

## Chapter 12

# **AGGREGATE SUPPLY, AGGREGATE DEMAND, AND INFLATION: PUTTING IT ALL TOGETHER**

*Macroeconomics in Context (Goodwin, et al.)*

### **Chapter Overview**

This chapter introduces you to the "Aggregate Supply /Aggregate Demand" (or "AS/AD") model. This model builds on the model for Aggregate Expenditure (AE) presented in Chapter 8, using the broader term "aggregate demand" to include explicit attention to the potential problem of inflation. The chapter also adds in the role of aggregate supply by presenting an Aggregate Supply curve. The AS/AD model is then deployed to analyze various current and past events (such as changes in fiscal and monetary policy, supply shocks, and other changes) and examine their effects on the rate of inflation and output. The chapter reviews real-life examples of U.S. macroeconomic performance seen through the lens of the AS/AD model. It also compares the classical school, with their view of a stable full employment equilibrium, to the Keynesians with their view of a dynamically evolving economy.

### **Chapter Objectives**

After reading and reviewing this chapter, you should be able to:

1. Explain the derivation of the Aggregate Demand curve relating inflation and output levels, and how it shifts.
2. Explain the derivation of the Aggregate Supply curve relating inflation and output levels, and how it shifts.
3. Use the AS/AD model to describe the consequences of changes in fiscal policy, monetary policy, supply shocks, and investor and consumer confidence, depending on whether an economic is in a recession or at full employment.
4. Apply the AS/AD model to understanding major U.S. macroeconomic developments of the last several decades.
5. Discuss how classical and Keynesian economic theories differ in how they understand the macroeconomy.

## Key Terms

aggregate demand (AD) curve  
real wealth effect  
real money supply  
aggregate supply (AS) curve  
maximum capacity output  
wage-price spiral  
wage and price controls  
disinflation  
supply shock  
stagflation

demand-pull inflation  
cost-push inflation

### *Appendix:*

real business cycle theory  
rational expectations theory  
neoclassical synthesis  
New Keynesian macroeconomics  
post-Keynesian macroeconomics  
path dependence

## Active Review

### *Fill in the Blank*

1. The curve that shows how inflation is related to total demand, and indicates an inverse relationship between inflation and output, is called the \_\_\_\_\_ curve.
2. The tendency for consumers to increase or decrease their consumption based on their perceived level of wealth is described as the \_\_\_\_\_ effect.
3. The nominal money supply divided by the general price level is known as the \_\_\_\_\_.
4. The curve that shows the combination of output and inflation that can occur in an economy, given the country's capacity constraints, is called the \_\_\_\_\_ curve.
5. Assume that a nation is fully using every last one of its available resources in production. Then that nation would be operating at \_\_\_\_\_ output.
6. When demand for labor and other resources is high, and that bids up wages, which in turn bids up prices as producers try to cover their higher cost of production, which then puts further upward pressure on wages as workers demand compensation for higher prices, etc., the result is what is called a \_\_\_\_\_.
7. During WWII, the government established \_\_\_\_\_ to keep inflation from spiraling out of control.
8. Something that changes the ability of an economy to produce goods and services (such as a natural disaster, a war, change in productivity, or change in the price of a key input like oil) is called a \_\_\_\_\_.

9. The presence of both economic stagnation (with rising unemployment) and rising inflation is known as \_\_\_\_\_.
10. Suppose people experience a higher level of inflation for a period of time, and begin to build in that higher rate of inflation into their contracts. This would be characterized as an increase in \_\_\_\_\_.
11. Inflation caused by excessive aggregate demand is referred to as \_\_\_\_\_.
12. (In appendix) The theory that changes in employment levels are caused by change in technological capacities or people's preferences concerning work is a theory associated with \_\_\_\_\_.
13. (In appendix). The theory that said that people will use all available information, including rational anticipation of the Fed's monetary policy movements, and will immediately incorporate changes in inflationary expectations into their contracts, is associated with the \_\_\_\_\_ school.
14. (In appendix) A combination of classical and Keynesian views, with Keynesian theory applied to the short and medium run, but the classical view prevailing in the long run, is known as the \_\_\_\_\_.
15. (In appendix) The school of thought which bases their analysis on rational, optimizing individuals and micro-level market behavior, but believes that the adjustment to full employment equilibrium could take a relatively long time, is called \_\_\_\_\_.
16. (In appendix) The school of thought that believes that economies are unstable, that history matters, and that the future is often unpredictable, is called \_\_\_\_\_.

