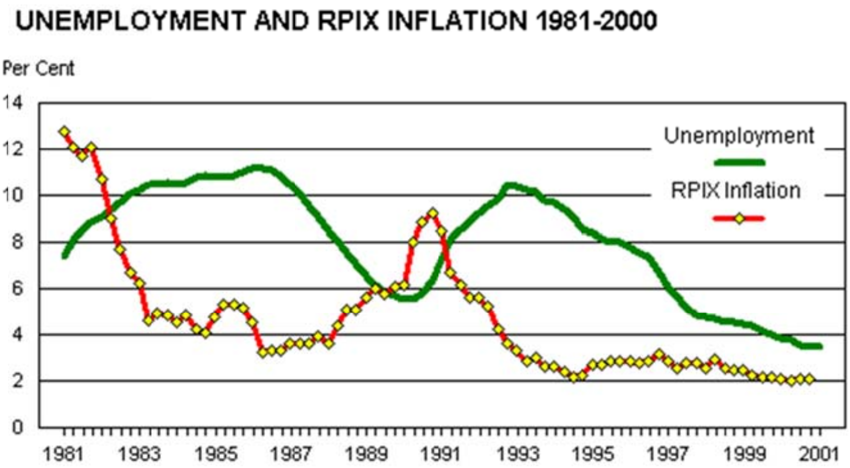
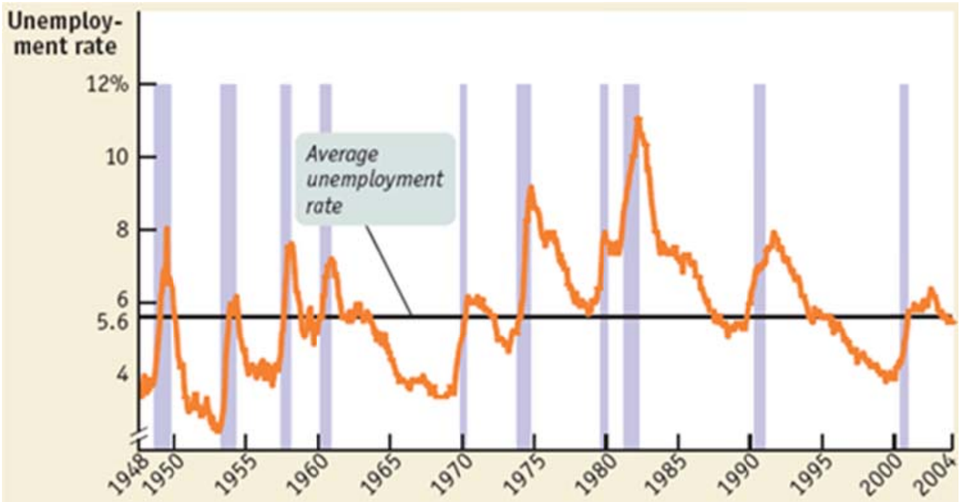
Problem Set 5 · The AS-AD model



1. Inflation and unemployment. The chart on the left shows the unemployment rate u and the inflation rate π in the UK (RPIX = retail price index excluding mortgage interest payments ≈ underlying inflation). Identify periods during which u and π are consistent with a stable Phillips curve and periods in which it is not. http://www.tutor2u.net/economics/content/topics/inflation/philips_curve.htm

2. Business cycle and unemployment. The chart on the right displays the unemployment rate u of the US economy (recessions = shaded areas). (i) On inspection, what is the relationship between u and the business cycle that the chart suggests? (ii) Does u appear to be a procyclical or a counter-cyclical variable? http://www.worthpublishers.com/krugmanwellsnew/main.htm



3. AS-AD model. (i) During the world recession of the 1970s, economies typically experienced a rise in the inflation rate and, at the same time, a reduction in real GDP. What changes in the functions of the AS-AD model could explain that outcome? (ii) During the world recession of the 1930s, economies typically experienced a decrease in both the inflation rate and real GDP. What changes in the functions of the AS-AD model could explain that outcome? (iii) In terms of the evolution of the inflation rate and real GDP, to which of the two abovementioned crises is the present crisis more similar? Explain your answer.

4. AS-AD model. By means of the AS-AD model, and assuming that the economy is initially at its macroeconomic equilibrium determine the effect on the macroeconomic equilibrium of the following events. In each case, explain the difference between assuming that the economy is on the non-inflationary region of the AS function and assuming that it is on the inflationary region.

