Problem Set 2 · Real side and financial side

1. Macro identities. (i) Define net private saving as $S - I$ and the government budget as $G + TR - T$. If both magnitudes double, what happens to the trade balance NX? (ii) If net private saving is positive and the trade balance negative, is there a budget deficit or a budget surplus?

2. Macro identities. Identify which of the following cases are possible and which are not.

Case	*net private saving*	*government budget*	*trade balance*
1	*rises*	*rises*	*rises*
2	*rises*	*falls*	*unchanged*
3	*falls*	*unchanged*	*rises*
4	*falls*	*rises*	*falls*
5	*falls*	*rises*	*unchanged*
6	*unchanged*	*rises*	*falls*

3. Macro identities. Fill out the following table.

Case	*net private saving*	*government budget*	*trade balance*
1	*positive*	*positive*	
2		*negative*	*positive*
3	*negative*		*positive*
4			*zero*
5	*zero*	*negative*	
6		*zero*	

4. Macro identities. Show how to get the identity $I \equiv S + (T - TR - G) + (IM - EX)$ from the identity $Y \equiv C + I + G + NX$.

5. Identities. Find net exports (NX) if $S = 50$, $I = 10$, $G = 20$, $TR = 5$, and $T = 30$.

6. M0, M1, M2. Explain which of the following situations can occur and which cannot occur: (i) M0 rises and, at the same time, M1 drops; (ii) M0 falls and, at the same time, M2 rises.

7. 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? Let M0 = 1,000, M1 = 4,000, and $l = 0.1$ What change in the reserve ratio r would neutralize the effect on M1 of a 10% increase in M0?

8. Money multiplier. Using derivatives, find the effect on the money multiplier of: (i) a rise in r; (ii) a fall in l.

9. Money multiplier formula. The money multiplier is 2. Bank reserves are R = 100. Sight deposits are D = 1,000. Ascertain the currency held by people E.

10. 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?

11. M0, M1. Let M1 = 4,000, $mm = 2$, and $r = 0.3$. (i) Find M0 and l. (ii) Find 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).

12. M1. An individual accidentally finds 1 million € and deposits the amount on a bank. Explain how this decision is likely to affect M0 and M1.

13. 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.

14. 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, the deposits, the reserve ratio, and the money multiplier.
(ii) If the central bank makes a 1,000 € purchase of government bonds, find the monetary base and the money stock.
(iii) Ignoring (ii), suppose that the aim is to increase the money stock by 10%. Which change in the reserve ratio would accomplish that goal?

15. Rate of return. (i) Compute the rate of return of a loan of 120 € when only 80 are repaid. (ii) What if 80 are loaned and 120 repaid? (iii) Find in each case the corresponding discount factor.

16. Present value. Calculate the present discounted value at period 1 of 100 €: (i) from period 2 when the interest rate is 5%?; (ii) from period 3 when the interest rate is 5% at period 1 and at period 2; (iii) from period 3 when the interest rate is 5% at period 1 and 10% at period 2; (iv) from period 3 when the interest rate is 10% at period 1 and 5% at period 2; (v) from period 3 when the interest rate is 10% at both period 1 and 2.

17. Interest rate, discount factor. Is it possible for the discount factor to rise while the interest rate is also rising?

18. Interest rate, discount factor. 50 € from period 1 are worth 60 € in period 2. Find the corresponding interest rate and the discount factor.

19. Interest rate. Find the real interest rate: (i) if the nominal interest rate is 5% and the CPI is 200; (ii) if the real interest rate is constant and the inflation rate is 5%.

20. Interest rate. (i) May the interest rate of an economy be negative? What would that mean? (ii) And zero? Can people be considered more patient when $i = 0$ than when $i > 0$?

21. T-bills. (i) Compute the rate of return of a T-bill will face value $V = 210$ and price $P = 200$? (iii) Find the interest rate i under which the rate of return of the T-bill agrees with i? (iii) Find the face value of T-bills priced 200 if the interest rate is $i = 5\%$.

22. Price of T-bills. Find the price (that prevents arbitrage) of a T-bill with face value 1200 if the real interest rate is 5% and the inflation rate is 15%. (ii) The nominal interest rate is 10% and the price of a T-bill is 200. Find the face value of the T-bill.

23. Price of T-bills. The nominal interest rate is 10% and the price of a T-bill is 200. Find the face value of the T-bill.

24. Price and rate of return. Explain why the fall in the price of T-bills is accompanied by an increase of the rate of return of T-bills.

