

Chapter 4

Introduction to Macroeconomics

Chapter Summary

1. Macroeconomics analyzes the economy as a whole, while microeconomics analyzes individual components of the economy. Topics in macroeconomics include the economy's level of output and employment, the price level, and the balance of payments. Topics in microeconomics include decision making by an individual, the theory of the firm, the allocation of economic resources, market structures, and price determination.
2. Three frequently used measures of aggregate output are nominal GDP, real GDP, and potential GDP. Nominal GDP measures the market value of all final goods and services produced in the domestic economy at current prices. Real GDP also measures the value of all final output in the domestic economy but with prices held constant. Potential GDP is the maximum output that can be produced in the domestic economy without putting upward pressure on the price level.
3. The GDP gap is the difference between potential GDP and real GDP. A positive GDP gap exists when real GDP falls below potential GDP. A negative GDP gap exists when real GDP exceeds potential GDP.
4. Aggregate demand represents the collective spending of individuals, businesses, government, and net exports. The aggregate demand curve is inversely related to the price level, indicating that there is less aggregate spending at a higher price level. The aggregate demand curve shifts when variables other than the price level change.
5. Aggregate supply is the collective quantity supplied by all producers. Three aggregate supply curves are presented: (1) a curve which is positively sloped, indicating that larger quantities are supplied at a higher price level; (2) a Keynesian aggregate supply curve, on which increasing quantities are supplied at a fixed price level until full-employment output is reached, at which time aggregate supply is positively sloped; and (3) a classical aggregate supply curve, which is vertical at the full-employment level of output and quantity supplied has no relationship to the price level. The aggregate supply curve shifts when the quantity or price of economic resources changes or when there is a technological advance.
6. The equilibrium level of output exists at the point of intersection of aggregate supply and aggregate demand. Equilibrium changes whenever aggregate supply or aggregate demand shifts.
7. Economic activity is subject to economic fluctuations because of periodic decreases in aggregate demand. A business cycle is a cumulative fluctuation in aggregate output that lasts for two or more years. A peak marks the point at which economic activity stops increasing, and a trough marks the point at which economic activity stops decreasing.

Important Terms

Aggregate demand. A schedule or curve which depicts the total quantity of output that is demanded at various price levels.

Aggregate supply. A schedule or curve which depicts the total quantity of output that is supplied at various price levels.

Business cycles. Fluctuations in real GDP which recur and last for periods of two years or more.

Classical aggregate supply curve. An aggregate supply curve which is vertical at the full-employment level of output.

GDP gap. Potential GDP less real GDP.

Keynesian aggregate supply curve. An aggregate supply curve which is horizontal until the full-employment level of output, at which point it becomes positively sloped.

Macroeconomics. The study of the economy as a whole; individual units in the economy are combined and analyzed as an aggregate.

Microeconomics. The study of individual components of the economy, such as a household, a firm, and the price of a good or service.

Nominal GDP. The market value of all final goods and services produced in the domestic economy during a one-year period measured at current prices.

Peak. The point at which economic activity stops expanding and begins to decline.

Potential GDP. The maximum output a domestic economy can produce without putting upward pressure on the price level.

Real GDP. The market value of all final goods and services produced in the domestic economy during a one-year period measured with constant prices; real GDP is nominal GDP corrected for inflation.

Recession. A period of time in which real GDP is declining.

Trough. The point at which economic activity stops declining and begins to increase.

Outline of Chapter 4: Introduction to Macroeconomics

4.1 Macroeconomics and Microeconomics

4.2 Gross Domestic Product

4.3 Aggregate Demand, Aggregate Supply, and Equilibrium Output

4.4 Changes in Aggregate Output

4.5 Business Cycles

4.1 MACROECONOMICS AND MICROECONOMICS

The study of economics is divided into two general fields: macroeconomics and microeconomics. *Macroeconomics* analyzes the economic behavior of the entire economy and major spending sectors: household consumption, business investment, government expenditures, and net exports (gross exports less gross imports). Macroeconomics focuses primarily on the level of output for the entire economy, the general level of prices, the rate of unemployment, and the economy's balance of payments. *Microeconomics* is concerned with the economic behavior of individual decision-making units in a free-enterprise market system, analyzing how an individual consumer spends income to maximize satisfaction, how a business firm combines economic resources to maximize profits, how the price of each resource is determined, and how price is determined in diverse market structures.

4.2 GROSS DOMESTIC PRODUCT

Gross domestic product (GDP) measures total output in the domestic economy. Nominal GDP, real GDP, and potential GDP are three different measures of aggregate output. *Nominal GDP* is the market value of all final goods and services produced in the domestic economy in a one-year period *at current prices*. By this definition, (1) only output exchanged in a market is included (do-it-yourself services such

as cleaning your own room are not included); (2) output is valued in its final form (output is in its final form when no further alteration is made to the good which would change its market value); and (3) output is measured using current-year prices. Because nominal GDP values are inflated by prices that change over time, aggregate output is also measured holding the prices of all goods and services constant over time. This valuation of GDP *at constant prices* is called *real GDP*. The third measure of aggregate output is *potential GDP* (trend GDP), the maximum production that can take place in the domestic economy without putting upward pressure on the general level of prices. Conceptually, potential GDP represents a point on a given production-possibility frontier.

Real GDP and potential GDP for the U.S. economy are plotted in Fig. 4-1 for the period 1960 through 1992. Note that the U.S. economy's potential output increases at a fairly steady rate each year while actual real GDP fluctuates around potential GDP. These fluctuations of real GDP are identified as business cycles and are discussed in Section 4.5. The GDP gap is the difference between potential GDP and real GDP; it is positive when potential GDP exceeds real GDP and negative when real GDP exceeds potential GDP. A positive gap indicates that there are unemployed resources and the economy is operating inefficiently within its production-possibility frontier. It therefore follows that an economy's rate of unemployment rises as its GDP gap increases, and falls when the gap declines. An economy is operating above its normal productive capacity when there is a negative gap. The economy's price level rises when a negative gap develops.

EXAMPLE 4.1. Figure 4-1 presents real and potential GDP for the U.S. economy from 1960 through 1992. Potential GDP increases annually, reflecting greater productive capability and therefore outward shifts of the economy's production-possibility frontier. Although real GDP usually increases each year, there are years when it actually decreases. For example, from 1981 to 1982, real GDP decreased from \$3843.1 billion to \$3760.3 billion, while potential GDP increased from \$3971.8 billion to \$4062.3 billion. The GDP gap is \$128.7 billion in 1981 (real GDP is already below potential GDP), and it increases to \$302.0 billion in 1982 as aggregate economic output in the U.S. economy decreases and potential output increases. Real GDP increases more rapidly than potential GDP beginning in 1983, and it exceeds potential GDP by 1988. The resulting negative GDP gap in 1988 causes upward pressure on the U.S. price level; the U.S. inflation rate increases from 1.9% in 1986 to 4.8% in 1989. The U.S. economy slips into a recession in 1990; real GDP falls below potential GDP during 1991.