*True or False*

17. According to the AS curve, at the "full employment" range of output the unemployment rate is 0%.
18. According to classical theory, any shifts in the AD curve will only lead to changes in inflation, and leave output unchanged.
19. There is a clear relationship between unemployment and inflation: inflation is low during periods of high unemployment and as unemployment declines inflation rate increases.
20. Stagflation is the combination of stagnation and deflation.

21. An oil price shock (assuming all else remains the same) can lead to stagflation.

*Short Answer*

22. Why is the AD curve downward sloping?

23. What variables would cause a shift in the AD curve?

24. What are the five regions of the aggregate supply curve diagram?

25. Why is the AS curve gently rising in the full employment range?

26. Why is the AS curve flat, rather than upward sloping, in the recession range?

27. Why is there no immediate response in the AS curve to an increase in inflation?

28. What factors would cause a shift in the AS curve (and in some cases, the maximum output)?

29. What is the classical school's rationale for the slope of the AS curve?

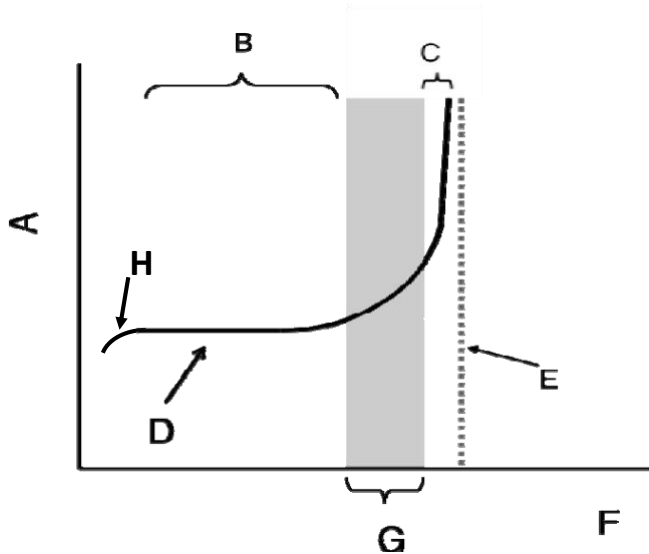
30. One of the simplifying assumptions in the macroeconomic AD/AS model is that only the level of spending is important, not its composition. What does the "composition of spending" entail?

31. How would you explain the high inflation during 2021-2022 based on the AS/AD model?

32. (In appendix) Is the difference between the classical school and the Keynesians only a matter of time (i.e. the time of the adjustment to the long run full employment equilibrium), or is there a more fundamental difference in world view between the two approaches?

**Problems**

1. Fill in the missing labels on the graph below:



- A: \_\_\_\_\_
- B: \_\_\_\_\_
- C: \_\_\_\_\_
- D: \_\_\_\_\_
- E: \_\_\_\_\_
- F: \_\_\_\_\_
- G: \_\_\_\_\_
- H: \_\_\_\_\_

2. For each of the following, illustrate the shift of one of the curves in the AS/AD model:
- Business confidence rises as firms expect an increase in GDP, sales, and profits.
  - A rise in inflation increases people's expectations of inflation in the medium run.
  - The distribution of high-speed internet to rural areas boosts productivity.
3. Illustrate the following periods of history with the AS/AD model:
- Government spending for the Vietnam War during the late 1960s pushed up the rate of inflation from about 1% to 5%.
  - In 1973-74, OPEC engaged in an oil embargo, causing an increase in oil prices. Inflation rose to above 9% in 1975, and the unemployment rate rose above 8%. (Illustrate the immediate effect.)
  - After another oil price shock in 1979, the Fed conducted a contractionary monetary policy (choosing a lower target inflation rate). Inflationary expectations fell. The unemployment rate rose to almost 10%, but inflation fell from 9% to 4%.
  - The 1990s brought an era of innovation, increasing global competition, and weakened unions from years of anti-union government policies. By 1998, the unemployment rate was 4.4% and inflation was 1.6%.