Multiple choice questions

1. If private saving remains constant and public saving is defined as spending minus receipts, what cannot happen?
(a) That public saving increases and the trade balance remains unchanged
(b) That public saving and the trade balance both decrease
(c) That public saving and the trade balance both increase
(d) That public saving and the trade balance both remain unaltered

2. At the issue date, the price of a T-bill to mature in one year and with face value 1,000 € is 400 €. By arbitrage, which must be interest rate for loans maturing in one year?
(a) There is no relationship between the price of the T-bill and the interest rate
(b) Exactly 40%
(c) Smaller than 40%
(d) Greater than 40%

3. Using the discount factor, if the one year interest rate is 10%, the price at the issue date of T-bill with face value 1,000 € is
(a) $1{,}000 \cdot (1 + 0.1)$
(b) $(1 + 10)/1{,}000$
(c) $1{,}000/(1 + 10)$
(d) $1{,}000/(1 + 0.1)$

4. The discount factor associated with interest rate $i = 50\%$
(a) cannot be computed.
(b) is also 50%.
(c) is smaller than 1.
(d) is greater than 1.

5. What is not a monetary aggregate?
(a) M1
(b) The monetary base
(c) M2
(d) The money multiplier

6. In which case has the economy lending capacity for sure?
(a) $S - I > 0$ and $T - G - TR > 0$
(b) $S - I > 0$ and $T - G - TR < 0$
(c) $S - I < 0$ and $T - G - TR > 0$
(d) $S - I < 0$ and $T - G - TR < 0$

7. In which case has an economy, for sure, no financing capacity?
(a) Net private saving is positive and the government budget is in deficit
(b) Net private saving is negative and the government budget is in surplus
(c) Net private saving is positive and the government budget is in surplus
(d) None of the above

8. What cannot be considered a financial asset?
(a) A bank deposit
(b) A government bond
(c) A loan
(d) None of the above

9. If there has been a 4% growth in real GDP and a 3% growth in the GDP deflator, then nominal GDP has approximately grown a
(a) 1%.
(b) –1%.
(c) 7% .
(d) It is impossible to ascertain

10. The base period CPI is 100, it is 110 in period 2, and it is 100 in period 3. From period 2 to 3, the CPI inflation rate
(a) cannot be calculated.
(b) is 0%.
(c) is 10%.
(d) is negative.

11. Which sentence is not true?
(a) GDP at constant prices may fall and, at the same time, GDP at current prices may rise
(b) Real GDP is always smaller than nominal GDP
(c) If nominal GDP rises and the GDP deflator diminishes, then real GDP increases
(d) Real GDP and nominal GDP may be equal

12. If the monetary base is 100, M1 is 1,000 and the liquidity ratio is 0.1,
(a) the money multiplier cannot be computed.
(b) the reserve ratio must be zero.
(c) the money multiplier is 10.
(d) None of the above

13. Which sentence is high unlikely?
(a) A highly liquid financial asset with a high rate of return will be very risky
(b) An almost riskless financial asset with a high rate of return will be highly illiquid
(c) A highly liquid financial asset with a high rate of return will be almost riskless
(d) None of the above

14. Which event does not reduce the money multiplier?
(a) An increase in the liquidity ratio
(b) An increase in the reserve ratio
(c) An increase in the liquidity ratio combined with a decrease in the reserve ratio
(d) None of the above

15. M0 is defined as
(a) currency held by the people minus bank reserves.
(b) currency held by the people plus sight bank deposits.
(c) sight bank deposits minus bank reserves.
(d) currency held by the people plus bank reserves.

16. Which sequence represents the money stock creation process?
(a) $\uparrow$ deposits $\Rightarrow$ $\downarrow$ loans $\Rightarrow$ $\uparrow$ reserves $\Rightarrow$ $\uparrow$ deposits
(b) $\uparrow$ deposits $\Rightarrow$ $\uparrow$ loans $\Rightarrow$ $\downarrow$ expenditures $\Rightarrow$ $\downarrow$ revenues $\Rightarrow$ $\uparrow$ deposits
(c) $\uparrow$ deposits $\Rightarrow$ $\uparrow$ liquidity ratio $\Rightarrow$ $\uparrow$ money multiplier $\Rightarrow$ $\uparrow$ deposits
(d) None of the above

17. Identify the sentence that is not false.
(a) The money multiplier may be negative
(b) M2 is always smaller than M1
(c) M0 is always greater than M1
(d) None of the above

18. It is to be expected from a financial asset that, other things being equal,
(a) the higher its liquidity, the smaller its risk.
(b) the smaller its rate of return, the higher its liquidity.
(c) the higher its risk, the smaller its rate of return.
(d) None of the above

19. Define the government saving as $T - TR - G$ and the foreign saving as $IM - EX$. If investment I equals private saving S, then
(a) the government saving necessarily equals the foreign saving.
(b) the government saving is necessarily greater than the foreign saving.
(c) the government saving is necessarily smaller than the foreign saving.
(d) the government saving may be equal to the foreign saving.