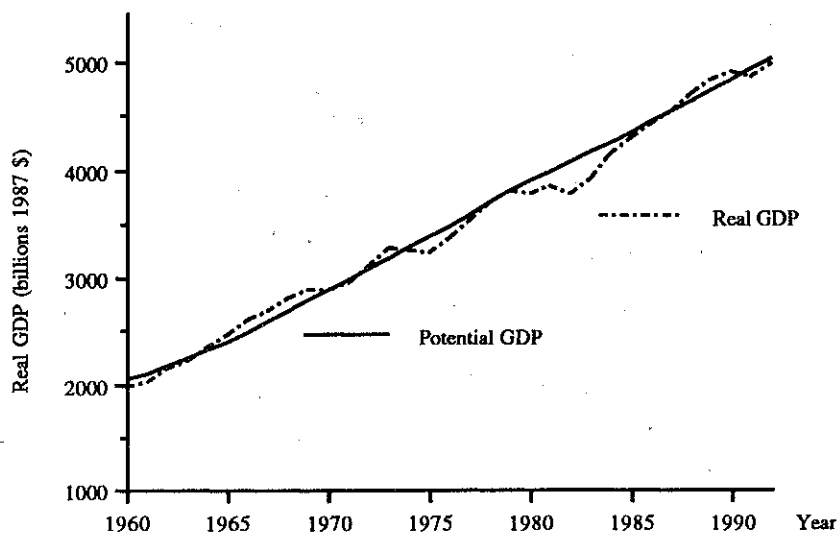


Fig. 4-1

EXAMPLE 4.2. The GDP gap and the unemployment rate for the United States are plotted in Fig. 4-2 for the period 1960 through 1992. Note how well the unemployment rate relates to the GDP gap. For example, the rise in the GDP gap from \$128.7 billion in 1981 to \$302.0 billion in 1982 is associated with an increase in the unemployment rate, from 7.6% to 9.7%. The unemployment rate declines after 1982 as the GDP gap narrows and reaches zero in 1987. This close relationship of the GDP gap and unemployment rate is not surprising, since increases

in the GDP gap indicate that the economy is moving away from full employment, and decreases in the GDP gap indicate that the economy is moving toward its production-possibility frontier and efficient use of its resources.

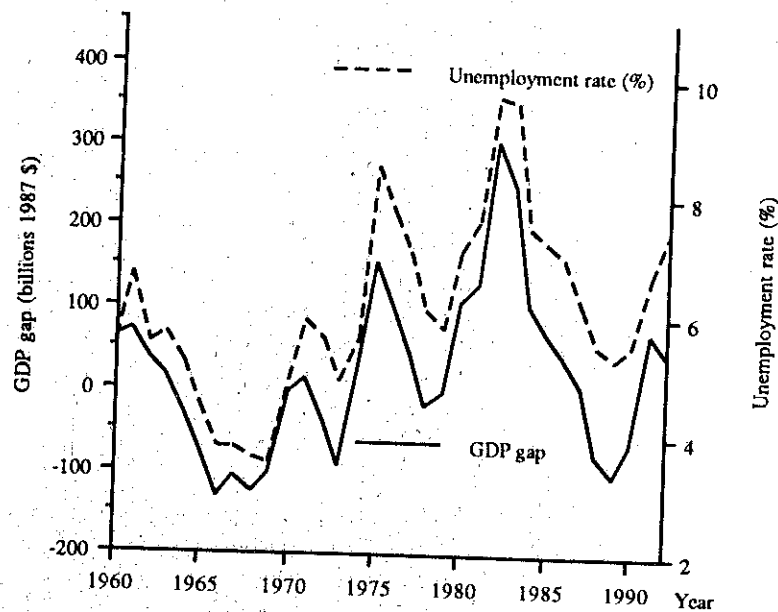


Fig. 4-2

4.3 AGGREGATE DEMAND, AGGREGATE SUPPLY, AND EQUILIBRIUM OUTPUT

The economy's equilibrium level of output occurs at the point of intersection of aggregate supply and aggregate demand. The concept of equilibrium developed in Chapter 3 is used in both macroeconomics and microeconomics. In microeconomics, equilibrium price exists where quantity demanded equals quantity supplied. The supply and demand schedules in macroeconomics differ from those in Chapter 3 in that they relate the aggregate quantity supplied and the aggregate quantity demanded to the price level.

AGGREGATE DEMAND

An aggregate demand curve represents the collective spending of consumers, businesses, and government, as well as net foreign purchases of goods and services, at different price levels. An aggregate demand curve, like the demand curve in microeconomics, is negatively related to price, holding constant other factors that influence aggregate spending decisions. Price, presented as the *price level* in macroeconomics, affects aggregate spending because of an interest rate effect, a wealth effect, and an international purchasing power effect. The *interest rate effect* traces the effect that interest rate levels have upon aggregate spending. The nominal rate of interest is directly related to the price level, *ceteris paribus*. Increases in the price level push up the nominal rate of interest. Rising interest rates usually will depress interest-sensitive spending. The *wealth effect* relates changes in wealth to changes in aggregate spending. The market value of many financial assets falls as the price level and interest rates increase. A higher price level will decrease the household sector's net wealth, lower consumer spending, and cause a lower level of aggregate spending. A country's imports and exports are also affected by a changing price level, i.e., by an *international purchasing power effect*. When the price level increases in the home country and is unchanged in foreign countries, foreign-made commodities become relatively less expensive, the home country's exports fall, its imports increase, and there is less aggregate spending on the home country's output.

An aggregate demand curve shifts when there is a change in a variable (other than price) that affects aggregate spending decisions. Outward shifts (shifts outward to the right) occur when consumers become more willing to spend or there are increases in investment spending, government expenditures, and net exports.

EXAMPLE 4.3. Aggregate demand increases (the aggregate demand curve shifts outward) as a result of the following events:

Consumer spending increases when (1) taxes are reduced and consumers are able to increase spending as a result of a higher level of disposable income; (2) consumers become more confident and are more willing to spend current disposable income or more willing to borrow to finance increased spending.

Investment spending increases when (1) new technology is developed and firms place orders for more technically advanced equipment; (2) government lowers corporate income tax rates, which increases corporate profits and generates larger cash flows which firms can use to expand their productive capacity; (3) firms are optimally using their existing plant capacity, and equipment additions become necessary to meet expanding sales; or (4) interest rates decline as a result of an easier monetary policy.

Government spending increases when Congress passes legislation authorizing new spending programs and this legislation is signed by the President.

Net exports increase when (1) the U.S. dollar depreciates and U.S.-produced goods become relatively less expensive in the world market while foreign-made goods become relatively more expensive in the United States; or (2) foreign countries purchase more U.S.-made goods as a result of an increase in their economy's level of economic activity.

AGGREGATE SUPPLY

An aggregate supply schedule depicts the relationship of aggregate output and the price level, holding constant other variables that could affect supply. There is no agreement among economists on the shape of the aggregate supply curve. It is customary to present three distinct aggregate supply curves to characterize this disagreement. The *Keynesian aggregate supply curve*, depicted in Fig. 4-3 as AS, is *horizontal* until it reaches the economy's full-employment level of output, at which point it becomes *positively sloped*. Figure 4-4 presents a positively sloped aggregate supply curve. Note for curve AS' that as aggregate output approaches the full-employment level y_f , increased output is associated with larger and larger increases in the price level. The *classical aggregate supply curve*, presented in Fig. 4-5, is *vertical*, indicating that there is no relationship between aggregate output and the price level.

