
Solutions to Problems

CHAPTER 1

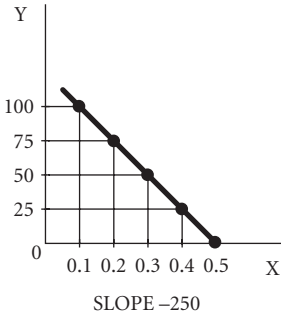
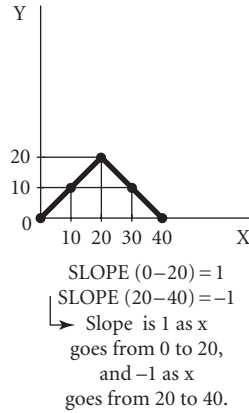
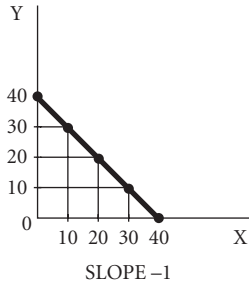
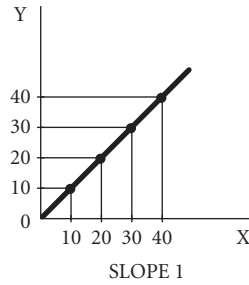
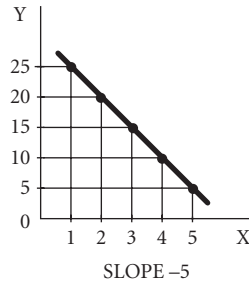
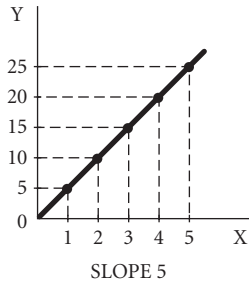
1. Answers will vary, but should include the notion that each activity provides benefits in the form of satisfaction or additional income, but also takes time away from the pursuit of other activities (opportunity cost). Time spent on each activity is limited because the additional benefit of devoting an extra unit of time to any one activity falls as more time is devoted to the activity. Hence, as more and more time is spent on one activity, it will become increasingly attractive to devote the next unit of time to some other activity.
2. Answers will vary.
3.
 - (a) normative
 - (b) positive
 - (c) positive
 - (d) normative
4. Average cost is $\$1.17(19.95 \div 17)$. Marginal cost is $\$0$.
5.
 - (a) The state should allow the market to provide what people want. Since gambling is not mandatory, only those who want to gamble will do so. Tax revenues that arise from casino gambling are paid voluntarily.
 - (b) Some argue that casino gambling is associated with criminal activity that has a cost to the community at large. In addition, gambling can be addictive, and sometimes entices those who can least afford it to participate. These concerns bear on the efficiency argument to the extent that there are costs from gambling not reflected in the price of gambling. These costs could potentially affect the community at large (e.g., more crime, the social cost of addiction) or the individual (to the extent that gambling creates unwanted addiction). The concern about the income bias of gambling (and the associated income bias of the tax revenue generated from gambling) is, in and of itself, an equity concern, not an efficiency one, although there could be social costs that arise from it.
6.
 - (a) Tuition (which could have been spent on other things), forgone wages, study time, etc.
 - (b) All the money (gas, depreciation of the car, etc.) could have been spent on other items; time spent en route could have been used for other activities.
 - (c) A better grade, no headache, perhaps admission to a better grad school, a higher-paying job. He has traded off an investment in human capital (staying in to study) for present consumption (going to the party).
 - (d) The other things that $\$200$ could buy.
 - (e) The $\$1$ million could have been invested in other profit-making ventures or projects or it simply could have been put into the bank or loaned out to someone else at interest.

(f) From the standpoint of the store, Alex is free. From Alex's standpoint he gives up other uses of time and wages that could be earned elsewhere.

