

## Objectives for Chapter 9 Aggregate Demand and Aggregate Supply

At the end of Chapter 9, you will be able to answer the following:

1. Explain what is meant by *aggregate demand*?
2. Name the four categories of aggregate demand?
3. Explain what will cause a movement along the aggregate demand curve?
4. Name as many factors as you can that will cause a shift in aggregate demand?
5. Define "*fiscal policy*" and "*monetary policy*".
6. Explain what is meant by *aggregate supply*? Draw the aggregate supply curve.
7. Explain what will cause a movement along the aggregate supply curve?
8. Name as many factors as you can that will cause a shift in aggregate supply?
9. Explain what is meant by "*macroeconomic equilibrium*"?
10. Explain what is meant by "*Potential Real GDP*" and by the "*GDP Gap*".
11. Explain what will result if there is an increase in aggregate demand.
12. Define "*demand inflation*" and "*expansion*".
13. Explain what will result if there is a decrease in aggregate demand.
14. Define "*recession*", "*depression*", "*deflation*", and "*disinflation*".
15. Explain what will result if there is a decrease in aggregate supply.
16. Explain what could cause such a decrease in aggregate supply?
17. Explain what a "*supply shock*" is?
18. Define "*stagflation*" (an "*inflationary recession*").
19. Explain what will result if there is an increase in aggregate supply.
20. Explain how the "*supply-side economists*" believe they can achieve an increase in aggregate supply?

## Chapter 9 Aggregate Demand and Aggregate Supply

(latest revision August 2004)

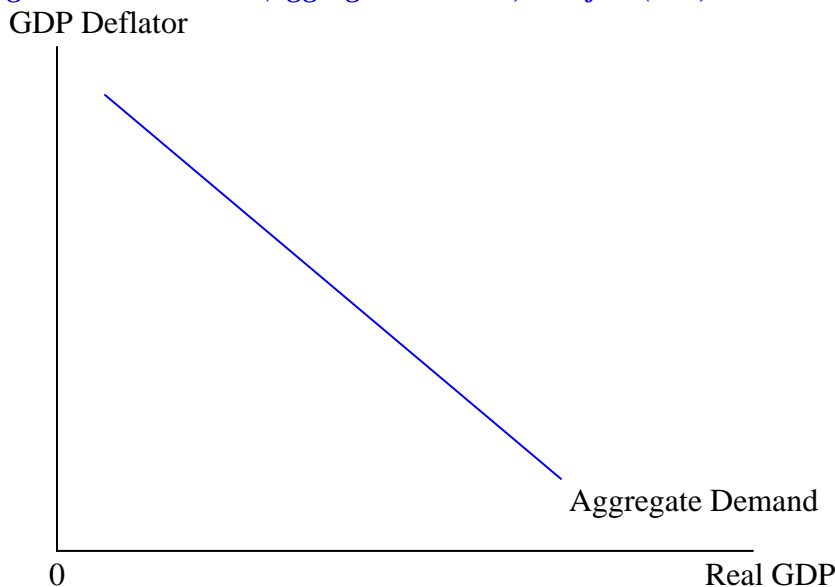
In the past few chapters, we have been analyzing the demand for and the supply of various goods and services. But macroeconomics is not about individual goods and services. Macroeconomics is about **aggregates**. As you learned in Chapter 1, the term “aggregates” refers to large groupings of goods and services or of people. So, in this chapter, we will begin our analysis of aggregate demand and aggregate supply.

**Aggregate demand** refers to the total demand for all goods and services produced in the United States. **Aggregate supply** refers to the total supply of all goods and services produced in the United States. These two concepts will be used continually throughout the remainder of the course.

When we analyzed the demand for and the supply of an individual good, we graphed the quantity of that good and the price of that good. Now, we are considering all goods and services. So, instead of the quantity of a particular good, we show the quantity of all goods and services produced in the United States. As you learned in Chapter 2, this quantity is measured by the **Real Gross Domestic Product (Real GDP)**. And, instead of the price of a particular good, we show the prices of all goods and services produced in the United States. As you learned in Chapter 4, these prices are measured by a price index called the **Gross Domestic Product Deflator (GDP Deflator)**. Go back to Chapters 2 and 4 to review these important concepts.

### 1. Aggregate Demand

Aggregate demand is the demand for all goods and services produced in the United States. The graph below shows the aggregate demand curve. The graph tells us that, as *the prices of all goods and services (the GDP Deflator) rise (fall), the demand for all goods and services (aggregate demand) will fall (rise)*.