(1) A significant number of immigrants come to the economy
(2) Autonomous consumption (the consumption that does not depend on income) falls
(3) The central bank buys government bonds
(4) Tourists no longer want to visit the country
(5) Oil prices surge
(6) The rest of the world becomes more competitive
(7) The rest of the world becomes richer

(8) The foreign nominal interest rate rises
(9) 20% of employed workers retires
(10) The domestic stock market crashes
(11) A drought devastates the country
(12) The economy experiences a technological revolution
(13) The government cuts taxes on the firms' profits
(14) Trade unions go on strike for two-weeks
(15) 50% of all the banks in the economy go bankrupt
(16) 50% of all the firms in the economy close
(17) The world wide web is closed
(18) The government severely cuts spending on public services
(19) The government simultaneously reduces transfers and taxes
(20) The government reduces the firms' contributions to social insurance
(21) It becomes easier for firms to dismiss workers
(22) One of the previous events and the following one in the list simultaneous occur
(23) Businessmen expect a drop in consumption
(24) The government offers subsidies to develop renewable sources of energy
(25) Businessmen become extraordinarily optimistic about future business conditions
(26) The government defaults on public debt payments
(27) People expect a rise in the inflation rate
(28) People expect a rise in the interest rate
(29) Firms expect a rise in the government budget deficit
(30) Alien intelligent life is discovered

5. AS-AD model. The AD function is given by $AD = 1/\pi$. The AS function is defined in two parts: $Y = \pi/4$ if $0 \leq \pi \leq 8$ and $Y = 2$ if $\pi > 8$.

(i) Graph the two functions and indicate the maximum level of production.
(ii) Compute the macroeconomic equilibrium.
(iii) Compute again the macroeconomic equilibrium if the AS function changes to $Y = \pi/4$ if $0 \leq \pi \leq 12$ and $Y = 3$ if $\pi > 12$.
(iv) Suggest three events that could have caused the previous shift in the AS function.
(v) Compute the macroeconomic equilibrium if the AS function is as in (iii) and the AD function is $AD = 16/\pi$.
(vi) What event could explain the change from $AD = 1/\pi$ to $AD = 16/\pi$? Indicate some event that could not.

6. Hyperinflation. Suggest some event that may lead the economy to enter the hyperinflationary region of the AS function.

7. Okun's law & AS function. Suppose Okun's law takes the following form: $\Delta u = 12 - \Delta y$, where $\Delta u = u - u_{-1}$ and $\Delta y = y - y_{-1}$. Let the Phillips curve be given by $\pi = 5 - u$. (ii) Graph each of the two relationships. (ii) Combine the two equations to obtain an AS function. (iii) Graph the resulting AS function.

8. Phillips curve. Consider the Phillips curve $\pi = a - b \cdot u$, where a and b are positive constant. (i) Make a graph of the Phillips curve. (ii) Let a include the inflation rate π^e expected by workers and firms. Show graphically the effect on the Phillips curve of an increase in π^e.

9. Okun's law. By assuming Okun's law as presented in exercise 7, explain how a Phillips curve can be obtained in the AS-AD model when the AD function is allowed to shift but the AS function is not.

10. AD expansion. (i) Indicate two events, not appearing in the lecture notes, that may hit positively on aggregated planned consumption. (ii) Do the same for investment. (iii) Do the same for net exports.

11. Procyclical/coincident variables. Explain the difference between a procyclical variable and a coincident variable.

12. Quantity equation. Using the version of the quantity equation expressed in rates of change, find the inflation rate if the velocity of money remains constant, the real GDP increases by 2%, and the money stock increases by 7%.

13. Inflation. In his *Response to the Paradoxes of Malestroit* (1568), the French political philosopher Jean Bodin (1530–1596) states the following: "In my opinion, several causes lay behind the increase in prices that we have witnessed. The main and almost unique cause (one that nobody has referred to previously) is the abundance of gold and silver, which is greater in this kingdom than it has been in the last 400 years. The second cause is due in part to monopolies. The third cause is scarcity, which is caused both by the export trade and by waste. And there is also the luxurious consumption by the kings and the nobles, who raise the price of fashionable goods." Analyze in the AS-AD model, or by means of equations presented so far in the course, the impact on the inflation rate of each the four causes listed by Bodin (analyze each cause independently of the rest of causes).

14. Macroeconomic equilibrium. Find out how each of the following events is likely to alter the macroeconomic equilibrium in the AS-AD model. [Write "↑" if there is an increase or a shift to the right; "↓" if there is a fall or a shift to the left; "=" if there is no change; and "?" if the change is uncertain.]

Event	AS	AD	π	Y
Taxes paid by firms are cut				
The government expenditure is reduced				
The cost to firms of dismissing workers goes up				
Oil prices rise and the central bank applies a monetary policy intended to keep the inflation rate constant				
The government transfers fall and, simultaneously, taxes are cut				
50% of all the banks go bankrupt				
50% of all the firms go bankrupt				
Expectations on the evolution of the economy turn depressed				
Foreign real GDP grows				

Multiple choice questions

1. What explanation is valid to justify a downward-sloping aggregate demand function?
(a) Wealth effect: if the inflation rate falls, money's purchasing power rises and people would like to consume more.
(b) Interest rate effect: if the inflation rate falls, by the Fisher effect, the nominal interest rate also falls, which stimulates consumption and investment.
(c) Competitiveness effect: if the inflation rate falls, domestic goods become comparatively cheaper, so net exports rise.
(d) None of the above

2. In the AS-AD model, both the AS function and the AD function shift to the right. As a result,
(a) the inflation rate necessarily rises.
(b) the economy is experiencing a recession.
(c) it is likely that real GDP will rise.
(d) it is impossible for disinflation to be occurring.