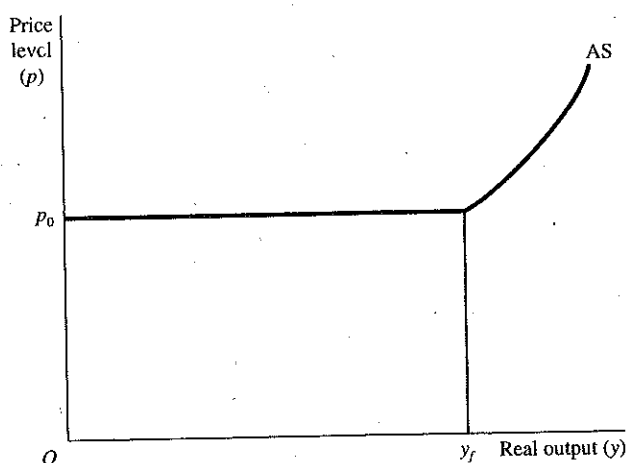


Fig. 4-3

EXAMPLE 4.4. Changes in resource availability, resource cost, and technology shift the aggregate supply curve. Aggregate supply curve AS' shifts rightward to AS'' in Fig. 4-4 when (1) improved technology increases the potential output of a given quantity of resources; (2) the quantity of economic resources increases; or (3) the cost of resources declines.

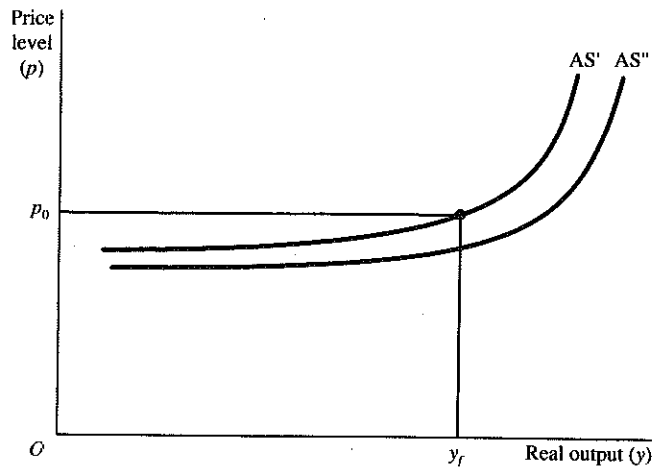


Fig. 4-4

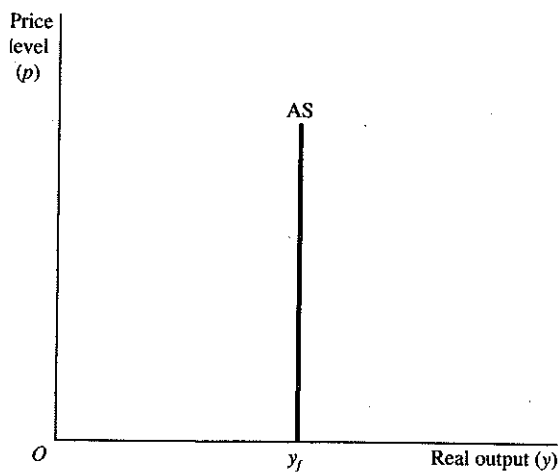


Fig. 4-5

4.4 CHANGES IN AGGREGATE OUTPUT

The effect of changes in aggregate demand and/or aggregate supply upon equilibrium output and the price level depends upon the shape of the aggregate supply curve. With a *Keynesian aggregate supply curve*, an increase in aggregate demand affects only output as long as the economy is below full-employment output, whereas an increase in aggregate supply has no effect upon either the price level or output when aggregate demand intersects aggregate supply in the horizontal portion of the curve (see Example 4.5). Increases in aggregate demand and/or aggregate supply affect both the price level and real output when aggregate supply is *positively sloped*. An increase in aggregate demand increases both the price level and real output for a positively sloped aggregate supply curve, while output increases and the price level falls when there is an increase in aggregate supply (see Example 4.6). For a *classical aggregate supply curve*, increases in aggregate demand result in only a higher price level, whereas increases in aggregate supply result in a higher level of output and a lower price level (Example 4.7).



EXAMPLE 4.5. Equilibrium real output is y_1 and the price level is p_1 for aggregate supply and aggregate demand curves AS' and AD' in Fig. 4-6. Increased government spending shifts the aggregate demand curve outward to AD'' , and the point of equilibrium changes from E_1 to E_2 . Since the intersection of aggregate supply and aggregate demand remains in the horizontal portion of the aggregate supply curve, equilibrium output increases from y_1 to y_2 with no

change in price level p_1 . If the quantity of resources increases, the aggregate supply curve shifts outward to AS'' ; the horizontal portion of the aggregate supply curve is elongated and there is no change in either equilibrium output or the price level.

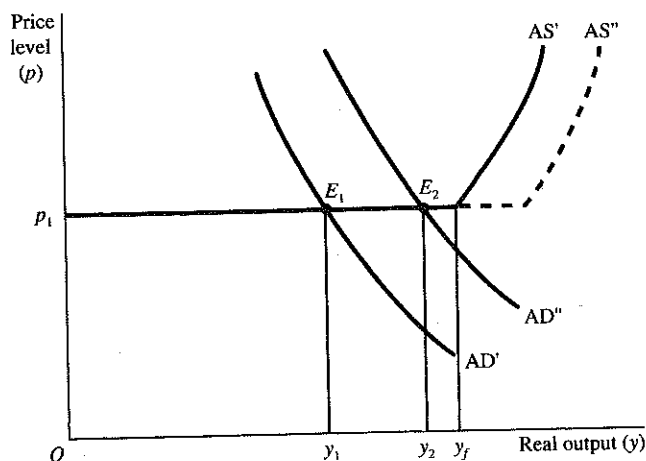


Fig. 4-6



EXAMPLE 4.6. Equilibrium real output is y_1 and the price level is p_1 for aggregate supply and aggregate demand curves AS' and AD' in Fig. 4-7. Increased government spending shifts the aggregate demand curve outward to AD'' , and the point of equilibrium changes from E_1 to E_2 ; equilibrium output increases from y_1 to y_2 as the price level rises from p_1 to p_2 . When aggregate supply increases to AS'' and aggregate demand remains at AD' , the equilibrium point changes from E_1 to E_3 ; equilibrium output increases from y_1 to y_2 and the price level falls from p_1 to p_0 .



EXAMPLE 4.7. Equilibrium real output is y_1 and the price level is p_1 for aggregate supply and aggregate demand curves AS' and AD' in Fig. 4-8. Increased government spending shifts the aggregate demand curve outward to AD'' , and the point of equilibrium changes from E_1 to E_2 . Since the aggregate supply curve is vertical, there is no change in equilibrium output and the price level rises from p_1 to p_2 . An increase in aggregate supply to AS'' , with no change in aggregate demand AD' , expands equilibrium output and reduces the price level as the point of equilibrium changes from E_1 to E_3 .