Notice that the aggregate demand curve looks just like the demand curve for an individual product. This is convenient. But one does not follow from the other. **There are several reasons for the downward slope of the aggregate demand curve (that is, for the fact that people will buy fewer goods and services if the prices of all goods and services rise)**. Some of these reasons we will encounter later in the course. But two of the reasons have already been explained. *First, in Chapter 7, you learned that, if the prices of all goods and services rise in the United States, Americans will buy more imported products and foreigners will buy fewer American exports products. Both of these changes will reduce aggregate demand* (that is, the demand for goods and services produced in the United States). *Second, in Chapter 4, you learned that, as the prices of all goods and services rise (this is inflation), people whose wealth is in financial form are losers*. That is, those with checking accounts, savings accounts, CDs, bonds, bills, stocks, and so forth will see their assets go down in value. *If people become less wealthy, they are likely to spend less, causing aggregate demand to fall*. There are other reasons for the downward slope of the aggregate demand curve. These will be explained in future chapters.

The graph operates in the same manner as the graphs we have used earlier. What will cause a **movement along** the aggregate demand curve? The answer is a change in the **prices** of all goods and services produced in the United States (that is, in **the GDP Deflator**). What will cause a **shift** in the aggregate demand curve? The answer is a change in **anything other than the prices** of all goods and services produced in the United States. ***Remember that aggregate demand is divided into four categories: consumption, business investment spending, government purchases, and net exports.*** So, anything that affects any of these categories (other than prices) will cause the aggregate demand curve to shift. Remember that, if aggregate demand increases, the shift is to the **right** and if aggregate demand decreases, the shift is to the **left**.

In Chapter 14, we will consider many factors that will affect consumer spending. And in Chapter 15, we will consider many factors that affect business investment spending. In Chapter 7, we have already considered exchange rates. All of these factors will cause the aggregate demand curve to shift. But most of our focus in the course will be on **fiscal policy and monetary policy**. As you learned in Chapter 1, ***fiscal (government) policy involves changes in government spending and in the tax system.*** Government spending can involve either ***government purchases or government transfers***, such as Social Security. So, if the government purchases increase, perhaps for an increase in defense spending, aggregate demand increases. The aggregate demand curve would shift right. And if the government transfers increase, perhaps for an increase in social security payments, aggregate demand increases. Again, the aggregate demand curve would shift right. And if the government increases taxes, aggregate demand decreases. If the government takes the income from you, you cannot spend it. The aggregate demand curve would shift left. Also, as you learned in Chapter 1, ***monetary policy involves changes in the money supply (the number of dollars in existence)***. If the money supply increases, there are more dollars. Someone with those dollars would spend them. Aggregate demand would increase. The aggregate demand curve would shift to the right. If the money supply decreases, the aggregate demand curve shifts left. The agency responsible for changes in the money supply is called the ***Federal Reserve System (Fed)***. Money and the Federal Reserve System will be considered in detail in Chapter 21.

### Test Your Understanding

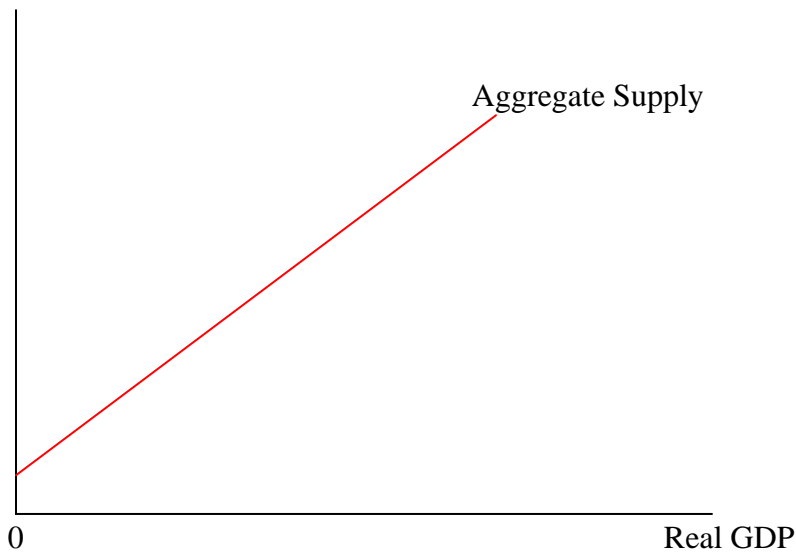
For each of the following, state whether there is a movement along or a shift in the aggregate demand curve. If there is a shift, is it to the right or left?