7. Answers will vary.

CHAPTER 1 APPENDIX

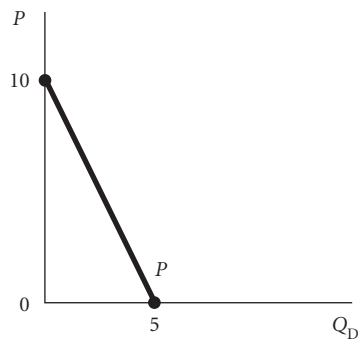
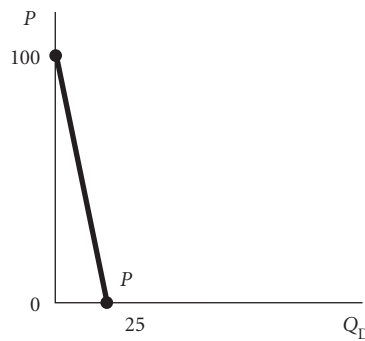
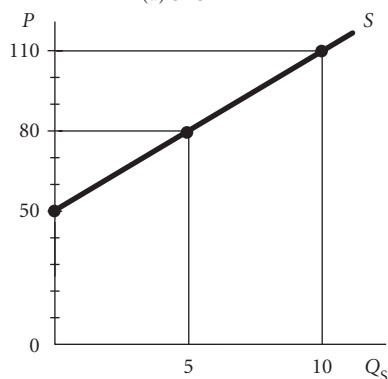
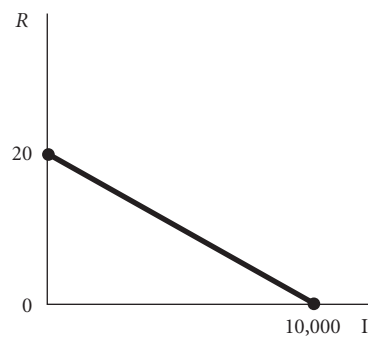
1. The slopes are as follows: line 1: 5; line 2: -5; line 3: 1; line 4: -1; line 5: slope is 1 as X goes from 0 to 20, and -1 as X goes from 20 to 40; line 6: -250.



2. Answers will vary.

- (a) Negative slope. As price rises, quantity of apples purchased falls.
- (b) Positive (and declining) slope. As income rises, taxes rise, but the rise in taxes is less at higher incomes than at lower incomes.
- (c) Negative (and declining) slope. As mortgage rates fall, home sales increase, but the increase in home sales is more at lower mortgage rates than at higher mortgage rates.
- (d) Negative, then positive slope. As young children get older, they run faster, but as adults get older (beyond a certain age), they run slower.
- (e) Positive slope. Greater sunshine leads to greater corn yield.
- (f) Positive, then negative slope. Up to a point, more fertilizer increases corn yield, but beyond a certain point, adding more fertilizer actually decreases the yield.

3.

(a) SLOPE = -2 (b) SLOPE = -4 (c) SLOPE = $+6$ (d) SLOPE = $\frac{-1}{500} = -.002$

CHAPTER 2

1. Answers will vary, but should include:

- the value of alternative uses of time (studying for other classes, leisure).
- the value of alternative uses of time (studying, other forms of leisure).
- the value of the other goods and services that could have been purchased with the money used to purchase the car.
- the value of the goods and services that taxpayers could have purchased with the additional property tax revenue.
- the value of other goods and services that the governments could have purchased with the money used to purchase the space station, or the value of the goods and services that taxpayers could have purchased with the tax revenue used to finance the space station.
- the foregone salary that you would have earned and the value of the alternative uses of time.

2. Disagree. To be efficient, an economy must produce what people want. This means that in addition to operating on the *ppf* (resources are fully employed, best technology is being used) the economy must be operating at the *right* point on the *ppf*.

3. Opportunity costs of building the bridge include the value of other goods and services that the government of Mallsburg could have purchased with \$25 million or the value of the goods and services that taxpayers could have purchased with the tax revenue used to finance the bridge, as well as any inefficiencies created by the income tax by reducing incentives to work. In addition, the construction itself may impose costs – delays, noise, and so on – and presumably shopkeepers located near the older bridge will lose as consumers shift their business toward the main mall.

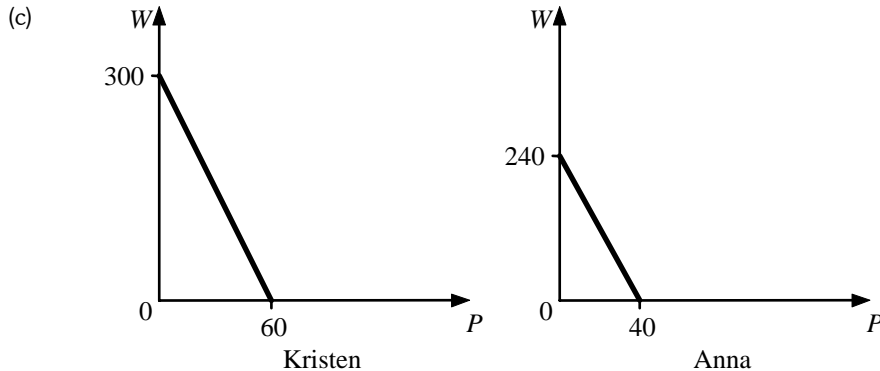
Benefits of the new bridge include reduced travel time for shoppers and commuting time for workers, increased sales tax revenues for Mallsburg, and gains for shopkeepers located in the main mall.

There may be other quality of life costs and benefits that are difficult to sort out without more information. The bridge may have environmental effects that could be positive (less pollution from idling traffic) or negative (depend-

ing on where and how the bridge is constructed). Also, there may be effects on the look and lifestyle of the town. A bridge through the center of the town is likely to effect daily living in any number of ways.

