

## Problem Set 3 • Determining the interest rate (loan market model)

**1. Loan market model.** In the loan market model, determine the effect on both the equilibrium interest rate and the volume of loans of each of the following events.

- (1) The arrival of a large number of immigrants
- (2) The closing of a significant number of firms
- (3) There is an increase in the proportion of income saved by households
- (4) To finance important investment projects the main firms of the economy issue corporate bonds
- (5) The central bank executes an expansive open market operation
- (6) There is an increase of foreigners willing to purchase domestic financial assets
- (7) The population of the economy grows old
- (8) The banks decide not to concede any loan to individuals younger than 40-year old
- (9) Foreign banks enter the economy and settle new offices
- (10) Unemployment doubles
- (11) The inflation rate doubles
- (12) It is expected that the inflation rate will double
- (13) The central bank increases the reserve ratio and sells T-bills to banks
- (14) The central bank increases the reserve ratio and purchases T-bills from banks
- (15) The government budget goes from surplus to deficit
- (16) The stock market crashes
- (17) Unquestionable evidence that the afterlife exists is made public
- (18) The economy goes into a recession

**2. Equilibrium interest rate.** Identify three events, different from the ones indicated previously, that may cause an increase of the equilibrium interest rate and another three that may cause a fall in the equilibrium volume of loans.

**3. Equilibrium interest rate.** Identify three events that may cause an increase in the equilibrium interest rate and, simultaneously, a fall in the equilibrium volume of loans.

**4. Equilibrium interest rate.** Identify two events that may cause, simultaneously, a fall in the equilibrium interest rate and a fall in the equilibrium volume of loans.

**5. Money multiplier process, loan market, monetary policy.** Banks have voluntarily decided to increase their reserves substantially. (i) Explain the effect that this decision is likely to cause on the money multiplier process. (ii) By means of a graphical representation of the loan market, show the impact of that decision on the equilibrium interest rate. (iii) Suggest a measure by the central bank that could offset that impact and explain why the measure can offset it.

**6. Real interest rate.** Find the real interest rate in a certain period if the nominal interest rate is 5%, the CPI at the beginning of the period is 200, and the GDP deflator at the end of the period is 220.

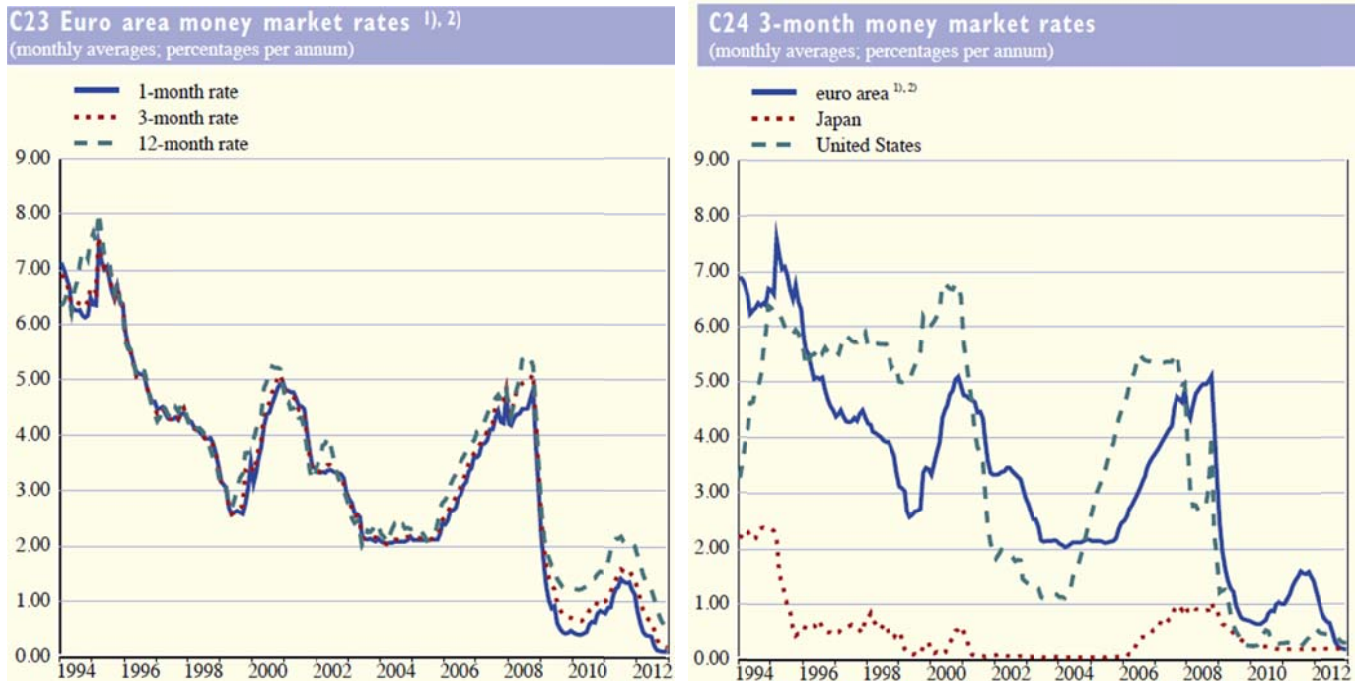
**7. Loan market model.** (i) Find out the effect on the loan market equilibrium of: (a) a reduction in the government deficit; (b) a reduction in the government deficit that takes place at the same time as a reduction in the number of banks. (ii) Suggests an open market operation capable of neutralizing the effect on the interest rate established in (b) and illustrate your answer graphically.

