Introduction to Macroeconomics · M5 · 2015-16
Problem set 2

1. Properties of money. Find something that: (i) could be medium of exchange and store of value but not, or hardly, unit of account; (ii) could be medium of exchange but neither store of value nor unit of account; (iii) could be store of value and unit of account but not medium of exchange; and (iv) nor medium of exchange, nor store of value, nor unit of account.

2. Reserve ratio. (i) Let $M0 = 1,000$, $M1 = 4,000$, and $r = 0.1$. What change in the liquidity ratio l would neutralize the effect on **M1** of a 10% fall in **M0**? (ii) Let $M0 = 1,000$, $M1 = 4,000$, and $l = 0.1$. What change in the reserve ratio r would neutralize the effect on **M0** of a 10% increase in **M0**?

3. Money multiplier. Using derivatives, find the effect on the money multiplier of a rise in r and a fall in l.

4. Cash. The money multiplier is 2. Bank reserves are $R = 100$. Sight deposits are $D = 1,000$. Find the currency E held by the public.

5. M0, M1. (i) Explain two differences between **M0** and **M1**. (ii) Can **M0** be greater than **M1**? And smaller than **M1**? And equal to **M1**?

6. M0, M1. Let $M1 = 4,000$, $mm = 2$, and $r = 0.3$. (i) Find M0 and l. (ii) Calculate **M1** if, given the results in (i), r dropped to zero. Explain the mechanism that produces the change in **M1** (reason what happens to loans, expenditure, revenues, deposits, and **M1** when r becomes 0).

7. Money multiplier. Find the money multiplier if: (i) the liquidity ratio is 0.1, the monetary base is 500, and the money stock is 1,000; (ii) the liquidity ratio is 0.1, the monetary base is 550, and the currency E held by the public is 100.

8. Monetary aggregates. The monetary base is €37,000, bank reserves amount to €12,000, and the liquidity ratio is 1/10. (i) Calculate (to two decimal places only) the currency held by the public, the money stock **M1**, deposits, the reserve ratio, and the money multiplier. (ii) If the aim of the central bank is to increase the money stock by 10%, which change in the reserve ratio would accomplish that goal? (iii) In the initial situation, what is the effect on **M1** of a €2,000 increase in **M0**?

9. M0, M1, M2. Can **M0** rise and, at the same time, **M1** drop? (ii) Can **M0** fall and, at the same time, **M2** rise?

10. Money multiplier. Find the money multiplier if the liquidity ratio is 0.1, the monetary base is 550, and the currency the public holds is 100.

11. Cash and deposits. Determine the amount of cash E and deposits D if the money stock **M1** equals 900 and the liquidity ratio is 1/2.

12. Money creation process. (i) Explain how an increase in unemploy-ment is likely to affect the money multiplier process. (ii) Considering the money multiplier process, indicate three events that could lower the money multiplier. (iii) How is the money stock likely to be affected by an increase in the number of people that do not repay bank loans?

13. M0. Find the monetary base if the money multiplier is 3/2, reserve and liquidity ratios coincide, and the currency the public holds is 150.

14. Currency and liquidity ratio. With $M1 = 1,000$, $M0 = 500$, reserve ratio equal to 3/8, and deposits $D = 800$, find the liquidity ratio l and the currency E held by the public.

15. Reserve ratio. With $M1 = 1,200$ and $M0 = 300$, find the reserve ratio if the reserve ratio is half the liquidity ratio.

16. M0. Calculate **M0** if $M1 = 1,200$, the reserve ratio is 1/10 and the currency held by the public is 200.

17. Deposits and M0. In the textbook model of money creation find the formula that expresses D in terms of **M0** (and the rest of parameters).

18. Loans and M1. In the alternative model of money creation consider the expression (4) that relates **M1** with L. (i) Calculate the partial derivates of this expression with respect to r and with respect to l, and interpret the results. (ii) Find the formula that relates **M0** and L.