### Self Test

1. Which of these factors explain why the AD curve is downward-sloping?
- With higher inflation, consumers real income and wealth is less and they consume less, resulting in lower output.
  - With higher inflation, the real money supply will be lower, resulting in lower output.
  - Because with higher inflation, exports will be more expensive, resulting in less net exports and lower output.
  - As inflation increases, the Fed will raise interest rates and slow down the economy, resulting in lower output.
  - All of the above.

2. Which of the following would *not* cause a shift in the aggregate demand (AD) curve?

- A. The government cuts taxes.
- B. Expectations of a growing economy lift business confidence and investment.
- C. The Fed chooses a more expansionary monetary policy.
- D. Technological progress improves productivity.
- E. Consumers increase autonomous spending.

3. Which of the following is *not* one of the five regions of the aggregate supply curve diagram?

- A. Maximum capacity output
- B. Wage-price spiral
- C. Full employment range of output
- D. Unemployment
- E. Net exports

4. What is the shape of the AS curve in the full employment range?

- A. Flat and horizontal
- B. Gently rising upwards
- C. Steeply rising upwards
- D. Completely vertical
- E. Downward sloping

5. Which of the following would *not* cause a shift in the AS curve?

- A. A natural occurrence, such as a bumper crop in agriculture.
- B. An increase in labor productivity.
- C. An increase in a key input of production, such as oil prices.
- D. A change in investment spending.
- E. A change in inflation that changes people's expectations of inflation in the medium run.

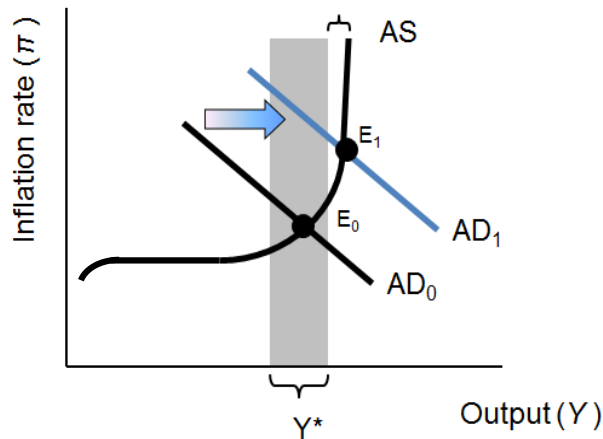
6. Which of the following would *not* cause a shift in both the AS curve *and* maximum capacity output?

- A. A natural occurrence, such as a bumper crop in agriculture.
- B. An increase in labor productivity.
- C. An increase in the price of a key input of production, such as oil.
- D. A change in inflation that changes people's expectations of inflation in the medium run.
- E. None of the above.

7. Which of the following would cause the AD curve to shift to the right?
- A. The government raises income taxes.
  - B. Firms become pessimistic about the future growth of GDP, sales, and profits.
  - C. The Fed shifts to a more expansionary monetary policy.
  - D. Workers build expectations of higher inflation into their contracts.
  - E. None of the above.
8. What could cause both the AS curve and maximum capacity to shift to the right?
- A. A decrease in labor productivity.
  - B. A decrease in inflationary expectations.
  - C. A cut in income taxes.
  - D. The distribution of high-speed internet access to rural areas in the U.S.
  - E. None of the above.
9. Suppose a war destroys much of a nation's infrastructure. Assume everything else remains unchanged. How would the impact be illustrated with the AS/AD model?
- A. AD shifts right/up.
  - B. AD shifts left/down.
  - C. AS and maximum capacity shift right.
  - D. AS and maximum capacity shift left.
  - E. AS, AD and maximum capacity remain unchanged.
10. Suppose the U.S. Congress passes a stimulus package with tax rebates for all qualifying U.S. households. Assume everything else remains unchanged. How would the impact be illustrated with the AS/AD model?
- A. AD shifts right.
  - B. AD shifts left.
  - C. AS and maximum capacity shift right/down.
  - D. AS and maximum capacity shift left/up.
  - E. AS, AD and maximum capacity both shift left.
11. Suppose we observe an increase in inflation and a decrease in output. Which of the following could be the cause?
- A. The Fed has chosen a lower inflation target.
  - B. Good weather has produced a bumper harvest.
  - C. An increase in consumer confidence has boosted consumption spending.
  - D. The price of a key input, oil, has increased.
  - E. None of the above.