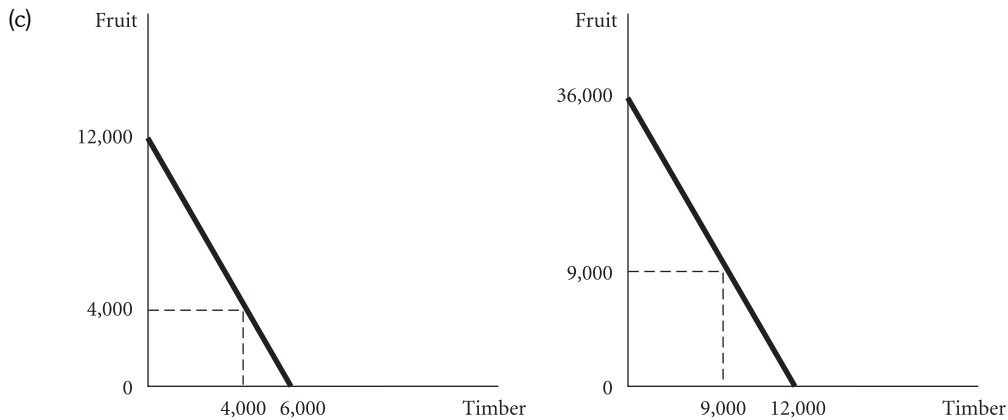
Beyond the costs and benefits, there is always the question of distribution. Is the income tax system of Mallsburg equitable? Are the shopkeepers likely to lose poorer than those likely to gain? Economists would typically argue for governments to undertake projects whose costs exceed their benefits, and then address any concerns about income distribution separately. To the extent these concerns are not addressed, however, you might consider writing about the income distribution effects of the new bridge.

4. (a) For Kristen, the “cost” of a potholder is five wristbands; for Anna, the cost of a potholder is six wristbands. Kristen has a comparative advantage in potholders.
 (b) Anna has a comparative advantage in the production of wristbands because the opportunity cost (1/6 potholder) is lower for Anna than it is for Kristen (1/5 potholder).



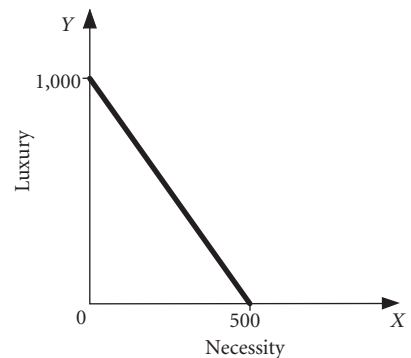
- (d) Kristen: 150 wristbands and 30 potholders. Anna: 120 wristbands and 20 potholders. Total wristbands = 270. Total potholders = 50.
 (e) 285 wristbands and 51 potholders.
 (f) Kristen should completely specialize in potholder production and earn $60 \times \$5.50 = \330 . Anna should completely specialize in wristband production and earn $240 \times \$1 = \240 . Maximum combined revenue is \$570.
5. (a) Sherice sacrifices the value of goods and services that could have been purchased with the income from work in order to obtain more leisure today. To the extent that this income will need to be replaced to finance her education, Sherice CHap substitutes future work for present consumption (of leisure). On the other hand, if the time off improves Sherice’s state of mind, she may be a more successful student, which may be pleasant in its own right, and may also provide monetary rewards (better job, better graduate school) in the future.
 (b) The opportunity costs are the alternative uses of time spent working out and the foregone pleasure of consuming foods that are not part of the diet. Presumably, the present sacrifice yields a future benefit of better health and more enjoyment of leisure activities.
 (c) Time and money spent today on maintenance is an investment. By reducing resources available for consumption today, more resources will be available in the future (since repair costs will be lower and breakdowns less frequent).
 (d) Jim may get to work faster, but at the risk of an accident or ticket, which could be costly. Included in the potential cost of this behavior are the monetary, criminal, or psychological penalties (remorse or direct concern about the welfare of others) that Jim will pay if others are harmed.

6. (a) Blah.
Blah.
(b) Blah: fruit.
Figistan: timber.



- (d) Figistan: 800 workers to timber
400 workers to fruit
produces 4,000 of each
Blah: 900 workers to timber
300 workers to fruit
produces 9,000 of each
- (e) Figistan moves all labor to timber and produces 6,000 board feet.
Blah moves 150 out of timber into fruit.
450 in fruit produces 13,500 baskets; 750 in timber produces 7,500 ft.
Blah trades 4,200 baskets to Figistan for 1,800 board ft.
Blah ends up with 9,300 of each; Figistan ends up with 4,200 of each.
Both move beyond their individual *ppfs*.