**8. Equilibrium interest rate.** Which is the effect on the interest rate of an increase in the reserve ratio that occurs at the same time as a sale of T-bills by the central bank? And if the sale were a purchase?

**9. Fisher effect.** The real interest rate in a certain economy has been negative for the last five years. Explain if this evidence is consistent or not with the Fisher effect.

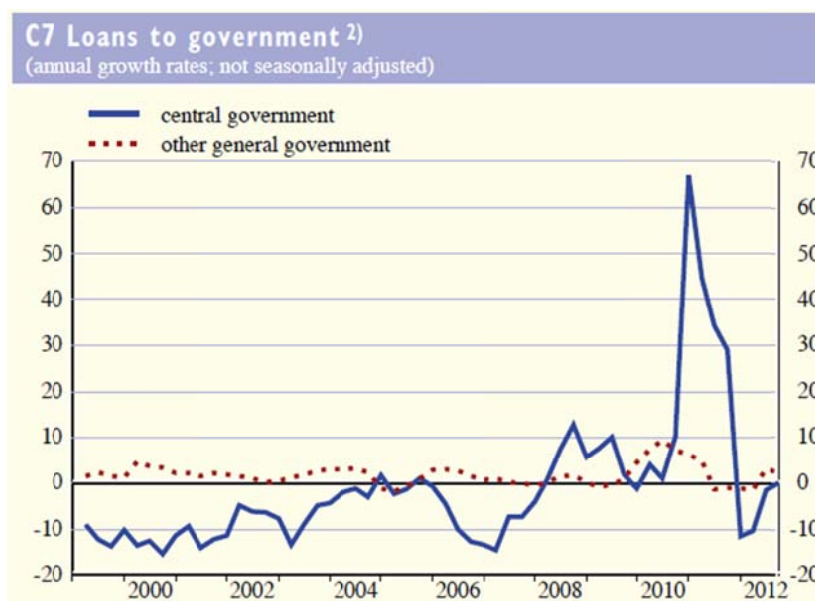
**10. Real interest rate.** Find the real interest rate: (i) if the nominal interest rate is 5% and the CPI is 200; (ii) if the real interest rate is constant and the inflation rate is 5%.

**11. Loan market model.** (i) Consider the chart on the left. (a) Suggest some change in the supply of loans and the demand for loans consistent with the evolution of interest rates between 2005 and 2008. (b) Do the same for the period 2008-2009. (ii) Consider now the chart on the right. (a) Over the nearly two decades represented, can monetary policy be considered, in all three economies, rather expansionary or rather contractionary? (b) What do the data suggest for the period 2008-2012, that the monetary policy has been more expansionary in the United States or in the eurozone?



Source: ECB Monthly Bulletin, 01/2013, <http://www.ecb.eu/pub/pdf/mobu/mb201301en.pdf> (S44)

**12. Loan market model.** The following chart offers information about loans to governments in the eurozone. Consider the sharp increase that took place towards the end of 2010. What could explain that the interest rate in the eurozone did not grow with the same intensity in that period (see C23 above)?