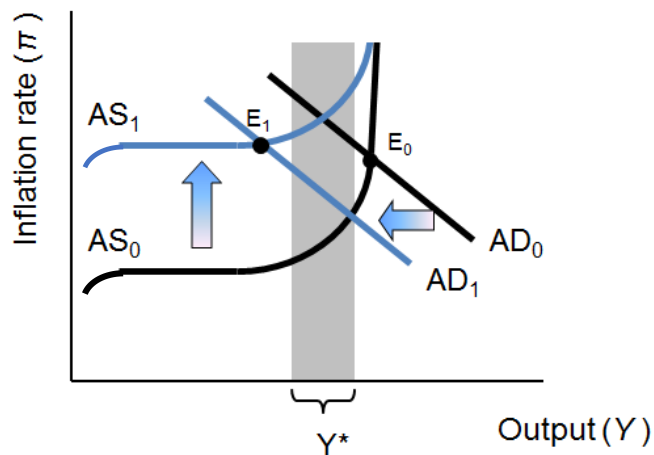


12. In the figure below, which of the following events could explain the shift of the AD curve to the right?



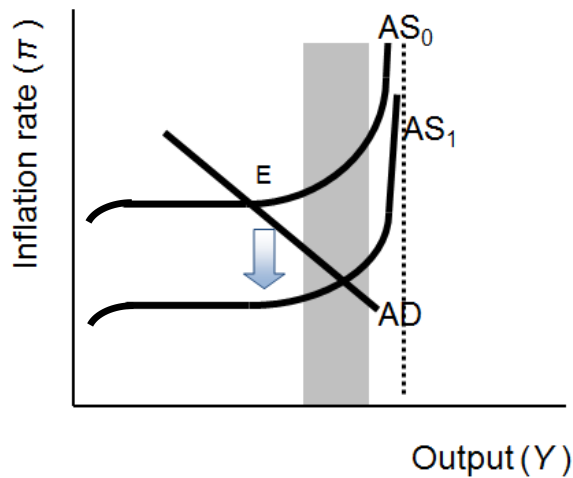
- A. An increase in government spending.
- B. A tax increase.
- C. An increase in consumer and investor confidence.
- D. (a) and (c) only.
- E. (b) and (c) only.

13. In the figure below, which of the following events could explain the upward shift of the AS curve, and the leftward shift of the AD curve?



- A. A tax cut.
- B. An increase in government spending.
- C. An increase in inflationary expectations, followed by a contractionary fiscal policy.
- D. A decrease in inflationary expectations, followed by an expansionary fiscal policy.
- E. None of the above.