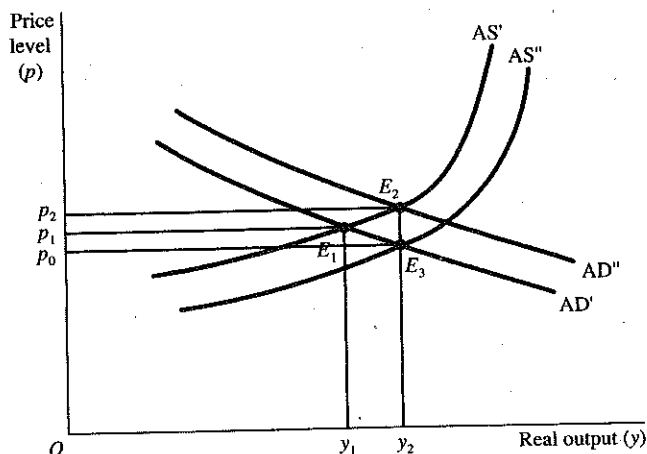


Fig. 4-7

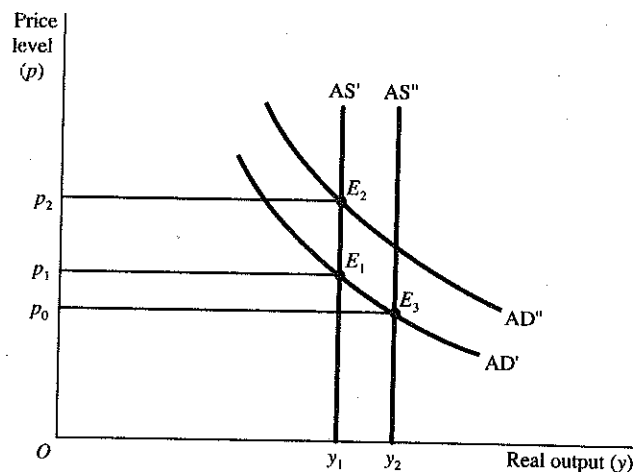


Fig. 4-8

4.5 BUSINESS CYCLES

A business cycle is a cumulative fluctuation in aggregate output that lasts for several years. Although recurrent, the duration and intensity of each fluctuation varies, and the impact of each cycle is widely diffused among a wide array of businesses. Points at which aggregate output changes direction are marked by peaks and troughs. A *peak* is a point which marks the end of economic expansion (rising aggregate output) and the beginning of a recession (decline in economic activity). A *trough* marks the end of a recession and the beginning of economic recovery. The time span between troughs and peaks is classified as an expansionary period (trough to peak) or a contractionary period (peak to trough). Peaks and troughs for the U.S. economy are presented in Table 4-1 along with the length of each expansionary and contractionary period.

Table 4-1 Peaks and Troughs for the U.S. Economy, 1961-1991

Trough	Peak	Trough	Expansionary Period (Trough to Peak)	Contractionary Period (Peak to Trough)
2/61	12/69	11/70	94 months	11 months
11/70	11/73	3/75	36 months	16 months
3/75	1/80	7/80	58 months	6 months
7/80	7/81	11/82	12 months	16 months
11/82	7/90	3/91	93 months	9 months

SOURCE: *Survey of Current Business*

EXAMPLE 4.8. The cyclical behavior of the U.S. economy from 1974 through 1993 is presented in Fig. 4-9. A recession began in November 1973 and continued until the March 1975 trough. Note that during this period real GDP was declining. An expansionary period followed and real GDP expanded through 1979. Note that during the expansionary period, real GDP increases fairly rapidly after the end of the recession and increases at a much slower rate in the latter phase of the expansionary period. A short six-month recession occurs in 1980 and is followed by a weak expansionary period which ends in July 1981. The 1981-1982 recession displays an uneven but decidedly downward movement of real GDP, followed by economic recovery after November 1982. The 1990-1991 recession began in July 1990 and ended in March 1991.

There are a number of explanations for the cyclical behavior of aggregate output. The central focus of many of these theories is investment spending and consumer purchase of durable goods (goods such as automobiles). No one theory of investment spending or consumer purchase of durable goods is able to

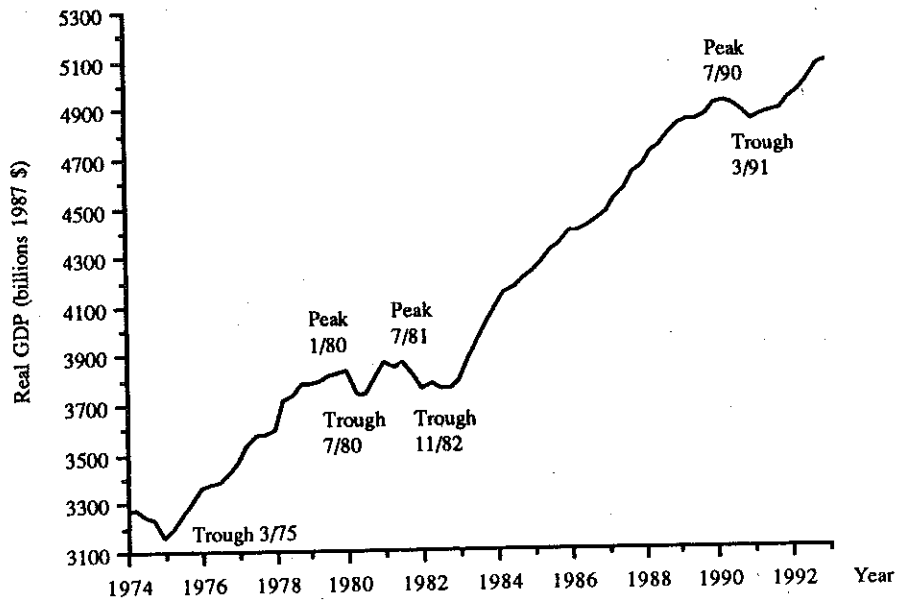


Fig. 4-9

explain why some business cycles are more severe than others. This suggests that there are numerous causes and that the importance of each cause varies over time.



EXAMPLE 4.9. Decreases in investment spending or consumer durable spending are viewed as the major cause of a decline in aggregate output. Suppose an economy's initial aggregate supply and aggregate demand curves are AS' and AD' in Fig. 4-10, and output is at the full-employment level y_f . A decrease in consumption and investment spending shifts aggregate demand to AD'' ; the equilibrium position changes from E_1 to E_2 ; output falls to y_1 ; and the economy is in a recession. *Consumer durable expenditures decline when* (1) government imposes higher taxes upon consumers; (2) consumers are less willing to spend because of a loss of confidence; (3) heavily indebted consumers are unable to borrow additional sums to purchase big-ticket items. *Business investment declines when* (1) government imposes higher taxes on businesses; (2) interest rates rise or businesses are less able to borrow to finance investment projects; (3) lenders are less willing to lend to businesses; (4) businesses no longer view capital additions as profitable.

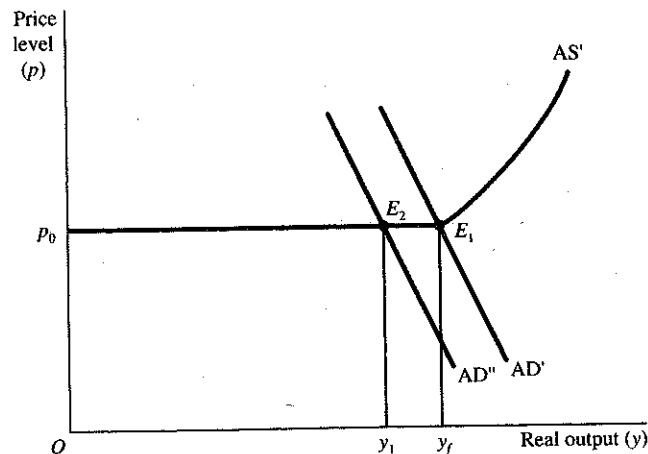


Fig. 4-10

Solved Problems

MACROECONOMICS AND MICROECONOMICS

- 4.1. Establish whether the following is a topic in macroeconomics or microeconomics.
- (a) A consumer must decide how to reallocate spending as a result of a 10% increase in the price of food and no change in disposable income.
 - (b) Purchases of durable goods fall as a result of deteriorating consumer confidence.
 - (c) Investment spending declines as a result of rising interest rates.
 - (d) A firm contemplates the purchase of more technologically efficient equipment as a result of a 20% increase in wages.
 - (e) A cut in federal income taxes is expected to increase consumer spending.
- (a) This is a topic in microeconomics since an individual consumer must restructure expenditures because of higher food prices.
- (b) This is a topic in macroeconomics because consumers, as a spending sector, decrease spending on durable goods as a result of increasing pessimism. This would be a topic in microeconomics if we analyzed how Individual A's pessimism affects her spending on various goods and services.
- (c) This is a topic in macroeconomics since we are considering the effect that rising interest rates have on total investment spending. This would be a topic in microeconomics if Corporation A was postponing capital spending plans because of rising interest rates.
- (d) This is a topic in microeconomics since it concerns one firm's decision about adding technologically efficient equipment.
- (e) This is a topic in macroeconomics since it considers the effect of lower taxes upon total consumer spending.