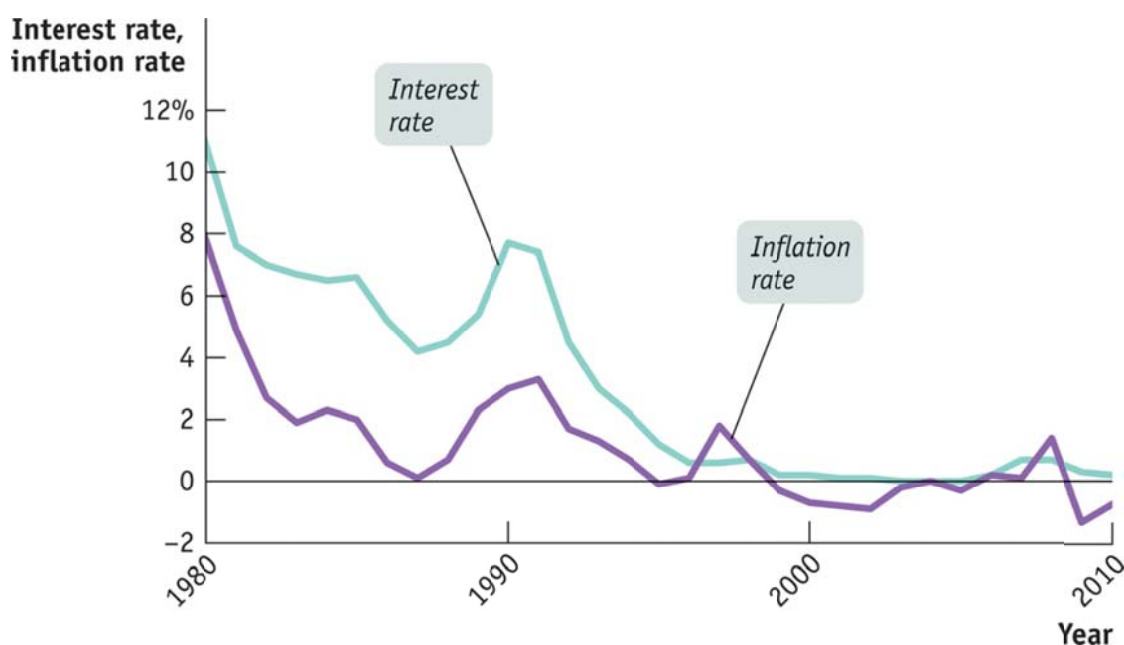


Source: ECB Monthly Bulletin, 01/2013, <http://www.ecb.eu/pub/pdf/mobu/mb201301en.pdf> (S16)

**13. Loan market model.** With the help of a graphical representation of the loan market, determine and explain the effect on the equilibrium interest rate of an increase in the number of people willing to purchase financial assets. (ii) Suggest two measures by the central bank that could neutralize that effect and indicate in a graphical representation of the loan market how these measures achieve the desired goal.

**14. Monetary policy.** A speculative bubble (market bubble or speculative mania) occurs when the price of a good or financial asset is systematically inflated with respect to what may be called its “intrinsic value”. In this case, most of the trade in the market is carried out under the expectation that the price of the good or the financial asset will rise, so buyers typically buy expecting to be able to sell later at a higher price. A speculative bubble bursts when the price of the good or financial asset suddenly plummets (crashes). Explain why central banks generally respond to a stock market crash by conducting expansionary open market operations.

**15. Real interest rate.** The chart below refers to Japan. (i) Does the chart provide information concerning the real interest rate? (ii) If so, identify a period in which it is positive and another one in which it is negative. (iii) Can a period be identified during which it rises? And another one during which it falls?



Source: [http://bcs.worthpublishers.com/krugmanwellsmacro3/default.asp?t\\_768077](http://bcs.worthpublishers.com/krugmanwellsmacro3/default.asp?t_768077) .  
(Chapter 16 → Student PowerPoint Slides)

### Multiple choice questions

1. Firms cannot obtain from banks the amount of desired credit. As a result, firms have decided to sell all the government bonds they own. What decision by the central bank can offset the effect on the nominal interest rate caused by the sale of bonds?

- (a) An increase in the reserve requirements
- (b) A rise in the central bank's discount rate
- (c) To carry out an expansionary open market operation
- (d) None of the above

2. A contractionary open market operation
- (a) consists of reducing reserve requirements.
  - (b) consists of purchasing financial assets.
  - (c) consists of purchasing foreign firms.
  - (d) None of the above

3. An expansionary monetary policy aims at rising
- (a) the money stock.
  - (b) the unemployment rate.
  - (c) foreign real GDP.
  - (d) None of the above

