points)

- a. What is monetary policy?
- b. What is the objective of the Bank of Canada in conducting monetary policy?
- c. What is the main instrument of monetary policy in Canada?

Question 8 (4 points)

What is inflation targeting? What are its advantages and disadvantages as a monetary policy regime?