GROSS DOMESTIC PRODUCT

- 4.2. Does gross domestic product (GDP) measure the domestic output of all final goods and services?

There are a number of productive activities that do not involve a market transaction (e.g., do-it-yourself home repairs and the productive services of a homemaker). Since GDP includes only domestic output that involves a market exchange, such productive activities are not included; their exclusion results in an understatement of the total value of final output.

- 4.3. (a) Distinguish between a final good and an intermediate good.
- (b) Is a loaf of bread a final or an intermediate good? What about a bag of flour?
- (c) Why would inclusion of final and intermediate goods in measuring GDP involve double counting?
- (a) A *final good* is one that involves no further processing and is purchased for final use. An *intermediate good* is one that (1) involves further processing during the year, (2) is being purchased, modified, and then resold by the purchaser, or (3) is resold during the year for a profit.
- (b) Bread and flour could be either final or intermediate goods, depending upon the purchaser's use of the goods. For example, a loaf of bread is a final good when purchased by a household for consumption; it is an intermediate good when purchased by a luncheonette which resells the bread as part of a sandwich. Similarly, a bag of flour is a final good when purchased by a household for family use but an intermediate good when purchased by a baker.
- (c) Intermediate goods are components of final goods. If the value of intermediate and final goods were included in the measurement of the value of final output, there would be a double counting of value and an overstatement of GDP.

- 4.4. (a) What is the difference between nominal GDP, real GDP, and potential GDP?
- (b) Establish whether the following involve a change in nominal GDP, real GDP, or potential GDP: (1) More individuals who are 16 years of age or older want to work; (2) An increase in the price of oil results in an increase in the prices of a variety of goods and services whose production is energy-dependent; (3) An increase in consumer spending results in greater utilization of the economy's economic resources.
- (a) *Nominal GDP* (current dollar GDP) is the market value of final output measured at current prices, whereas *real GDP* (constant dollar GDP) measures final output with prices that prevailed in a specific year. *Potential GDP* measures the economy's capacity to produce at a point in time; potential GDP is a point on an economy's production-possibility frontier.
- (b) (1) Having greater economic resources (e.g., a larger number of people over age 16 who want to work) translates into greater productive capacity. There is an increase in the economy's potential GDP and therefore an outward shift of the economy's production-possibility frontier. (2) The increase in the price of oil and oil-dependent goods and services results in an increase in the price level and therefore an increase in nominal GDP. (3) Increased consumer spending results in more output and therefore an increase in real GDP. Nominal GDP is also higher as a result of the increase in real GDP.
- 4.5. An economy's potential output is depicted by the production-possibility frontier in Fig. 4-11.

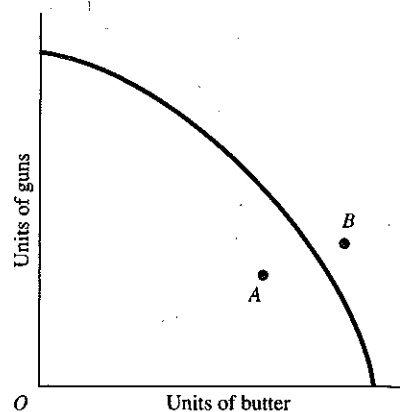


Fig. 4-11

- (a) Explain the relationship between potential GDP and real GDP when output is at point A.
- (b) What is a GDP gap?
- (c) Is there a GDP gap for the situation described in part (a)?
- (d) Can a GDP gap be negative?
- (a) Point A is within the economy's production-possibility frontier. Thus, actual output is less than the economy's ability to produce, i.e., real GDP is less than potential GDP.
- (b) A GDP gap exists when real GDP does not equal potential GDP. The GDP gap is measured by subtracting real GDP from potential GDP.
- (c) There is a positive GDP gap at point A since the economy's production of goods and services is below its ability to produce.
- (d) The production-possibility frontier and therefore potential GDP measures the economy's ability to produce goods and services *without* putting upward pressure on factor and output prices. The production-possibility frontier can therefore be exceeded, but in doing so there are increases in both output and the price level. Thus, a negative GDP gap can exist—real GDP can exceed potential GDP—when real GDP is, for example, at point B in Fig. 4-11 and the economy is producing beyond its natural full-employment level of output.

4.6. Potential GDP, real GDP, and the GDP gap are presented in Table 4-2 for a hypothetical economy for period 1:1 (year 1, quarter 1) through period 3:4.

- (a) Is this economy ever on its production-possibility frontier?
- (b) What is happening to labor's unemployment rate between periods 1:1 and 1:4? Between periods 3:1 and 3:4?
- (c) What is happening to the price level between periods 2:1 and 2:4?

Table 4-2
(in Billions of Constant Dollars)

Period	Potential GDP	Real GDP	GDP Gap
1:1	408.0	395.6	9.4
1:2	412.1	403.7	8.4
1:3	416.2	412.0	4.2
1:4	420.4	420.0	0.4
2:1	424.6	424.6	0.0
2:2	428.8	430.0	-1.2
2:3	433.1	436.1	-3.0
2:4	437.5	440.5	-3.0
3:1	441.8	440.5	1.3
3:2	446.2	436.1	10.1
3:3	450.7	433.9	16.8
3:4	455.2	433.4	21.8

- (a) Real GDP equals potential GDP during period 2:1. The economy is on its production-possibility frontier and there is full employment of economic resources.
- (b) There are unemployed labor resources from period 1:1 through period 1:4—real GDP is less than potential GDP. The declining GDP gap from period 1:1 to period 1:4 indicates that labor's unemployment rate is declining during these periods. Real GDP is again below potential GDP during periods 3:1 and 3:4. The rising GDP gap from period 3:1 through period 3:4 indicates an increasing unemployment rate.
- (c) Real GDP exceeds the economy's normal full-employment level of output from period 2:1 through period 2:4; the economy's price level is rising during these periods.

AGGREGATE DEMAND, AGGREGATE SUPPLY, AND EQUILIBRIUM OUTPUT

4.7. Aggregate demand and aggregate supply curves for a hypothetical economy are presented in Fig. 4-12. Full employment output exists at output y^* .

- (a) Find the economy's equilibrium level of output.
- (b) Is this economy producing on its production-possibility frontier? Is there a GDP gap?
- (a) The equilibrium level of output exists at y_1 where aggregate demand equals aggregate supply.
- (b) An economy is on its production-possibility frontier when there is full employment and real GDP equals potential GDP. This economy is producing within its production-possibility frontier since real GDP (y_1) is less than full-employment output (y^*). The GDP gap is the distance from y_1 to y^* , the amount by which potential GDP exceeds real GDP.