14. In the figure below, which of the following could explain the shift downwards of the AS curve?



- A. An increase in inflationary expectations.
  - B. An increase in oil prices.
  - C. A fall in inflationary expectations.
  - D. An increase in government spending.
  - E. None of the above.
15. If the Fed pursues contractionary monetary policy, what are the effects in the medium run (once people's inflation expectations have had time to adapt)?
- A. AD shifts down/left.
  - B. AD shifts down/left and AS shifts down.
  - C. AD shifts up/right.
  - D. AD shifts up/right and AS shifts up.
  - E. AD shifts down/left and AS shifts up.
16. According to classical theory, the aggregate supply (AS) curve is:
- A. perfectly horizontal
  - B. gently upward sloping
  - C. flat at first, and then rises steeply
  - D. perfectly vertical
  - E. downward sloping

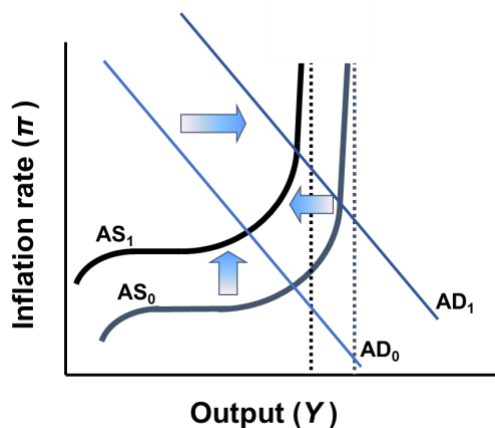
17. Which of the following statements does *not* characterize classical theory?
- A. Markets are self-adjusting, and the economy tends to function smoothly.
  - B. Individuals are rational, optimizing agents, who quickly respond to market conditions.
  - C. Output always remains at its full employment level.
  - D. Fiscal and monetary expansion tends to lead to higher inflation.
  - E. The government should intervene to keep market conditions favorable for corporations to maximize profits.
18. Which of the following statements characterizes Keynesian theory?
- A. Individuals are not always rational, optimizing agents, but instead are subject to waves of optimism or pessimism.
  - B. The “animal spirits” of investors can lead to big fluctuations in the business cycle.
  - C. The AD curve is perpetually on the move over the peaks and troughs of the business cycle.
  - D. Governments should intervene to smooth out the peaks and troughs of the business cycle and keep the AD curve more stable.
  - E. All of the above.
19. The macroeconomic AS/AD model illustrates the following points about the economy:
- A. Expansionary fiscal and monetary policies tend to push the economy toward higher output.
  - B. Contractionary fiscal and monetary policies tend to push the economy toward higher output.
  - C. Adverse supply shocks lower output and raise inflation.
  - D. (a) and (c) only.
  - E. (b) and (c) only.
20. Which of the following are current schools of macroeconomics (see Appendix)?
- A. rational expectations school
  - B. neoclassical synthesis
  - C. New Keynesian macroeconomics
  - D. post-Keynesian macroeconomics
  - E. All of the above are current schools of macroeconomics

## Answers to Active Review Questions

1. aggregate demand
2. real wealth
3. real money supply
4. aggregate supply curve
5. maximum capacity
6. wage-price spiral
7. wage and price controls
8. supply shock
9. stagflation
10. inflationary expectations
11. demand-push inflation
12. (In Appendix) real business cycle theory
13. (In Appendix) rational expectations school
14. (In Appendix) neoclassical synthesis
15. (In Appendix) New Keynesian macroeconomics
16. (In Appendix) Post-Keynesian macroeconomics
17. False. There will be some unemployment (transitory unemployment) at the full employment range of output, but not enough unemployment to be considered a problem.
18. True.
19. False. Though there seems to be an inverse relationship between unemployment rate and inflation rate as suggested by the Phillips curve, this is not always true. During the 1970s, the United States experienced both high inflation and high unemployment (stagflation).
20. False. It is the combination of stagnation and inflation.
21. True.
22. The AD curve is downward sloping due to the Fed reaction rule: when inflation is rising, the Fed will raise interest rates, thereby lowering output, and vice versa when inflation is falling. Thus higher rates of inflation lead to lower rates of output, and vice versa. Other explanations for the downward sloping AD curve include real wealth effect (lower consumption due to a decline in the value of people's savings and wealth caused by inflation), real money supply effect (decline in real money supply, increase in interest rates and a decline in investment caused by inflation), and a decline in net exports due to an increase in the price of domestic goods.