1. The Federal Reserve Decreases the Money Supply
2. Workers Receive Higher Wages
3. The American Dollar Depreciates
4. Taxes on Personal Incomes are Decreased
5. Taxes on Businesses are Increased
6. Government Purchases Decrease
7. Foreign Incomes Increase
8. The GDP Deflator Rises

## 2. Aggregate Supply

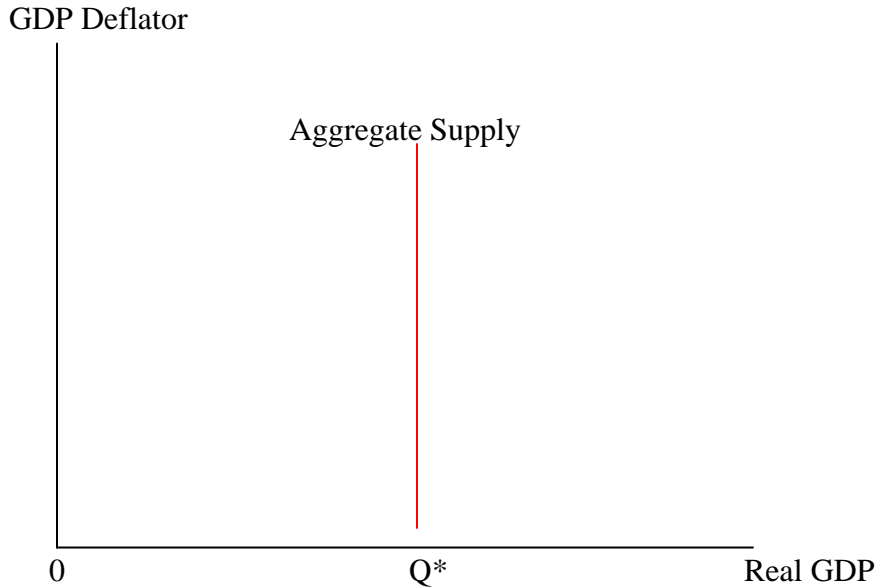
Aggregate supply refers to the supply of all goods and services produced in the United States. The graph below shows the aggregate supply curve. The graph tells us that, *as the prices of all goods and services (the GDP Deflator) rise (fall), the supply of all goods and services (aggregate supply) will rise (fall).*

GDP Deflator



Notice that this aggregate supply curve looks just like the supply curve for an individual product. Again, this is convenient. But, again, one does not follow from the other. *The reasons for the upward slope of the aggregate supply curve (that is, for the fact that companies will sell more of all goods and services if the prices of all goods and services rise)* will be explained in Chapter 22.

There is some disagreement about the shape of this aggregate supply curve. Some people believe that the aggregate supply curve is actually vertical, as shown below.



According to this graph, the quantity of all goods produced in the United States will be the same whether the prices of these goods rise or fall. The quantity that will remain unchanged ( $Q^*$ ) is the **Potential Real GDP**. As you learned in Chapter 2, *the Potential Real GDP is the amount of production necessary to have unemployment equal full-employment (the natural rate of unemployment)*. Today, we think this means the amount of production to generate enough jobs so that the unemployment rate is only 4%. Those who argue that the aggregate supply curve is vertical believe that the economy will always be able to maintain the Potential Real GDP (the economy will never experience a recessionary or inflationary gap). We will consider this argument later. But in this chapter, we will assume that the graph looks like the upward-sloping. With this graph, there is much we can explain.

The Aggregate Supply graph operates in the same manner as the other graphs. What will cause a **movement along** the aggregate supply curve? The answer is a change in the **prices** of all goods and services produced in the United States (that is, in **the GDP Deflator**). What will cause a **shift** in the aggregate supply curve? The answer is a change in **anything other than the prices** of all goods and services produced in the United States. In this course, we will focus on only one factor that will shift the aggregate supply curve --- a change in the costs of production. *Any change that increases costs of production will decrease aggregate supply, shifting the aggregate supply curve to the left. Any change that decreases costs of production will increase aggregate supply, shifting the aggregate supply curve to the right.*