7. (a) The ppf curve is a straight line intersecting the Y-axis at 1,000 units of the luxury goods and intersecting the X-axis at 500 units of the necessity goods. These are the limits of production if all resources are used to produce only one good.
- (b) Society's production could be inside the ppf as a result of (i) unemployment or underemployment of labor or (ii) inefficient production with full employment. With only one factor, the possibility of inefficient production means that workers are not using the best available technology to produce one or both goods. To move from inside to a point on the ppf, the economy would need to move to full employment or to adopt the most efficient production technology.

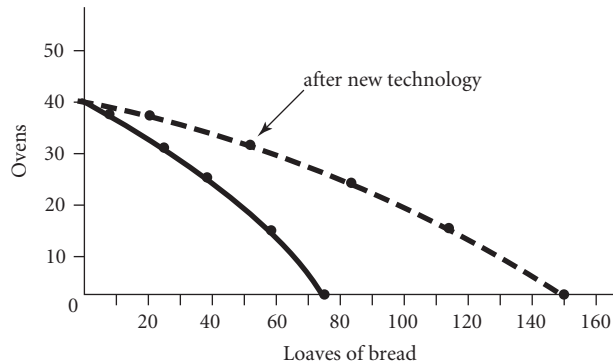


- (c) Answers will vary, but the decision should be based on the relative value of necessities and luxuries, as well as the degree of concern that enough necessities are produced to meet the needs of the population. Although this part does not address distribution, if too few necessities are produced, some people will not have enough necessities under any distribution scheme.

(d) If left to the free market, income distribution will depend on some combination of individual effort and chance, where chance includes the possession of valuable abilities, opportunity, and inheritance. Each individual would have to find a job to earn income to command some of the economy's production.

8. (a) c, d, e.
 (b) a, b, d, e, f.
 (c) d, e (since they prefer meat).
 (d) e.
 (e) b, c, d, e, f.
 (f) b.

9. (a)

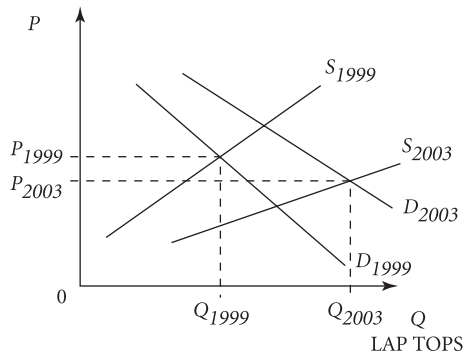


- (b) Yes, increasing opportunity cost applies. The opportunity cost of the first 15 million loaves of bread is 4 ovens; of the next 15 million loaves, 6 ovens; and so on.
- (c) Over time, as the number of ovens increases, the capacity to produce bread with the same quantity of other resources will also increase. Thus, the production possibilities curve will shift out horizontally to the right. The vertical intercept (maximum possible oven production) will remain unchanged, but the horizontal intercept (maximum possible bread production) will increase.
- (d) See graph in part (a) above.
- (e) Before the introduction of the new technology, production of 22 ovens left enough resources to produce 45 loaves of bread. After the introduction of the new technology, production of 30 ovens leaves enough resources to produce 60 loaves of bread.

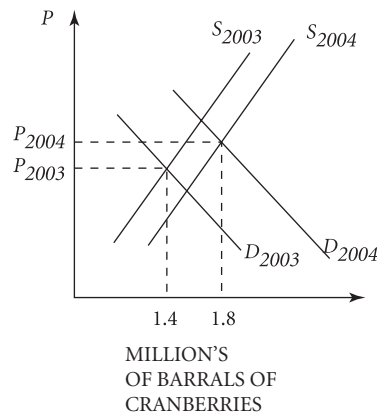
10. Answers will vary.

CHAPTER 3

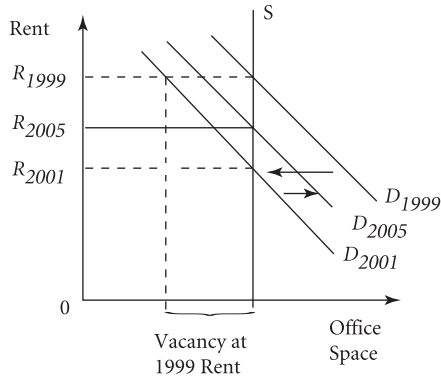
1. (a)



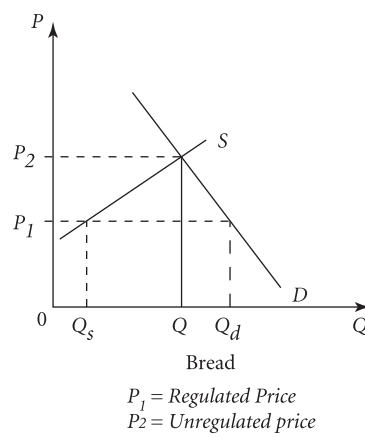
(b)