3. What is typical of a recession?
(a) Workers are laid off, the inflation rate rises
(b) GDP falls, the inflation rate rises
(c) unemployment falls, the inflation rate falls
(d) None of the above

4. It is reasonable to expect some factories to remain idle
(a) during the contractionary period of the business cycle.
(b) never during the business cycle.
(c) when the economy is entering the inflationary region of the aggregate supply function.
(d) None of the above

5. By itself alone, the AS-AD model can be used the predict the changes in the
(a) unemployment rate.
(b) real interest rate.
(c) inflation rate.
(d) real exchange rate.

6. The macroeconomic equilibrium lies on the inflationary region of the AS function. Starting from this point, an increase in the number of firms together with an increase in the number of consumers cannot lead to
(a) an increase in the aggregate production.
(b) an increase in the inflation rate .
(c) a reduction in the inflation rate.
(d) a reduction in the aggregate production.

7. A period of rising GDP and falling unemployment is called
(a) Okun's law.
(b) business cycle.
(c) depression.
(d) None of the above

8. Which sentence is not true?
(a) In the AS-AD model, every change in the AD function always causes a change in the inflation rate.
(b) Negative shocks to the AS function tend to cause stagflation.
(c) According to the AS-AD model, during the expansion period of the business cycle, the inflation rate tends to rise.
(d) Neither (b) nor (c) is false.

9. If people feel poorer because of a fall in the price of financial assets,
(a) the AD function will shift to the left because people will be induced to consume more.
(b) the AD function will shift to the right as people will be induced to consume more.
(c) the AD function will shift to the left because people will be induced to consume less.
(d) the AD function will shift to the right as people will be induced to consume less.

10. Aggregated planned expenditure is more likely to rise if
(a) the interest rate and the exchange rate rise.
(b) the interest rate rises and the exchange rate falls.
(c) the interest rate falls and the exchange rate rises.
(d) the interest rate and the exchange rate fall.

11. Which argument cannot contribute to justify a downward-sloping aggregate demand function?
(a) A falling inflation rate increases the purchasing power of money and that stimulates consumption.
(b) A rising inflation rate erodes competitiveness and that causes a drop in net exports.
(c) When the inflation rate grows, the central bank raises the interest rate, which tends to reduce investment.
(d) None of the above

12. In the AS-AD model, production has risen and the inflation rate has remained unchanged. A possible explanation is that
(a) consumers have lost part of their wealth.
(b) the oil prices are on the rise.
(c) there has been a cut in the taxes consumers pay while the economy remains on the non-inflationary region of the AS function
(d) None of the above

13. In a fixed exchange rate regime, the government decides a devaluation of the domestic currency. According to the AS-AD model, this policy is likely to
(a) fuel inflation.
(b) reduce the nominal exchange rate.
(c) increase the interest rate.
(d) raise the unemployment rate.

14. A shift of the AD function to the left cannot be explained by
(a) the general belief that the economy is entering a recession.
(b) a tax reduction combined with a cut in the government purchases of goods.
(c) the price level goes down faster at the rest of the world than at home.
(d) None of the above.

15. The expression "business cycle" refers to
(a) the ups and downs of the trade deficit.
(b) the ups and downs of the inflation rate.
(c) the changes in the firms' profits.
(d) None of the above

16. What cannot shift right the AD function?
(a) Consumption rises, investment falls.
(b) Net exports fall, government expenditures rise.
(c) Consumption falls, net exports fall.
(d) None of the above.

17. "Automatic stabilizers are provisions in the budget that cause government spending to rise or taxes to fall automatically —without legislative action— when GDP falls." (Abel, Bernanke, Croushore). As a result, automatic stabilizers
(a) act without any multiplier effect being necessary.
(b) do not stabilize the economy.
(c) reduce the money multiplier.
(d) None of the above

18. The peaks and troughs of a lagging variable tend to occur
(a) at about the same time as the peaks and troughs of the business cycle.
(b) later than the peaks and troughs of the business cycle.
(c) before the peaks and troughs of the business cycle.
(d) None of the above

19. Loosely speaking, Okun's law relates
(a) the unemployment rate to GDP.
(b) the inflation rate to the unemployment rate.
(c) the inflation rate to the interest rate.
(d) GDP to the exchange rate.