### Test Your Understanding

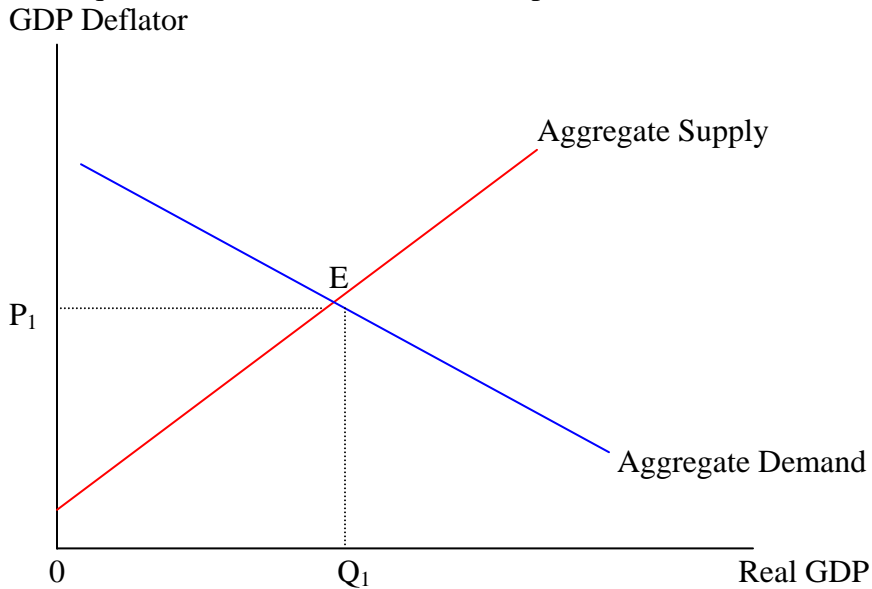
For each of the following, state whether there is a movement along or a shift in the aggregate supply curve. If there is a shift, is it to the right or left?

1. The Productivity of American Workers Increases at a More Rapid Rate
2. Workers Receive Higher Wages (Consider This Now as a Cost of Production)
3. An Increase in the Price of Oil, Which is Used in the Production of Most Products
4. A Government Subsidy to Business to Buy More Capital Goods

5. Government Regulations Which Raise Costs of Production to Businesses
6. A Depreciation of the Dollar (Which Affects the Prices of Imported Parts and Materials Used in Production)
7. An Increase in the GDP Deflator

### 3. Macroeconomic Equilibrium

Putting the aggregate demand and the aggregate supply curves together provides us with equilibrium, as it did for individual products. This is shown in the graph below.

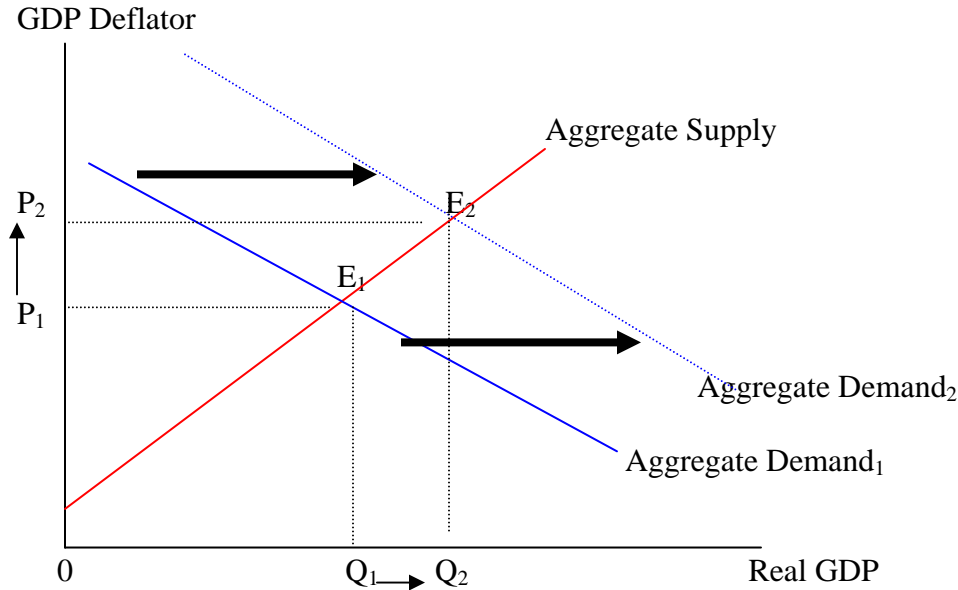


The behaviors of all buyers (aggregate demand) and the behaviors of all sellers (aggregate supply) have determined that the quantity (Real Gross Domestic Product) will be  $Q_1$  and that the price index (GDP Deflator) will be  $P_1$ . In 2003,  $Q_1$  would equal \$10,493 billion and  $P_1$  would equal 105.88. We know that both aggregate demand and aggregate supply can change. Each can increase and each can decrease. So there are four possibilities. Let us examine each in turn and use them to illustrate some recent American economic history.