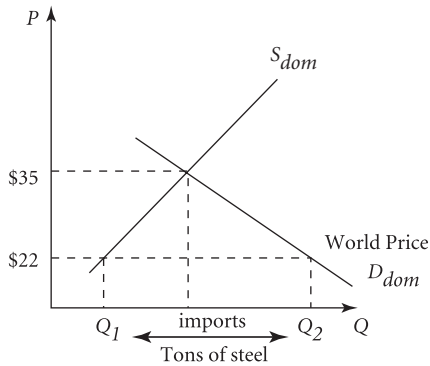
(c)



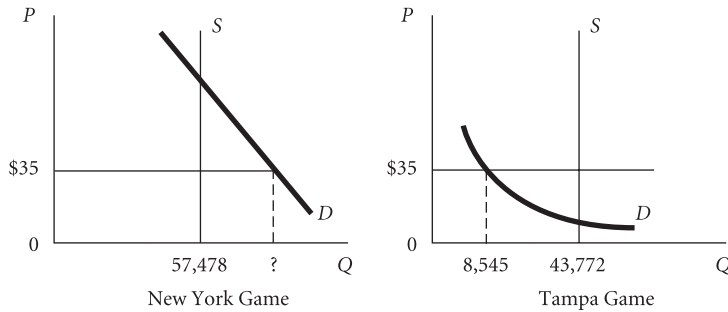
(d)



(e)

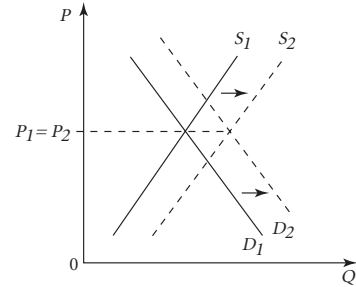


2. (a)



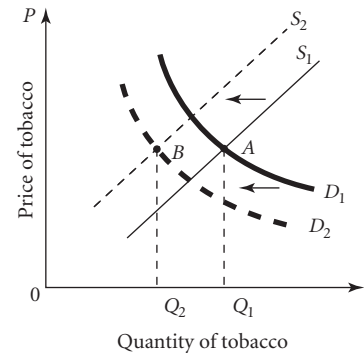
- (b) It depends on whether demand responds to the lower price and by how much. The diagram in (a) suggests that if price was lowered by a lot, the stadium would be filled. If demand is “elastic” enough, the quantity demanded will increase by more than the fall in ticket price, and revenues will rise. If demand is not responsive enough, the quantity demanded may not increase enough to offset the fall in ticket prices, and revenues will fall. The easiest example of the latter would occur if demand were “perfectly inelastic,” which implies that no one else would come to the game despite the lower price.
- (c) The price system was not allowed to work to ration the New York tickets. Some other rationing device must have been used. Perhaps people stood in line or queued. Perhaps there was a lottery. In all likelihood, there would be a secondary market for the tickets (“scalpers”). You could no doubt find them for sale on line at a high price.

3. If the supply of new homes kept pace with the expanding demand, prices would remain constant. The supply curve shifts to the right at the same rate as the demand curve shifts to the right:

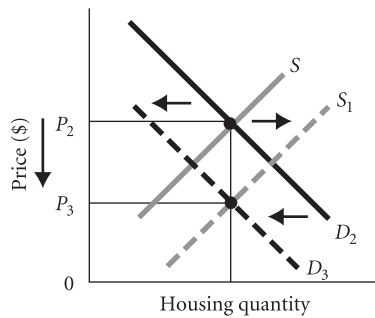
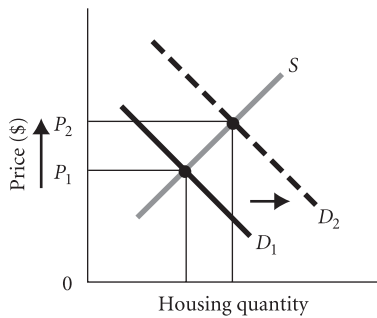


- 4. (a) Disagree. They are complements.
- (b) Agree.
- (c) Disagree. A rise in income will cause the demand for inferior goods to fall, pushing prices down.
- (d) Disagree. Sure they can. Steak and lobster are both normal goods.
- (e) Disagree. Price could go down if the shift of supply is larger than the shift of demand.
- (f) Agree.

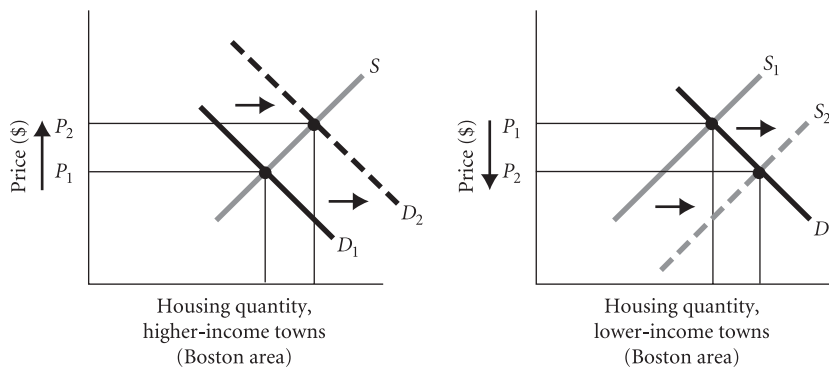
5. If the price of tobacco is supported by limiting land used to grow it, then the supply curve for tobacco shifts to the left. The anti-smoking publicity works to shift the demand curve to the left. Both of these policies work together to reduce consumption of tobacco.