19. Eurozone. Identify three eurozone members whose country name does not contain the letter "a".

20. Money multiplier process. Name five variables involved in the money multiplier process.

21. Rates of return. The government of Spain issues T-bills. With probability 2/3 the government pays the full nominal value of the T-bill at maturity, in which case the profit an investor obtains from buying a T-bill is €60. With probability 1/3 the government defaults and the investor losses €30 from each T-bill bought. The government of Greece also issues T-bills. With probability 1/2 the government pays the full nominal value of the T-bill at maturity, in which case the profit an investor obtains from buying a T-bill is €120. With probability 1/3 the government defaults and the investor losses €60 from each T-bill bought. There are two options.

● **Option 1**. Purchase of two T-bills issued by the government of Greece.

● **Option 2**. Purchase of one T-bill issued by the government of Greece and one T-bill issued by the government of Spain.

(i) Calculate the return of each option assuming that the default risks are uncorrelated. (ii) Calculate the return of each option assuming that the government of Spain defaults if and only if the government of Greece defaults (suppose that the probability that the Spanish government defaults is determined by the Greek probability). (iii) In (ii), replace the values 120 and −60 corresponding to the possible results of the Greek investment by values x and $-y$ such that: (a) the expected return coincides with the expected return of a Spanish T-bill; and (b) the return of purchasing one Spanish T-bill and one Greek T-bill is negative under the conditions of (ii).

22. Reserve ratio. Find the reserve ratio if the monetary base is 350, deposits amount to 1,000, and the liquidity ratio equals 1/4.

23. Money multiplier. Explain the economic mechanism by means of which an increase in the liquidity ratio affects the money multiplier.

24. Money creation models. Explain one difference between the textbook model of money creation and the alternative model and one common characteristic.

25. Definitions. Define the concepts of securitization and financial depth.

26. Reserve ratio. Cash in the hands of the public is 100. Deposits amount to 600. With both deposits and the cash in the hands of the public remaining constant, the money multiplier has jumped from 2 to 4. If possible, find the change in the reserve ratio.

27. Instability of the financial sector. Identify three reasons that could justify the belief that the financial sector of an economy is inherently unstable.

28. Money creation process. Consider Example 16.1. Calculate the values that, in Table 7, would correspond to rounds 6 and 7.

29*. Money creation process. (i) Show that, in the textbook model of bank money creation with unknown values for r and l, the final increment $\Delta \boldsymbol{D}$ resulting for an increase $\Delta \mathbf{M0}$ in the monetary base is given by the formula

$$\Delta \boldsymbol{D} = \frac{1}{r + l} \cdot \Delta \mathbf{M0} \, .$$

(ii) Determine the formula obtained from the previous one when $\Delta \mathbf{M0}$ is replaced by $\Delta \mathbf{M1}$.

30. M1. What is the meaning of the expression "**M1** is endogenous"?

31. Money creation. Initially, banks lend 100% of all the funds they could legally lend. How is the money creation process likely to be affected by the banks' decision of reducing the proportion of funds lent to 50%?

32. Liquidity and reserve ratios. (i) The money multiplier is 2. Deposits equal four times reserves. If possible, find the liquidity ratio. (ii) The money multiplier is 2, the monetary base is 1,000, and deposits amount to 1,500. If possible, find the reserve ratio; if not possible, explain why.

33. Money creation process. Explain how each of the following three events is likely to be affect the money multiplier process: (i) the bankruptcy of half of the banking system of an economy; (ii) firms and households decide to borrow from banks only 50% of what banks offer to lend; (iii) people double their liquidity ratio (from 0.2 to 0.4) and, at the same time, the reserve ratio is reduced from 0.4 to 0.3.

34. Money multiplier. Suppose currency has an expiry date: coins and banknotes newly issued by the central bank are legal tender for just six months. Explain how this event is likely to affect the money multiplier.

35. Financial sector. The financial sector can be considered fragile. Why?