### 4. Changes in Aggregate Demand or Aggregate Supply

#### Case 1: Aggregate Demand Increases

Let us assume that something occurs to cause aggregate demand to shift to the right (increase). This is shown in the graph below.



First, what happens to Real GDP if aggregate demand rises? As you can see, Real GDP rises. As you know from Chapter 3, a period in which Real GDP is rising is called *an expansion*. And during an expansion, unemployment falls. The increase in goods and services being produced and the reduction in unemployment are both good things. Second, what happens to prices (the GDP Deflator) if aggregate demand rises. As you can see, they rise. A rise in prices is, of course, called inflation. But since the cause was an increase in aggregate demand, we call this *“demand inflation”*. As you know from Chapter 4, inflation is a bad thing. So there is **a trade-off** involved; we gain the benefits of greater production and lower unemployment but bear the costs of higher inflation.

This situation is relevant to understanding several periods in recent American economic history. First, there is the period from 1964 to 1969. The increase in aggregate demand began with a tax decrease known as the **Kennedy Tax Cut of 1964** (to be discussed in Chapter 18). Then, there was a large increase in government purchases. This began with a series of government spending programs known as the **War on Poverty** in 1964. Then, there was a large increase in government spending on health care as **Medicare** was passed in 1965. Medicare provides health insurance coverage for people over age 65. Most significantly, there was a large increase in government spending as the **Vietnam War** spending rose significantly throughout the decade. As our graph shows, there was an expansion in this period. The expansion lasted 8 ½ years, which was the longest expansion in American history until the 1990s. Unemployment fell to a low of 3.2%, a rate that has not been achieved since. But as the graph also shows, the result was inflation. The period of steady inflation began in the decade of the 1960s.

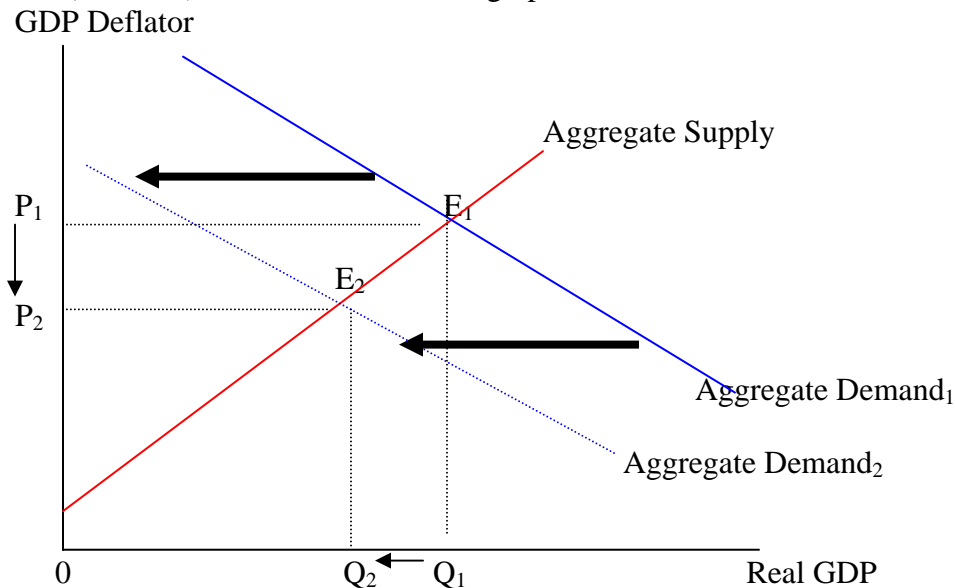
The period from 1982 to 1990 also illustrates the effects of an increase in aggregate demand. In this period, there was an increase in aggregate demand caused by the large increase in defense spending, by a major tax cut in 1981, and by an increase in the money supply by the Federal Reserve. The 1981 tax cut, under President Reagan, will be analyzed in some detail in Chapter 19. The increase in aggregate demand caused an expansion. Real GDP rose. Unemployment fell from over 10% in the fall of 1982 to a low of 5% in March of 1989. The Consumer Price Index (CPI) rose from 94.3 in January

of 1982 to 127.4 eight years later. (Go back to Chapter 4 to review the interpretation of the Consumer Price Index (CPI) numbers).