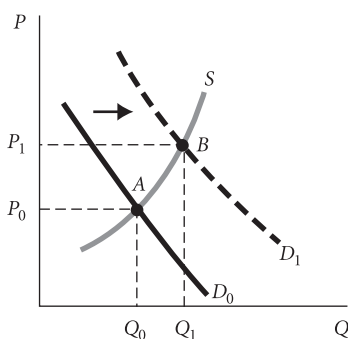
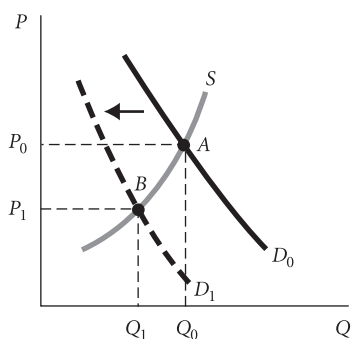
- 6. (a) A simple demand shift; same diagram for both cities.
- (b) Rightward shift of supply with new development; leftward shift of demand with falling incomes; same diagram for both cities. (Assumes the shifts are equal.)



(c) Trade-up buyers shift demand in the higher-income towns and supply in the lower-income towns.

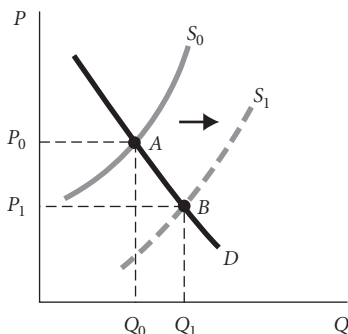
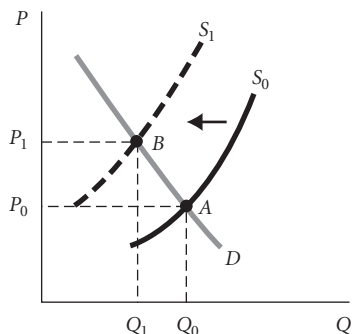


7. (a) This sequence confuses changes in demand (shifts of the demand curve) with changes in quantity demanded (movements along a demand curve). First, a demand shift does cause price to rise. As price rises, the quantity supplied increases along the supply curve, and the quantity demanded declines along the new demand curve as the market moves to reestablish equilibrium. Nothing here suggests that demand shifts back down, or that prices will fall back to their original levels.
- (b) This sequence confuses a change in price (per unit) with a change in total spending on meat. When price falls, the quantity demanded increases along the demand curve. Thus, the total amount spent (price \times quantity demanded) depends on whether quantity demanded goes up by more than price per unit falls. Total spending could increase if demand responds strongly to the lower price.
8. (a) P decreases, Q decreases (b, d) P increases, Q increases



(c) P increases, Q decreases

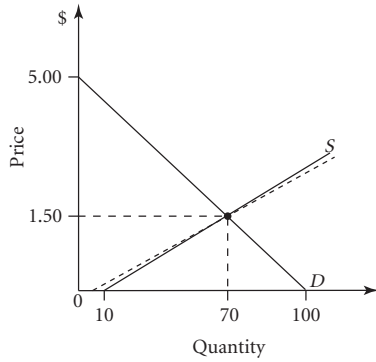
(e) P decreases, Q increases



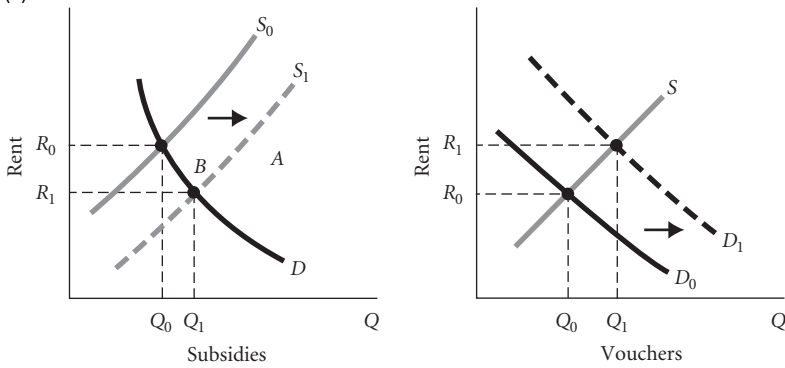
9. (a)