23. The AD curve would shift with changes in: levels of government spending, taxation, autonomous consumption, autonomous investment, and net exports, and with a change in the Fed inflation rate target.
24. The five regions are: maximum capacity output, the wage price spiral, the full employment range of output, recession or recovering from recession, and deep recession where output is far below the full employment level and inflation starts to drop or may even be negative.
25. Because producers start to encounter bottlenecks in the supply of some of resources as they increase production, prices will rise in some sectors, leading to some aggregate increase in inflation.
26. The AS curve is flat in the recession range because the existence of unemployed resources produces no pressure for inflation to rise, and the stickiness of wages and prices (their tendency to be slow in adjusting downwards) produces little pressure for inflation to fall.
27. There is no immediate response to inflation in the short run, because it takes time for people to notice the higher inflation and to incorporate it into their contracts.
28. Shifts in the AS curve are caused by: changes in inflationary expectations, and supply shocks (whether beneficial or harmful) such as changes in the price of a key input, or changes in productivity.
29. The classical AS curve is perfectly vertical because the economy is always at its full employment equilibrium. If output falls below full employment equilibrium, unemployed workers would bid down wages, and the economy would thereby return to full employment. Likewise, if output were to rise above full employment equilibrium, workers would bid up wages, and the economy would again return to full employment.
30. The composition of spending entails both the types of goods and services produced, as well as the production methods used in generating GDP. Remember from our discussion in Chapter 1 that ‘what’ is produced and ‘how’ it is produced are central to understanding how the production process affects well-being.

31. The high inflation in 2021-2022 is likely to have been caused by the high government spending during the COVID-19 pandemic (outward shift in the AD curve) as well as the supply bottlenecks due to supply-chain problems (left and upward shift of the AS curve). This is shown in the figure below, where AD moves to the right from  $AD_0$  to  $AD_1$ , while AS shifts left from  $AS_0$  to  $AS_1$ , resulting in an equilibrium where inflation is high.

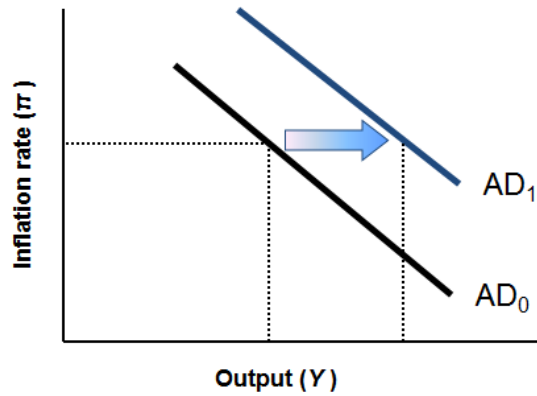


32. Some economists operating with a classical/Keynesian synthesis would see the differences merely as a matter of time. The New Keynesians would be among them, who would argue that it could take a significant amount of time to reach the long run full employment equilibrium. Post-Keynesians, on the other hand, would see a much more fundamental difference between the two approaches. Their starting point is not the rational, optimizing behavior of individuals and markets that are smoothly functioning. Rather, they see the economy as unstable and unpredictable, with individuals influenced by waves of optimism or pessimism.

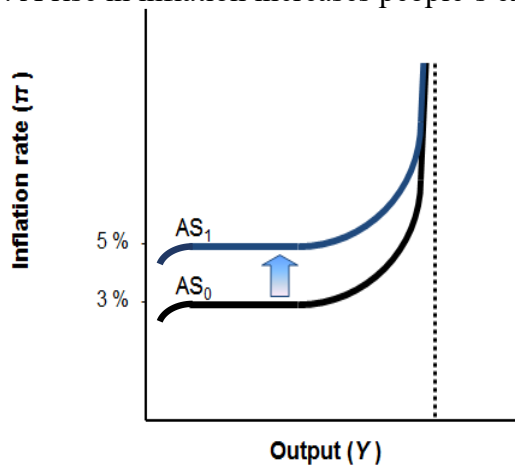
### Answers to Problems

1.
  - A: Inflation rate
  - B: Recession
  - C: Wage-Price Spiral
  - D: Aggregate Supply
  - E: Maximum Capacity
  - F: Output ( $Y$ )
  - G:  $Y^*$  (Full employment output range)
  - H: deep recession and decline in inflation