Finally, the ten-year period from 1991 to 2001 illustrates the effect of an increase in aggregate demand. Here, the major cause was an increase in the money supply and resulting low interest rates. The low interest rates caused business investment spending to greatly increase creating an expansion --- the longest in American history. Unemployment fell to a low of 3.9% in 2000. But again, there was inflation. The Consumer Price Index (CPI) rose again from 134.6 in January of 1991 to 172.2 at the end of 2000.

### Case 2: Decrease in Aggregate Demand

Now, let us assume that something occurs to cause aggregate demand to shift to the left (decrease). This is shown in the graph below.



First, what happens to Real GDP if aggregate demand decreases? As you can see, Real GDP falls. As you know from Chapter 3, a period in which Real GDP is falling is called **a recession**. And during a recession, unemployment rises. The decrease in goods and services being produced and the increase in unemployment are both bad things. Second, what happens to prices (the GDP Deflator) if aggregate demand decreases. As you can see, they fall. A fall in prices is called **deflation**. In Chapter 4, you learned that the United States has not experienced deflation over a full year since the 1950s. In reality, in this situation, we would see **disinflation** (not shown on the graph).

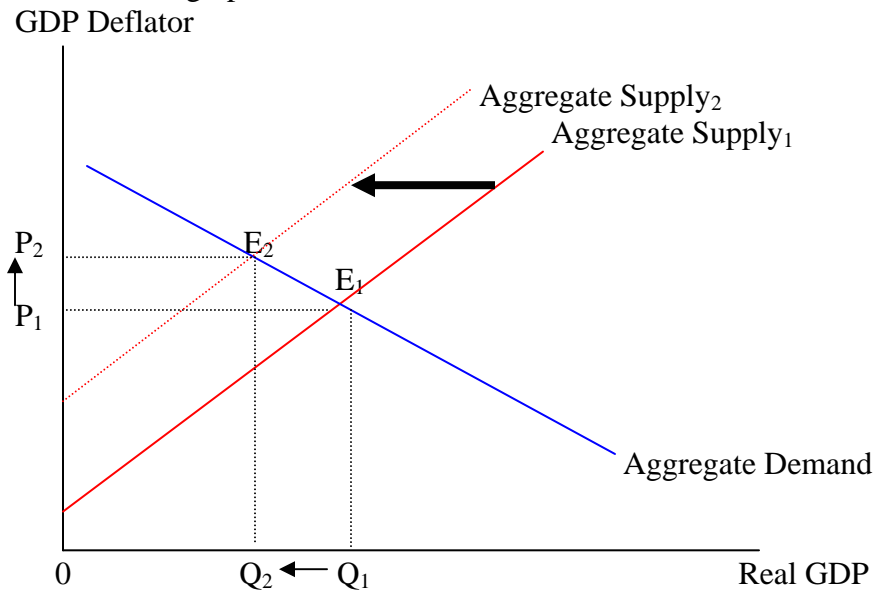
**Disinflation means that prices are still rising, but they are rising at a slower rate than previously.** If prices rise 4% one year and then rise 3% more the next year, we have disinflation. We will consider later why the country experiences disinflation, and not deflation, when aggregate demand falls. Both deflation and disinflation can be considered good. So once again, there is **a trade-off**. We gain the benefits of deflation or disinflation. But we must bear the burden of falling production and rising unemployment.

The graph on the previous page illustrates several periods in recent American history. From 1969 to 1971, from 1974 to 1976, and again from 1979 to 1982, aggregate demand fell due to a decrease in the money supply by the Federal Reserve. In all three periods, the Federal Reserve decreased the money supply in order to try to slow inflation. In all three periods, the Federal Reserve succeeded. The United States experienced disinflation each time. However, the United States also experience recession each time, with falling production and rising unemployment. Unemployment reached its postwar peak of over 10% in 1982. The graph also illustrates the period from 1990 to 1991. In this case, the decrease in aggregate demand was not caused by a decrease in the money supply. Instead, the causes were a decrease in consumer spending, as consumers found themselves heavily in debt, and a decrease in government spending on the military, as the Cold War came to an end. The decrease in spending on military equipment, bases, and personnel caused the 1990 recession to be particularly severe in southern California.

Finally, the graph illustrates the period from 2000 to 2001. In this case, aggregate demand fell because of a decline in business investment spending. We will consider this near the end of the course.