Price	Quantity Demanded (in Millions)	Quantity Supplied (in Millions)
\$.50	90	30
\$1.00	80	50
\$1.50	70	70
\$2.00	60	90
\$2.50	50	110

- (b) Quantity demanded equals quantity supplied at $P = \$1.50$, with quantity = 70 million dozen eggs.
 (c)

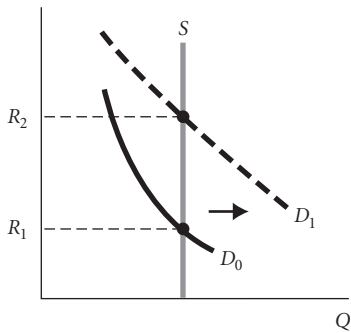


10. (a)

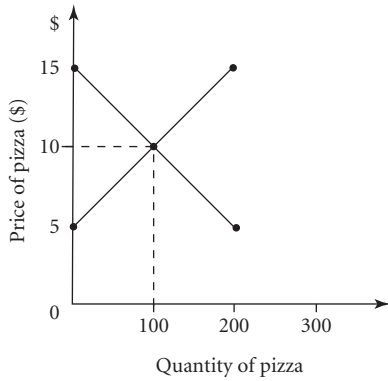


The demand side strategy (vouchers) results in higher rents.

- (b) Critics believe that the supply curve for low-income housing looks like this:



11. (a)

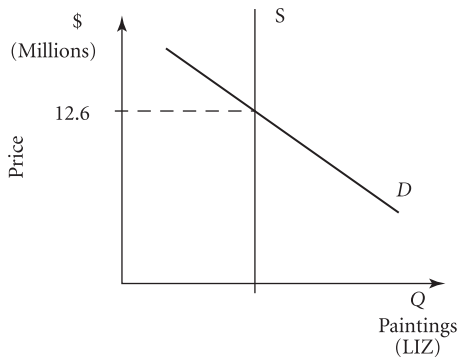


- (b) $Q_d = Q_s \rightarrow 300 - 20P = 20P + 100 \rightarrow P = \10 . Substitute $P = \$10$ into either the demand or supply equation to get $Q = 100$.
- (c) With $P = \$15$, producers would want to supply $20 \times 15 - 100 = 200$ pizzas, but consumers would want to buy $300 - 20 \times 15 = 0$ pizzas. There would be an excess supply of pizzas, which would bring the price down. As the price decreased, quantity supplied would decrease while quantity demanded would increase until both were equal at a price of \$10 and a quantity of 100.
- (d) The new market demand for pizzas would be $Q_d = 600 - 40P$.
- (e) $Q_d = Q_s \rightarrow 600 - 40P = 20P \rightarrow 700/60 = \11.67 . Substitute $P = \$11.67$ into either the demand or supply equation to get $Q = 133$.

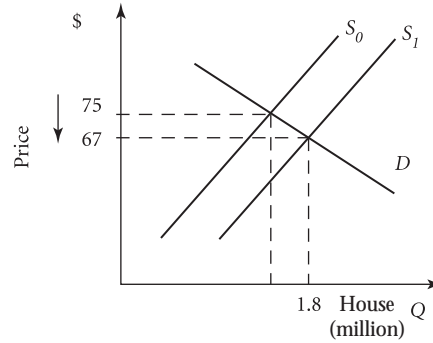
CHAPTER 4

1.

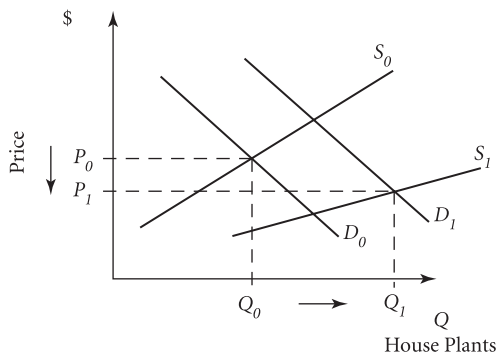
(a)



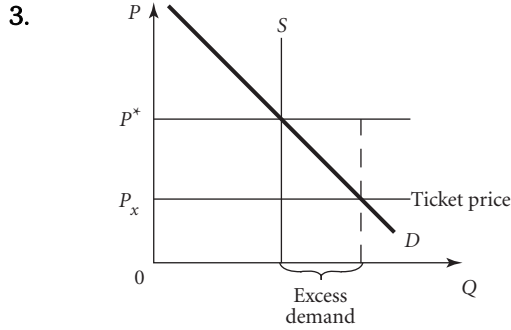
(b)



(c)