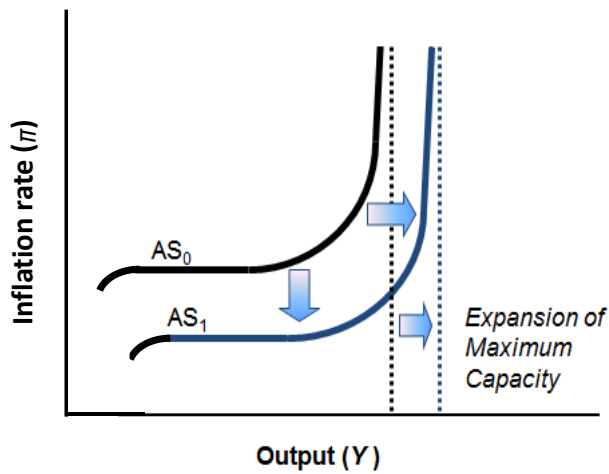
2.  
 a. Business confidence rises as firms expect an increase in GDP, sales, and profits.



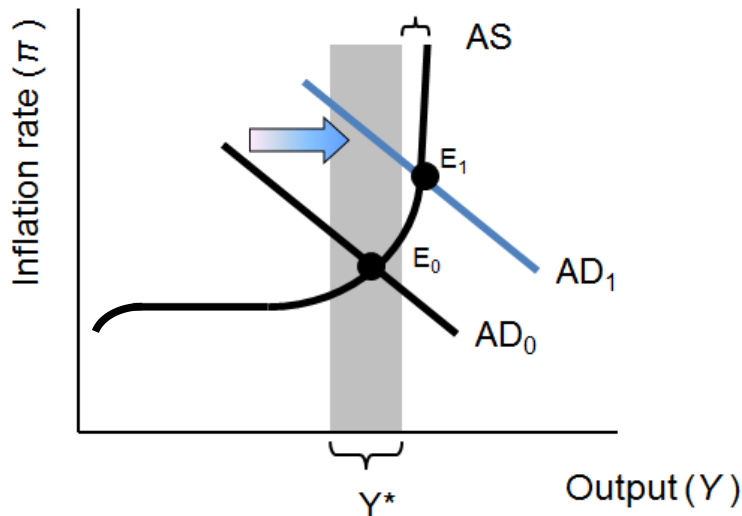
- 2b. A rise in inflation increases people's expectations of inflation in the medium run.



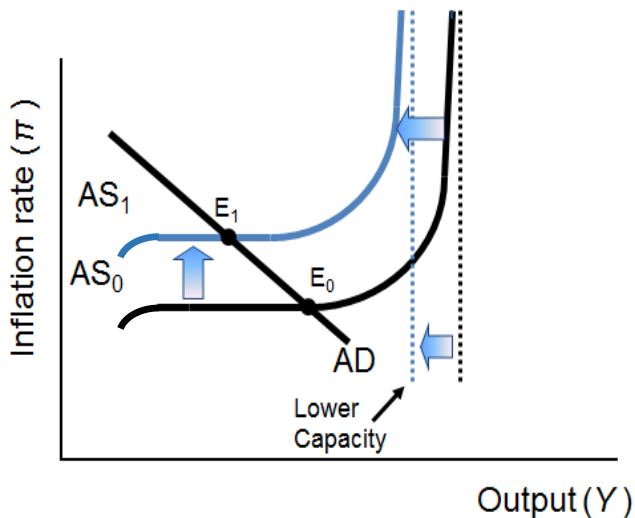
- 2c. The distribution of high speed internet to rural areas boosts productivity.



3a. Government spending for the Vietnam War during 1964-69 pushed up the rate of inflation from about 1% to 5% -- shown by an upward shift in the AD curve.