20. If the government runs neither a budget surplus nor a budget deficit, then
(a) there must be a trade surplus.
(b) there must be a trade deficit.
(c) if investment I differs from private saving S, then the trade balance is necessarily neither in surplus nor in deficit.
(d) None of the above

21. According to the second fundamental accounting identity, the trade balance NX is equal to
(a) $S + I - (G + TR - T)$.
(b) $T - G - TR - S + I$.
(c) $T - I - G - TR + S$.
(d) None of the above

22. On the basis of the second fundamental accounting identity, that an economy has lending capacity means that
(a) the government is running a budget surplus.
(b) a trade surplus exists.
(c) net private saving $S - I$ is negative.
(d) the economy is suffering from twin deficits.

23. Which of the following concepts represents currency?
(a) The nominal interest rate
(b) The bank deposits
(c) The liquidity ratio
(d) None of the above

24. The money multiplier directly relates
(a) the nominal interest rate to the reserve ratio.
(b) M1 to M0.
(c) the currency E held by the public to the face value of T-bills.
(d) the open market operations to the bank reserves.

25. If the nominal interest rate falls, then, necessarily,
(a) the associated discount factor also falls.
(b) the price of financial assets also falls.
(c) the real interest rate rises.
(d) None of the above

26. The discount factor is directly related to
(a) the CPI inflation rate.
(b) the money multiplier.
(c) the nominal interest rate.
(d) None of the above

27. Which of the following countries is not a member of the eurozone (officially known as "euro area")?
(a) Estonia
(b) Malta
(c) Slovenia
(d) None of the above

28. Which claim about the money multiplier process is not true?
(a) More deposits give rise to more loans.
(b) More loans give rise to more expenditure.
(c) More expenditures give rise to more revenues.
(d) More revenues give rise to fewer deposits.

29. Suppose financial assets A and B differ only in two properties. Which one of the following sentences is more likely to be true?
(a) If A is more liquid than B, then B should be more profitable than A.
(b) If A is riskier than B, then B's rate of return should be higher than A's.
(c) If A is less liquid than B, then A should be riskier than B.
(d) If A's rate of return is higher than B's, then A should be more liquid than B.

30. What may leave the money multiplier unchanged?
(a) The liquidity ratio l falls and the reserve ratio r remains constant.
(b) The liquidity ratio l falls and the reserve ratio r rises.
(c) The liquidity ratio l and the reserve ratio r both fall.
(d) The liquidity ratio l and the reserve ratio r both duplicate.

31. Suppose financial assets A and B differ only in two properties. Which one of the following sentences is more likely to be true?
(a) If A is riskier than B, then B's rate of return should be higher than A's.
(b) If A is less liquid than B, then A should be riskier than B.
(c) If A's rate of return is higher than B's, then A should be more liquid than B.
(d) None of the above

32. The Fisher effect refers to
(a) the unemployment rate and the real GDP.
(b) the nominal interest rate and the inflation rate.
(c) the stock of money and the money multiplier.
(d) None of the above

33. Which sentence is not false?
(a) If two financial assets differ only in liquidity and profitability, the more liquid asset is always the more profitable one.
(b) If the government runs a budget deficit ($G + TR > T$), then there is, necessarily, a trade deficit ($NX < 0$).
(c) That an economy has lending capacity means that the government runs a budget surplus ($T > G + TR$).
(d) The above three sentences are false.

34. Which of the following sentences is not true?
(a) The nominal interest rate tends to be inversely correlated with the price of financial assets.
(b) When the central bank executes an open market operation, the nominal interest rate tends to be inversely correlated with M1.
(c) The discount rate is inversely correlated with the nominal interest rate.
(d) None of the above

35. The nominal interest rate on a one-year loan is 5%. Assuming arbitrage, find the likely initial price of a T-bill with the same time to maturity as the loan and with face value equal to 100.
(a) There is not enough information to determine the answer.
(b) The price is the present discounted value of 5%.
(c) The price is $100\ (1 + 0.05) = 105$.
(d) None of the above