4.8. Aggregate demand is the sum of spending by individuals, businesses, and government, plus the net export of goods and services.

- (a) Explain why aggregate demand is inversely related to the price level, i.e., why aggregate spending decreases as the price level increases.

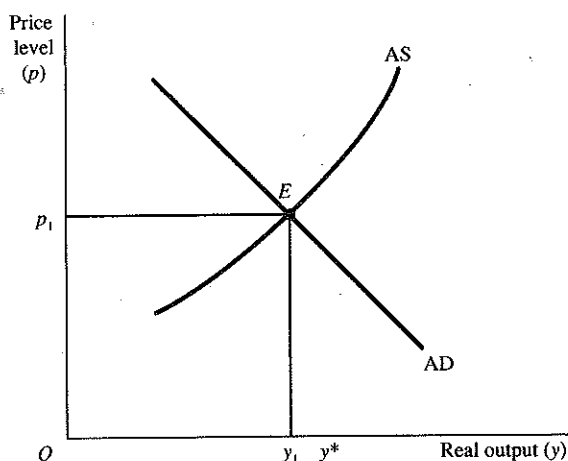


Fig. 4-12

- (b) What variables other than the price level can affect aggregate demand?
- (c) What happens to an aggregate demand curve when variables other than the price level change?
- (a) Consumer and business spending as well as net exports are inversely related to the price level. An increase in the price level, *ceteris paribus*, pushes up the nominal rate of interest. Because a higher interest rate negatively affects consumer purchases of durable goods (cars, etc.) and housing units and negatively affects business purchases of producers' durable goods and nonresidential structures, consumer and investment spending declines as the price level and the rate of interest increase. Higher interest rates, *ceteris paribus*, depress the market value of many financial assets and therefore the market value of consumer wealth; individuals therefore can be expected to spend less when a rising price level decreases consumer wealth. Also, an increase in the domestic price level, *ceteris paribus*, will depress net exports; a country will import more and export less when domestically produced commodities become more expensive relative to commodities produced in other countries.
- (b) Aggregate demand is affected by variables which influence spending units' ability and willingness to purchase goods and services. Ability is altered when the government changes the tax rate or the monetary authority changes the rate of interest. For example, a decrease in the personal or corporate income tax rate increases the ability of individuals or business units to consume and invest. An easing of monetary policy increases bank lending, lowers the rate of interest, and induces a higher level of consumption and investment. Willingness to purchase goods and services is affected by perceptions of job security, expectations about the future, and utilization of existing capacity. For example, individuals are less willing to consume when they become increasingly concerned about being laid off and/or they become increasingly uncertain about their future level of real disposable income. Businesses are less willing to add to their existing plant capacity when there is decreasing use of existing plant capacity and/or they expect a decrease in consumer spending.
- (c) Changes in individuals' and businesses' ability and/or willingness to spend shift the aggregate demand curve. An increased ability and/or willingness to spend shifts aggregate demand outward, whereas a decrease shifts aggregate demand inward.
- 4.9. (a) What is the difference between a Keynesian aggregate supply curve and a classical aggregate supply curve? Is the aggregate supply curve AS presented in Fig. 4-13 Keynesian or classical?
- (b) What happens to the economy's production-possibility frontier and the aggregate supply curve in Fig. 4-13 when there is a technological advance or an increase in the labor supply?
- (a) A classical aggregate supply curve is a vertical line at the full-employment level of output. A Keynesian aggregate supply curve has output increasing without any change in the price level until the economy reaches full employment, at which time aggregate supply becomes positively sloped. According to a Keynesian aggregate supply curve, output can be increased from a point within the production-

possibility frontier to a point on the production-possibility frontier without any increase in the price level. Output beyond the normal full-employment level (outside the production-possibility frontier) is achieved only by increases in the price level. A classical aggregate supply curve appears in Fig. 4-13.

- (b) A technological advance or an increase in the labor supply shifts the production-possibility frontier outward. Such an increase in the economy's productive capability is depicted by a parallel rightward shift of the classical aggregate supply curve in Fig. 4-13, from AS to AS'.

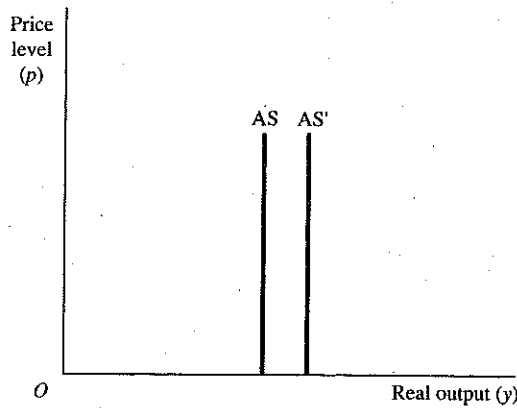


Fig. 4-13

4.10. A positively sloped aggregate supply curve appears in Fig. 4-14. Full employment exists at y^* .

- (a) How does this positively sloped aggregate supply curve differ from a Keynesian aggregate supply curve?
 - (b) What happens to the aggregate supply curve in Fig. 4-14 when (1) there is a substantial increase in the cost of raw materials, and (2) there is an increase in labor productivity?
- (a) The positively sloped aggregate supply curve in Fig. 4-14 shows that there are some increases in the price level as the economy moves from a point *within* the production-possibility frontier to a point *on* the production-possibility frontier, whereas a Keynesian aggregate supply curve shows a constant price level for such a movement. The Keynesian and positively sloped aggregate supply curves are both positively sloped for output levels beyond the full-employment level of output, y^* .
- (b) (1) The cost of supplying output increases when raw material costs rise; consequently, there is an inward shift of aggregate supply curve AS in Fig. 4-14. (2) Increases in labor productivity lower production costs and result in an outward shift of aggregate supply curve AS.

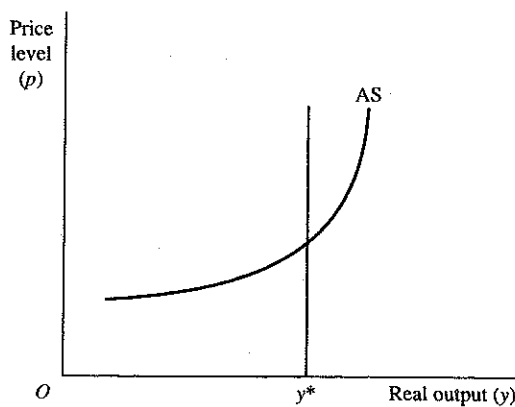


Fig. 4-14

CHANGES IN AGGREGATE OUTPUT

- 4.11. Use aggregate demand and aggregate supply curves AD and AS in Fig. 4-15 to answer the following questions.
- Is the aggregate supply curve Keynesian or classical?
 - Find the economy's equilibrium level of output and price level.
 - Does an increase in government spending, *ceteris paribus*, shift aggregate demand AD or aggregate supply AS?
 - What happens to equilibrium output and the price level when government spending increases, *ceteris paribus*?
 - Suppose there is a technological advance rather than an increase in government spending. What happens to aggregate demand AD? Aggregate supply AS? Equilibrium output? The price level?
 - What can one generalize about the effect on output and price level of a change in aggregate demand when aggregate supply is vertical?
 - What can one generalize about the effect on output and price level of a change in aggregate supply when aggregate supply is vertical?