### Case 3: Decrease in Aggregate Supply

Now let us assume there is a shift of aggregate supply to the left (a decrease). This is shown in the graph below.



What happens to Real GDP if aggregate supply decreases? As you can see, Real GDP falls. As you know, a period in which Real GDP is falling is called *a recession*. During a recession, unemployment rises. The decrease in goods and services being produced and the increase in unemployment are both bad. What happens to prices (the GDP Deflator) if aggregate supply decreases. As you can see, they rise. A rise in prices is *inflation*. Why would aggregate supply decrease? As you saw earlier in this chapter, aggregate supply decreases when something occurs to increase the costs of production. Because this is so, the resulting inflation is called *“cost-inflation”*, to differentiate it from

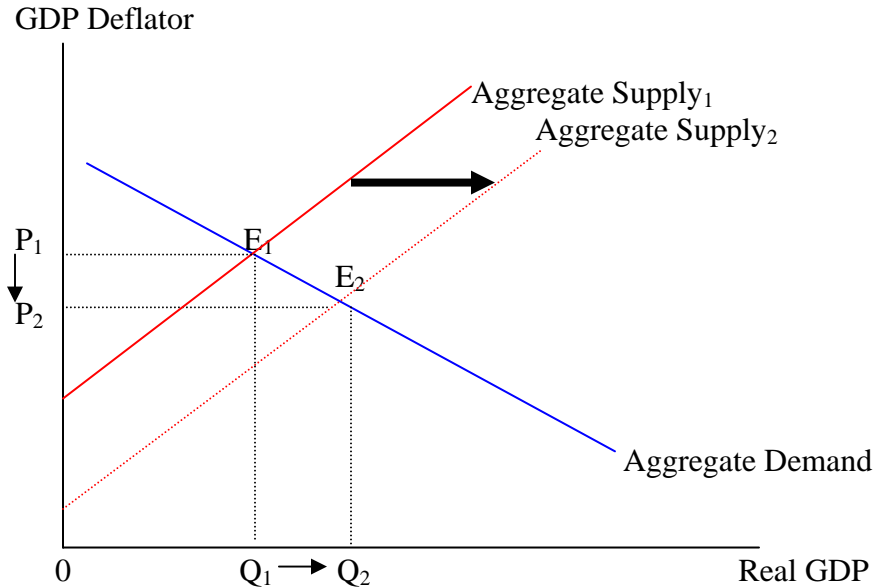
demand- inflation. Notice that there is no trade-off now. The decline in production is a bad thing. The rise in unemployment is a bad thing. The rise in prices is a bad thing. This is a “Murphy’s Law” situation: everything that could go wrong did go wrong. **A period with both recession and cost-inflation together is called *stagflation* (a combination of the words *stagnation* and *inflation*).**

There were two important periods in recent American economic history that illustrate this graph. One began in 1973. The other began in 1979. In both cases, **aggregate supply shifted to the left because of a large increase in costs of production caused by increases in the price of oil.** In the 1973 period, oil prices rose from about \$4 per barrel to about \$14.50 per barrel in a little over one year. (A barrel of oil is 42 gallons.) In the 1979 period, oil prices rose from the \$14.50 per barrel to almost \$40 per barrel, before settling in at around \$28 per barrel. This meant that oil prices in 1980 were seven times what they had been at the beginning of 1973. As oil is involved in the costs of so many products, these costs rose greatly. (Oil is used in power generation, in all transportation, in the development of plastic materials, and so forth.) Because the costs of production rose greatly, consumer prices also rose greatly (as high as 13 1/2 % per year by 1980). Since the price rises were shocking, and since it was a decrease in aggregate supply that caused them, they came to be called ***supply shocks***. In both periods, the supply shocks caused stagflation. The United States went through both a severe recession and a severe inflation in each period. Both periods led up to elections in which the incumbent President was defeated (Ford in 1976 and Carter in 1980). Oil prices rose dramatically again in 2000 and 2003. By the time of this writing (August 2004), a barrel of oil had risen to about \$45 (up from under \$20 two years earlier). Some people fear another round of stagflation in 2004. This remains to be seen.

#### Case 4: An Increase in Aggregate Supply

Finally, let us assume there is a shift of aggregate supply to the right (an increase). This is shown in the graph on the next page.