36. Which variables are linked by the money multiplier?

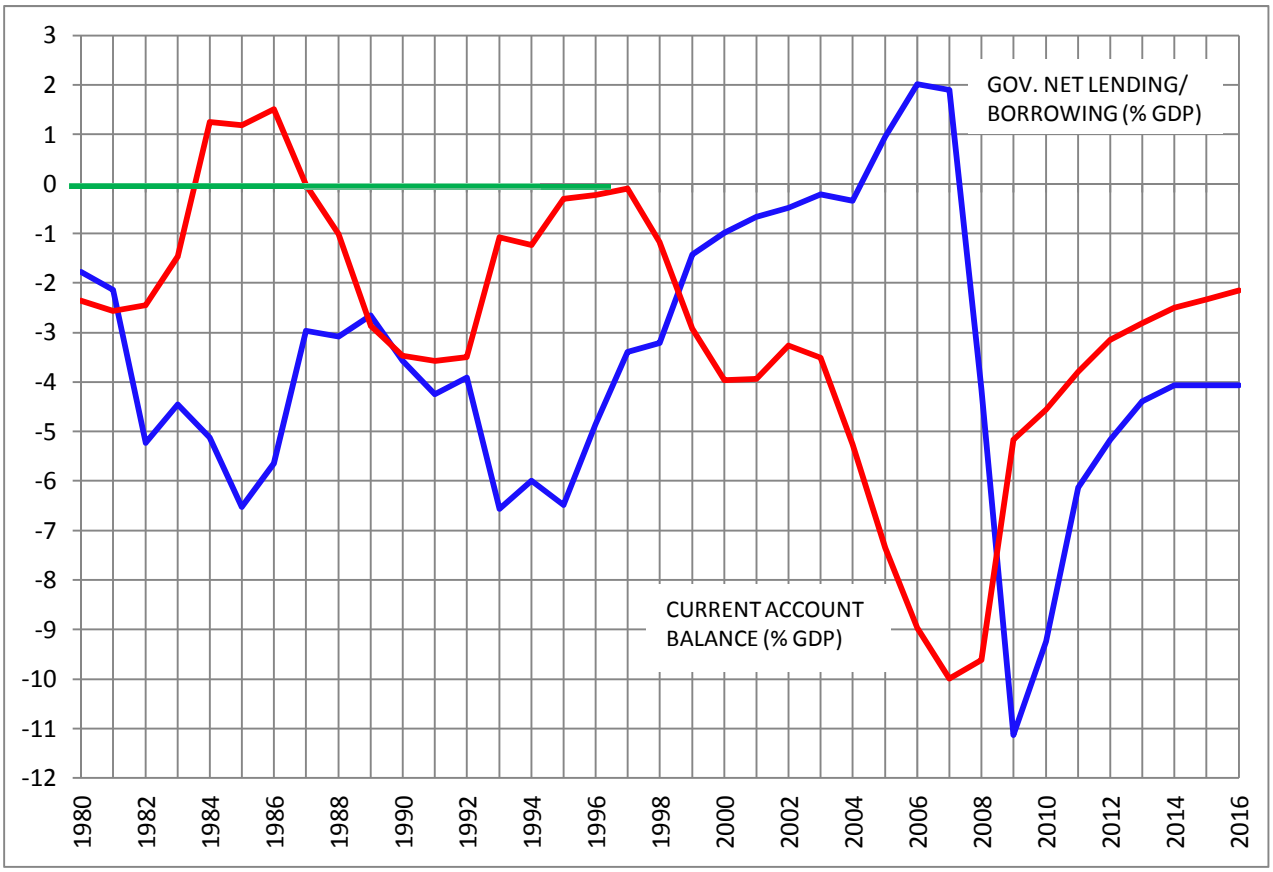
(a) The monetary base and the nominal interest rate.
(b) The money stock and the bank reserves.
(c) The liquidity ratio and the volume of sight deposits.
(d) None of the above

37. The money multiplier has decreased. A possible explanation is that

(a) the liquidity ratio l has decreased.
(b) the reserve ratio r has decreased.
(c) both the liquidity ratio and the reserve ratio have remained constant.
(d) the liquidity ratio l has increased and the reserve ratio r has decreased.

38. Consider the graph below, which plots data for Spain.

(a) It shows evidence of the existence of twin deficits in Spain
(b) Suggests than the rate of growth of GDP has been traditionally negative in Spain
(c) It is impossible that the data plotted refer to Spain or any other country in the world
(d) It indicates that Spain is a country with a strong lending capacity
(e) None of the above
(f) All of the above except (e) and (c)
(g) Only (a) and (d)
(h) Only (b) and (d)
(i) Only (a), (b), and (d)



Source: http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weoselgr.aspx