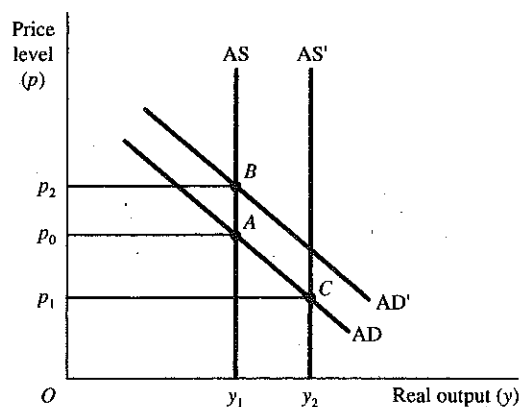


Fig. 4-15

- Figure 4-15 depicts a classical aggregate supply curve since it shows no relationship between aggregate output and the price level.
- Equilibrium exists where the aggregate demand curve intersects the aggregate supply curve. Equilibrium for curves AD and AS exists at point A; the price level is p_0 and output is y_1 .
- Increased government spending results in an outward shift of aggregate demand. There is no change in aggregate supply since there has been no change in the economy's ability to produce goods and services.
- We shall assume that the increase in government spending shifts aggregate demand from AD to AD' and aggregate supply remains at AS. Equilibrium now exists at point B rather than point A. Equilibrium output remains at y_1 , and equilibrium price increases from p_0 to p_2 .
- The technological advance has no effect on aggregate demand, but it shifts aggregate supply rightward. We shall assume that aggregate supply shifts rightward from AS to AS'. Equilibrium changes from point A for curves AS and AD, to point C for curves AD and AS'. Equilibrium output has increased from y_1 to y_2 , while the price level has decreased from p_0 to p_1 .
- When aggregate supply is vertical, a change in aggregate demand (shift of the aggregate demand curve) has no effect upon output and changes only the price level.
- When aggregate supply is vertical, a change in aggregate supply affects both equilibrium output and the price level.

- 4.12. Use aggregate demand and aggregate supply curves AD and AS in Fig. 4-16 to answer the following questions. (Full-employment output is y^* .)
- Is the aggregate supply curve in Fig. 4-16 Keynesian or classical?
 - Find the economy's equilibrium level of output and price level.
 - Does an increase in investment demand, *ceteris paribus*, shift aggregate demand or aggregate supply?
 - What happens to equilibrium output and the price level when investment demand increases?
 - What can one generalize about the effect on output and the price level when aggregate demand shifts and there is a Keynesian aggregate supply curve?

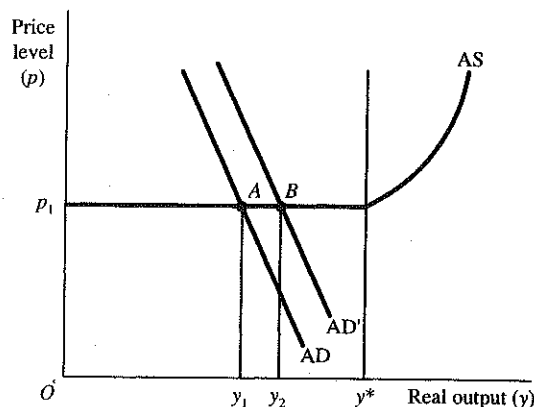


Fig. 4-16

- Figure 4-16 depicts a Keynesian aggregate supply curve since there can be continual increases in output without a change in the price level until full-employment output y^* is reached.
 - Equilibrium exists where aggregate demand intersects aggregate supply. Equilibrium output is at point A for curves AD and AS; the price level is p_1 and output is y_1 .
 - An increase in investment demand shifts aggregate demand outward. There is no change in aggregate supply since there has been no change in the economy's ability to produce goods and services.
 - We shall assume that the increase in investment demand shifts aggregate demand from AD to AD' while aggregate supply remains at AS. Equilibrium now exists at point B rather than point A. Equilibrium output increases from y_1 to y_2 while equilibrium price remains at p_1 .
 - A change in aggregate demand increases output and has no effect upon the price level as long as the economy is below full-employment output—in this example, below y^* . Intersections of aggregate demand and aggregate supply beyond y^* result in changes in both output and the price level.
- 4.13. Use aggregate demand and aggregate supply curves AD and AS in Fig. 4-17 to answer the following questions. (Full-employment output is y^* .)
- Find the economy's equilibrium level of output and price level.
 - Does an increase in consumer confidence, *ceteris paribus*, shift aggregate demand or aggregate supply?
 - What happens to equilibrium output and the price level when consumers become more confident?
 - Suppose there is no change in consumer confidence but there is an increase in the price of raw materials. What effect will an increase in the price of raw materials have on output and the price level?

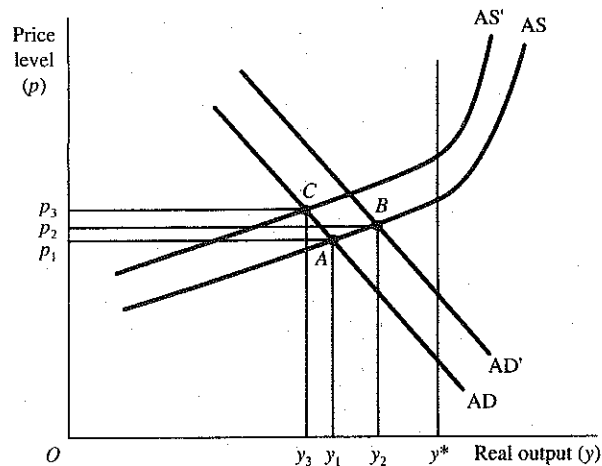


Fig. 4-17

- (a) Equilibrium exists where aggregate demand intersects aggregate supply. Equilibrium is at point A for curves AD and AS; the price level is p_1 and output is y_1 .
- (b) Increased consumer confidence results in a higher level of consumption which shifts aggregate demand outward. There is no change in aggregate supply since there has been no change in the economy's ability to produce goods and services.
- (c) We shall assume that increased consumption shifts aggregate demand from AD to AD' while aggregate supply remains at AS. Equilibrium now exists at point B rather than point A. Equilibrium output increases from y_1 to y_2 , and equilibrium price increases from p_1 to p_2 .
- (d) An increase in the price of raw materials raises the price of producing goods and services; the aggregate supply curve shifts inward. We shall assume that the inward shift of aggregate supply is from AS to AS' in Fig. 4-17. AS' and AD' curves intersect at point C; equilibrium output falls from y_1 to y_3 , and the price level increases from p_1 to p_3 .

BUSINESS CYCLES

- 4.14. (a) What is the normal relationship of real GDP and potential GDP during a period of economic contraction? A period of economic expansion?
 - (b) What is a peak? A trough?
 - (a) During an economic contraction, real GDP is normally falling due to decreased spending levels, while potential GDP continues to increase since the economy's resources normally increase from quarter to quarter and technological advance is a continuous process. Potential GDP and real GDP both increase during an expansionary period. Potential GDP is usually greater than real GDP during an economic expansion until the later segment of the expansionary period, at which time real GDP exceeds potential GDP and there are increases in the economy's price level.
 - (b) A *peak* is the point at which real GDP stops expanding and begins to decline. A *trough* is the point at which real GDP stops contracting and begins expanding.
- 4.15. Figure 4-18 presents quarterly data on real GDP for a hypothetical economy.
 - (a) Identify periods of economic contraction, economic recovery, and economic expansion.
 - (b) Identify peaks and troughs.
 - (a) Economic activity is contracting during periods 1:1 through 1:3 and during periods 3:3 through 4:2. Real GDP is increasing from period 1:3 through period 3:3 and from 4:2 through 4:4. Periods of economic contraction are usually identified as recessions. Periods of economic expansion consist of the time of

economic recovery, as real GDP returns to the level reached before the recession, and further expansion of real GDP.