What happens to Real GDP if aggregate supply increases? As you can see, Real GDP increases. As you know, a period in which Real GDP is increasing is called **an *expansion***. During an expansion, unemployment falls. The increase in goods and services being produced and the decrease in unemployment are both good things. What happens to prices (the GDP Deflator) if aggregate supply increases. As you can see, they decrease. A decrease in prices is ***deflation*** (in reality, we would most likely see ***disinflation***). This is a “win-win” situation. The rise in production, the fall in unemployment, and the decline in inflation rates are all good things.



What would make aggregate supply increase? We would like to know, as the results of an increase in aggregate supply are all good. *The answer is that aggregate supply increases if something happens to make the costs of production decrease.* This graph likely characterizes the period from 1995 to 2000 and again from late 2001 to the present. In this period, aggregate supply has been rising because of a large increase in the productivity of workers. We will consider this increase near the end of the course.

Generally, we do not know how to use public policy to make costs of production decrease more than a little. However, various groups have had proposals that they believe would make aggregate supply increase significantly. One group, known as *supply side economists*, focused on the effects of reducing tax rates on increasing aggregate supply. This group was most associated with President Reagan, but has also been associated with both Bush presidencies. We will explain and evaluate these proposals in Chapter 19. President Clinton also had many proposals to increase aggregate supply significantly. These involved reforms of the educational system, improved worker training, and so forth. We will explain and evaluate his proposals in Chapter 27.

### Test Your Understanding

1. In Mexico in 1982, prices were rising very rapidly. On the graph, show aggregate demand, short-run aggregate supply, and the equilibrium Real GDP and GDP Deflator.
  - a. The government of Mexico responded to the problem with a program. First, it significantly **reduced government spending**. Second, it **raised taxes**. And third, it **decreased the money supply**. Show the result of these three changes on the graph. Since all three of these changes have the same effect, you may show them as only one change. As a result of these policies, what happened to Real GDP in Mexico? What happened to the GDP Deflator?
  - b. Another part of the government's program was to **create a large depreciation of the Mexican peso**. On the graph, draw the original situation again. Then, draw the changes caused by the depreciation of the peso. There will be **both** a change in aggregate demand and also a change in aggregate supply. Draw both. Assume, as actually was the case, that **the shift in aggregate supply was the larger shift**. As a result of this depreciation of the peso, what happened to Real GDP in Mexico? What happened to the GDP Deflator?

- c. Yet a final part of the government's program was to **reduce wages**. In the graph, again draw the original situation. Then, show the results of reducing wages. There will be changes in **both** aggregate demand and also in short-run aggregate supply. Draw both. Assume, as actually happened, that **the shift in aggregate demand was the larger shift** in this case. What happened to the Mexican Real GDP from this policy of decreasing wages? to the GDP Deflator?
- d. Write a very brief conclusion: from these policies, what can you conclude would happen to the Mexican economy?

### Practice Quiz for Chapter 9

- The aggregate demand curve slopes:
  - horizontally
  - vertically
  - down and to the right
  - up and to the right
- Which of the following would cause a **movement along** the aggregate demand curve?
  - an increase in government spending
  - an increase in the money supply
  - depreciation of the American dollar
  - an increase in the GDP Deflator
- Which of the following would cause the **aggregate demand curve** to shift to the **right**?
  - an increase in government spending
  - an increase in the money supply
  - depreciation of the American dollar
  - all of the above
- The **aggregate supply curve** is:
  - horizontal
  - vertical
  - upward-sloping
  - downward-sloping
- Which of the following would cause the **aggregate supply curve** to shift to the **right**?
  - an increase in wages paid to workers
  - productivity increases which lower costs of production
  - depreciation of the American dollar which increases the costs of imported materials
  - all of the above
- Assume that something occurs to cause **aggregate demand to increase**. Which of the following should result?
  - expansion and inflation
  - recession and deflation
  - recession and inflation
  - expansion and deflation
- Assume that something occurs to cause **aggregate demand to decrease**. Which of the following should result?
  - expansion and inflation
  - recession and deflation
  - recession and inflation
  - expansion and deflation
- Assume that something occurs to cause **aggregate supply to decrease**. Which of the following should result?
  - expansion and inflation
  - recession and deflation
  - recession and inflation
  - expansion and deflation
- Assume that something occurs to cause **aggregate supply to increase**. Which of the following should result?
  - expansion and inflation
  - recession and deflation
  - recession and inflation
  - expansion and deflation
- Stagflation** is a combination of:
  - expansion and inflation
  - recession and deflation
  - recession and inflation
  - expansion and deflation

Answers: 1. C 2. D 3. D 4. C 5. B 6. A 7. B 8. C 9. D 10. C