20. The Phillips curve does not refer to
(a) the inflation rate.
(b) the real exchange rate.
(c) the unemployment rate.
(d) None of the above

21. The macroeconomic equilibrium is given by
(a) the inflation rate and the unemployment rate.
(b) the real GDP and the unemployment rate.
(c) the real GDP and the inflation rate.
(d) the real interest rate and the real exchange rate.

22. According to the AS-AD model, a positive shock to consumption combined with a negative shock to the AS function tends to generate
(a) necessarily, a fall in the unemployment rate.
(b) always, an uncertain effect on the inflation rate.
(c) a rise in the inflation rate.
(d) necessarily, a fall in GDP.

23. A negative shock to the aggregate supply function on the inflationary region generates a
(a) rise in the inflation rate and a fall in real GDP.
(b) fall in the inflation rate and a fall in real GDP.
(c) rise in the inflation rate and a rise in real GDP.
(d) fall in the inflation rate and a rise in real GDP.

24. A rise in production together with a fall in the inflation rate has been observed. What could explain that result?
(a) Only the AD function has been modified.
(b) Both the AD function and AS function may have changed.
(c) Necessarily, only the AS function has been modified.
(d) None of the above

25. A positive shock to the aggregate demand function on the non-inflationary region of the aggregate supply function causes
(a) a rise in the inflation rate and a fall in real GDP.
(b) a fall in the inflation rate and a fall in real GDP.
(c) a significant rise in the inflation rate and a rise in real GDP.
(d) essentially, only an increase in real GDP.

26. The expenditure multiplier effect means that
(a) an initial exogenous increase in the inflation rate leads to an increase in the interest rate that further increases the inflation rate, that further increases the interest rate, that further increases the inflation rate…
(b) the tax revenue is always a multiple of the money stock.
(c) when the economy is booming, the inflation rate becomes a procyclical variable.
(d) an initial exogenous increase in aggregate demand leads to an increase in income that further increases aggregate demand, that further increases income, that further increases aggregate demand…

27. Which argument does not justify a negatively sloped aggregate demand function?
(a) A decline in the inflation rate increases purchasing power and stimulates consumption
(b) A surge in the inflation rate erodes competitiveness and causes a reduction in net exports
(c) When the inflation rate rises, the central bank increases the interest rate, which tends to reduce expenditure
(d) None of the above

28. By the expenditure multiplier effect,
(a) an increase in the inflation forces the central bank to rise the interest rate, so the money stock falls.
(b) an increase in the government budget deficit financed by bond issue induces people to save for the payment of additional future taxes, so they cut consumption and aggregate demand falls.
(c) an increase in transfers, raises aggregate demand, which raises income, which raises consumption, which raises aggregate demand, which raises income…
(d) None of the above

29. What is likely to shift the aggregate demand function to the right?
(a) An increase in net export
(b) A decline in the firms' production costs
(c) An increase in the unemployment rate
(d) A decline in aggregate income

30. What is likely to shift the aggregate supply function to the left?
(a) An increase in the government spending
(b) An increase in the firms' production costs
(c) A productivity rise
(d) A tax cut

31. Characteristically, in a booming economy
(a) GDP does not decline.
(b) the inflation rate is falling.
(c) the economy is reaching the through of the business cycle.
(d) countercyclical variables become cyclical, and coincident indicators become lagging indicators.

32. Okun's law establishes a negative relationship between
(a) real GDP growth and the interest rate.
(b) the unemployment rate and the inflation rate.
(c) real GDP growth and the unemployment rate.
(d) the inflation rate and the unemployment rate.

33. What tends to shift the aggregate demand function to the right?
(a) An increase in imports
(b) A reduction in the firms' production costs
(c) A fall in the proportion of income that is saved
(d) A decline in aggregate income

34. A raise in the reserve ratio
(a) increases the expenditure multiplier.
(b) increases the money multiplier.
(c) lowers the expenditure multiplier.
(d) lowers the money multiplier.

35. The expenditure multiplier effect means that
(a) an exogenous rise in the inflation rate causes an increase in the interest rate i, which in turn causes an increase in the inflation rate, which causes an increase in i…
(b) an exogenous increase in aggregate demand AD causes an income rise, which rises AD, which rises income…
(c) an increase in the monetary base M0 causes an increase in the money stock M1, which causes an increase in M0, which causes an increase in M1…
(d) aggregate demand is a multiple of the government expenditure.

36. A period during which real GDP grows and unemployment falls is called
(a) a Phillips curve.
(b) the business cycle.
(c) an expansion.
(d) a recession.

37. An increase in real GDP and a decrease in the inflation rate have been observed. A possible explanation is that
(a) an expansionary fiscal policy has been implemented.
(b) a contractionary monetary policy has been implemented.
(c) supply policies have been adopted.
(d) None of the above