4. If the central bank sells financial assets,
- a rise of the interest rate is to be expected.
  - a fall of the interest rate is to be expected.
  - the money stock increases.
  - the money multiplier automatically puts up because both the liquidity ratio and the reserve ratio rise.
5. The interest rate has dropped. A possible explanation is that
- there are more banks and fewer firms.
  - there are fewer banks and fewer firms.
  - there are fewer banks and more firms.
  - None of the above
6. What could explain a rise in both the interest rate and the volume of loans?
- An open market operation by the central bank
  - An increase in unemployment
  - Neither (a) nor (d)
  - A rise in the budget deficit combined with an increase in the number of banks
8. The sale of financial assets implemented by the central bank
- tends to reduce the interest rate.
  - tends to reduce the money supply.
  - increases the money multiplier because it necessarily causes a fall in the liquidity ratio.
  - tends to raise the interest rate.
9. Which of the following is not a monetary policy instrument of a central bank?
- Open market operations
  - Reserve requirements
  - Interest rates set by the central bank when it lends
  - None of the above
10. A negative real interest rate
- is impossible.
  - is not impossible.
  - is the consequence of having a nominal interest rate equal to the inflation rate.
  - None of the above.
11. The real interest rate
- links M1 with M2.
  - is, in general, equal to the real GDP.
  - coincides with the discount factor.
  - depends on the nominal interest rate and the inflation rate.
12. According to the loan market model, what could not explain a rise in the interest rate?
- An increase in the budget deficit
  - An open market operation
  - A reduction of the number of banks combined with a rise in unemployment
  - An increase in the number of banks combined with a fall in the number of firms
13. A negative real interest rate
- necessarily implies a negative inflation rate.
  - arises when the nominal interest rate is greater than the inflation rate.
  - occurs when the inflation rate is greater than the nominal interest rate.
  - is a plain impossibility.
14. According to the Fisher equation, if real interest rate is 4% and nominal interest rate is 6%, then the inflation rate is, roughly,
- 10%.
  - 2%.
  - 2%.
  - None of the above
15. If the real interest rate remains constant, then, assuming the Fisher effect, a 3-point increase in the inflation rate
- will be accompanied by a 3-point reduction in the nominal interest rate.
  - will cause no effect on the nominal interest rate.
  - is simply impossible.
  - None of the above
16. Which concept is unrelated to the nominal interest rate?
- The Fisher effect
  - The price of T-bills
  - The income identity
  - None of the above
17. What decision by the central bank could offset the effect on the interest rate of a worsening in the expectations concerning the short-term evolution of the economic activity?
- The reduction of the reserve ratio
  - The reduction of the discount rate (the interest rate at which the central bank furnishes loans to the banks)
  - The purchase of financial assets
  - None of the above

18. According to the Fisher effect, a surge in the inflation rate causes
- a reduction of the unemployment rate.
  - an increase in real GDP.
  - a reduction of the nominal interest rate.
  - an increase of the nominal interest rate.
19. The Fisher effect relates the
- economy growth rate and the nominal interest rate.
  - economy growth rate and the inflation rate.
  - unemployment rate and the nominal interest rate .
  - inflation rate and the nominal interest rate.
20. If the number of banks increases and the number of firms decreases, it is likely that the nominal interest rate
- none of the following.
  - will necessarily remain constant.
  - will rise.
  - will fall.
21. Identify a monetary policy instrument of central banks.
- The money multiplier
  - The GDP deflator inflation rate
  - The rate of growth of the real GDP
  - None of the above
22. If the central bank executes an expansionary open market operation and, simultaneously, the government issues bonds to finance an increase in the government expenditure, the equilibrium interest rate in the loan market necessarily
- rises.
  - falls.
  - remains constant.
  - None of the above
23. The government budget deficit has increased. According to the loan market model, what event could neutralize the effect on the interest rate of that increase?
- A contractionary open market operation
  - That the most important banks go bankrupt.
  - That firms sell financial assets they own to finance new investment projects.
  - An increase in unemployment combined with the closure of 20% of all the factories in the economy.
24. A shift to the right of the supply of loans function combined with a shift to the right of the demand for loans function necessarily causes
- a fall in the equilibrium volume of loans.
  - a rise in the equilibrium nominal interest rate.
  - a fall in the equilibrium nominal interest rate.
  - a rise in the equilibrium volume of loans.
25. How can a central bank increase the economy's liquidity (money supply)?
- By selling financial assets in an OMO
  - By increasing the reserve ratio
  - By reducing the liquidity ratio
  - By purchasing financial assets in an OMO
26. The nominal interest rate has fallen. A possible explanation is that
- one of every three firms has closed down.
  - the central bank has sold government bonds.
  - the government budget deficit has risen.
  - None of the above
27. Which event could cause a fall in the interest rate but not a rise?
- Having fewer banks and fewer firms
  - Having fewer banks but more firms
  - Neither (a), nor (b), nor (d)
  - Having more banks but fewer firms
28. When the central bank sells financial assets
- the interest rate tends to rise.
  - the interest rate tends to fall.
  - liquidity tends to grow.
  - the money multiplier increases because the sale of financial assets causes a rise in the reserve and liquidity ratios.
29. The nominal interest rate has fallen. What could not explain this result?
- That both the supply of loans and the demand for loans have shifted.
  - That only the supply of loans has shifted.
  - That only the demand for loans has shifted.
  - That the supply of loans has shifted to the left and the demand for loans has shifted to the right.
30. The interest rate is never affected by changes
- in the inflation rate.
  - in the government budget.
  - in the monetary policy.
  - None of the above