- (b) Troughs occur during periods 1:3 and 4:2, when economic activity stops declining and begins to increase. Economic activity peaks during period 3:3.

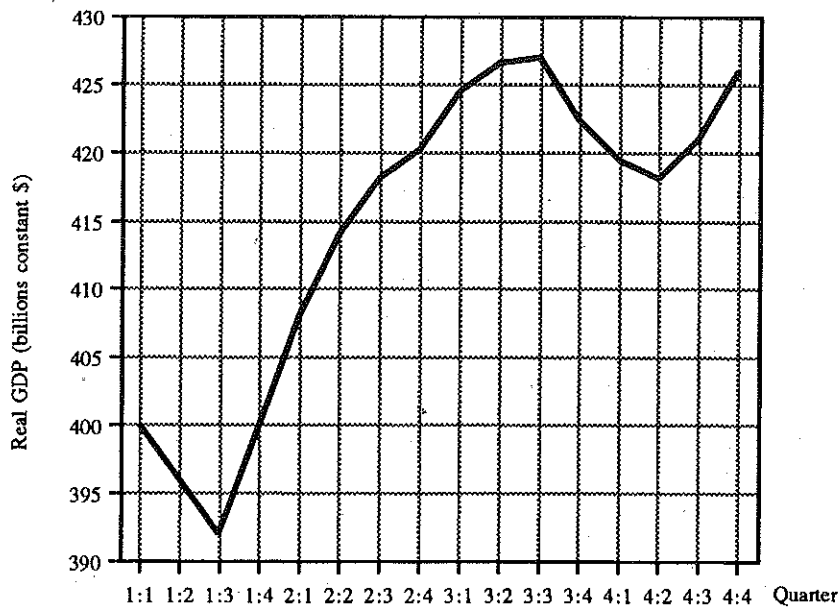


Fig. 4-18

- 4.16. Suppose a negatively sloped aggregate demand and a positively sloped aggregate supply curve determine a \$400 billion level of real GDP for period 1:1. The economy's potential GDP during period 1:1 is \$410 billion. What is the economy's GDP gap during this period?

The economy's GDP gap is +\$10 billion since potential GDP exceeds real GDP by \$10 billion.

- 4.17. Explain why investment spending and consumer spending on durable goods are probably the principal cause of the business cycle.

Consumer durable goods expenditures and investment spending consist of large-ticketed items whose purchase, in most cases, can be postponed. For example, an individual can repair an existing car rather than purchase a new one; a firm can produce more through greater use of existing capacity (e.g., overtime) than by adding new capacity. Thus, purchases of such big-ticketed items occur when credit (borrowing) is more readily available or less costly, individuals are more optimistic about the future, and/or cash flows are more certain. Such purchases tend to cluster and tend to be closely related to current and expected levels of real GDP.

Multiple Choice Questions

- Which of the following does not refer to macroeconomics?
 - The study of the aggregate level of economic activity,
 - The study of the economic behavior of individual decision-making units such as consumers, resource owners, and business firms,
 - The study of the cause of unemployment,
 - The study of the cause of inflation.

2. Gross domestic product is the market value of
 - (a) all transactions in an economy during a one-year period,
 - (b) all goods and services exchanged in an economy during a one-year period,
 - (c) all final goods and services exchanged in an economy during a one-year period,
 - (d) all final goods and services produced in a domestic economy during a one-year period.

3. A positive GDP gap exists when
 - (a) nominal GDP is greater than real GDP,
 - (b) real GDP is greater than potential GDP,
 - (c) potential GDP is greater than real GDP,
 - (d) economic activity is at its full-employment level.

4. Aggregate demand is inversely related to the price level because an increase in the price level
 - (a) lowers the rate of interest, which results in a higher level of aggregate spending,
 - (b) has a negative effect upon wealth, which results in increased aggregate spending,
 - (c) dampens exports and increases imports, which results in a lower level of aggregate spending,
 - (d) causes government spending to decline, which results in a lower level of aggregate spending.

5. Which of the following will result in a shift up and to the right by an aggregate demand curve?
 - (a) There is an increase in government spending, *ceteris paribus*.
 - (b) There is an increase in gross imports, *ceteris paribus*.
 - (c) There is an increase in the rate of interest, *ceteris paribus*.
 - (d) There is an increase in taxes, *ceteris paribus*.

6. A classical aggregate supply curve shows the following relationship between the price level and real output.
 - (a) Aggregate supply is positively related to real output.
 - (b) Aggregate supply is negatively related to real output.
 - (c) Aggregate supply is unrelated to the price level.
 - (d) Aggregate supply is horizontal.

7. Suppose equilibrium output is y_0 and the price level is p_0 for an aggregate demand and a classical aggregate supply curve. A technological advance will result in
 - (a) an increase in the equilibrium level of output and the price level,
 - (b) an increase in the equilibrium level of output and a decrease in the price level,
 - (c) an increase in the price level and no change in equilibrium output,
 - (d) an increase in the equilibrium level of output and no change in the price level.

8. Suppose equilibrium output is y_0 , which is below the full-employment level, and the price level is p_0 for an aggregate demand and a Keynesian aggregate supply curve. An increase in government spending will result in
 - (a) an increase in the equilibrium level of output and the price level,
 - (b) an increase in the equilibrium level of output and a decrease in the price level,
 - (c) an increase in the price level and no change in equilibrium output,
 - (d) an increase in the equilibrium level of output and no change in the price level.

9. Which of the following statements is true?
 - (a) A peak occurs at the start of an economic recovery.
 - (b) A trough occurs at the start of an economic decline.
 - (c) A peak occurs when economic activity starts decreasing.
 - (d) A trough occurs when economic activity starts decreasing.

10. Which of the following statements is true?
- (a) During a recession the economy is inside its production-possibility frontier.
 - (b) During a recession the GDP gap is positive.
 - (c) During a recession the unemployment rate is increasing.
 - (d) All of the above.

True or False Questions

11. _____ Increases in nominal GDP always result in increases in real GDP.
12. _____ Increases in potential GDP always result in increases in real GDP.
13. _____ The GDP gap is negative when real GDP exceeds potential GDP.
14. _____ Increases in a positive GDP gap are associated with increases in the unemployment rate.
15. _____ Aggregate demand shifts upward to the right when government reduces income taxes.
16. _____ A depreciation of the U.S. dollar causes the aggregate demand curve for the United States to shift downward to the left.
17. _____ All economists agree that an increase in aggregate demand will result in an increase in both the price level and real output.
18. _____ When aggregate supply is positively sloped, an increase in the cost of raw materials or economic resources, *ceteris paribus*, results in an increase in the price level and a decrease in real output.
19. _____ A business cycle occurs every two years.
20. _____ Economic recessions (periods of declining economic activity) are shorter than periods of economic expansion.

Answers to Multiple Choice and True or False Questions

- | | | | |
|--------|---------|---------|---------|
| 1. (b) | 6. (c) | 11. (F) | 16. (F) |
| 2. (d) | 7. (b) | 12. (F) | 17. (F) |
| 3. (c) | 8. (d) | 13. (T) | 18. (T) |
| 4. (c) | 9. (c) | 14. (T) | 19. (F) |
| 5. (a) | 10. (d) | 15. (T) | 20. (T) |