3b. In 1973-74, OPEC engaged in an oil embargo, causing an increase in oil prices. Inflation rose to above 9% in 1975, and the unemployment rate rose above 8% -- shown by an upward shift in the AS curve.

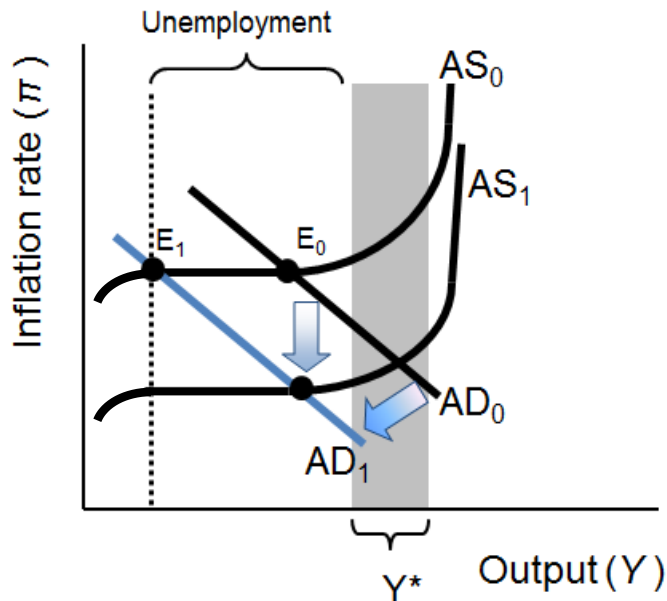


c. After another oil price shock in 1979, the Fed conducted a contractionary monetary policy (choosing a lower target inflation rate). Inflationary expectations fell. The

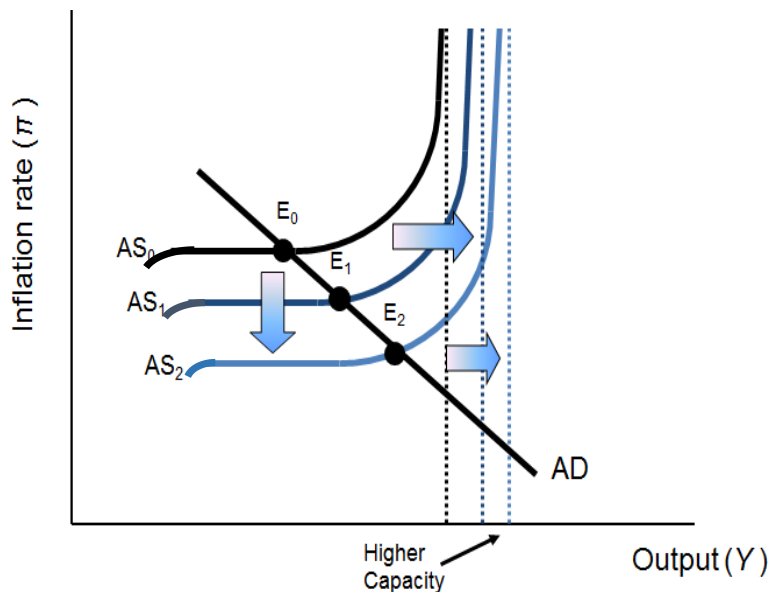
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unemployment rate rose to almost 10%, but inflation fell from 9% to 4% -- shown by a leftward shift in the AD curve combined with a downward shift in the AS curve.



d. The 1990s brought an era of innovation, increasing global competition, and weakened unions from years of anti-union government policies. By 1998, the unemployment rate was 4.4% and inflation was 1.6% -- continual beneficial supply shocks leading to a downward and rightward shift of the AS curve and the economy's maximum capacity.



## Answers to Self Test Questions

- |       |       |
|-------|-------|
| 1. E  | 11. D |
| 2. D  | 12. D |
| 3. E  | 13. C |
| 4. B  | 14. C |
| 5. D  | 15. B |
| 6. D  | 16. D |
| 7. C  | 17. E |
| 8. D  | 18. E |
| 9. D  | 19. D |
| 10. A | 20. E |