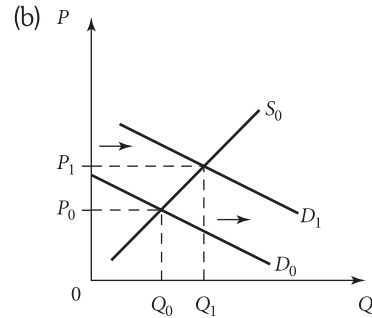
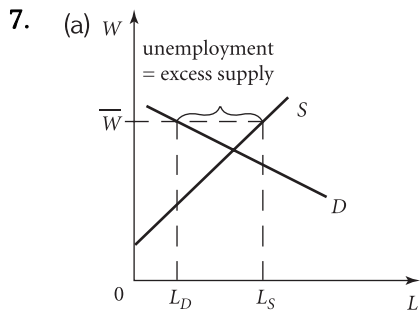
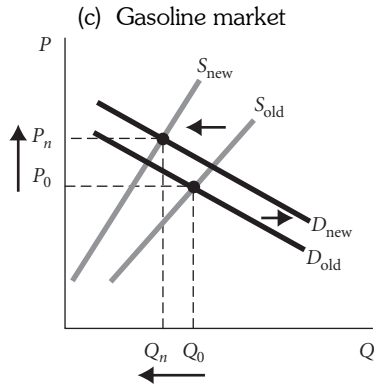
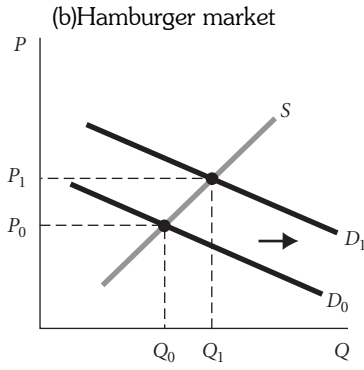
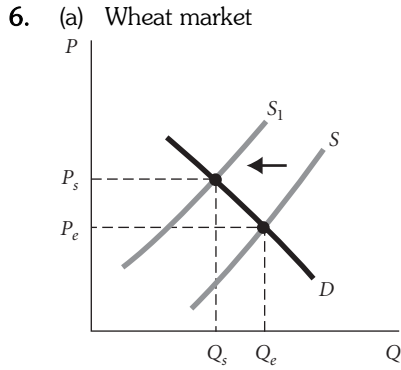
2. Disagree. Every demand curve hits the quantity axis because of diminishing marginal utility . . . at a price of zero, there is a limit to how much one can or wants to consume. The argument that at some price demand goes to zero explains why all demand curves hit the price axis.



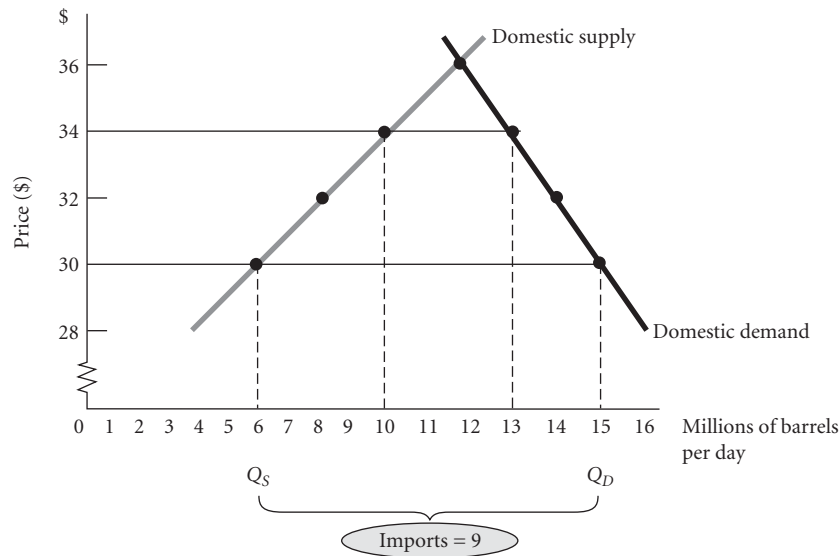
The diagram shows that some people are willing to pay a very high price (even higher than P^*) for the tickets. Some nonprice rationing system was used to allocate the tickets to people willing to pay as little as P_x . What a scalper does is pay those near P_x more than they paid for the tickets and then sells the tickets to someone nearer or even above P^* . Since both the buyers and sellers engage in the trade voluntarily, both are better off and the exchange is efficient.

4. The subsidy does increase the “cost” of planting—there is now an opportunity cost. (By planting, the farmers will have to give up the subsidy.) The subsidy will clearly lead to fewer acres of production and higher farm prices. In effect, it shifts the supply curve to the left.

5. Disagree; this is not hard to explain. The law of demand does say that higher prices should lead to lower demand, but that refers to a change in the quantity demanded, a movement along a demand curve. An increase in demand (a rightward shift of the demand curve) would result in a higher price. Therefore, a sharp increase in the demand for apartments in New York City is entirely consistent with a sharp increase in rent, which is the price of those apartments.

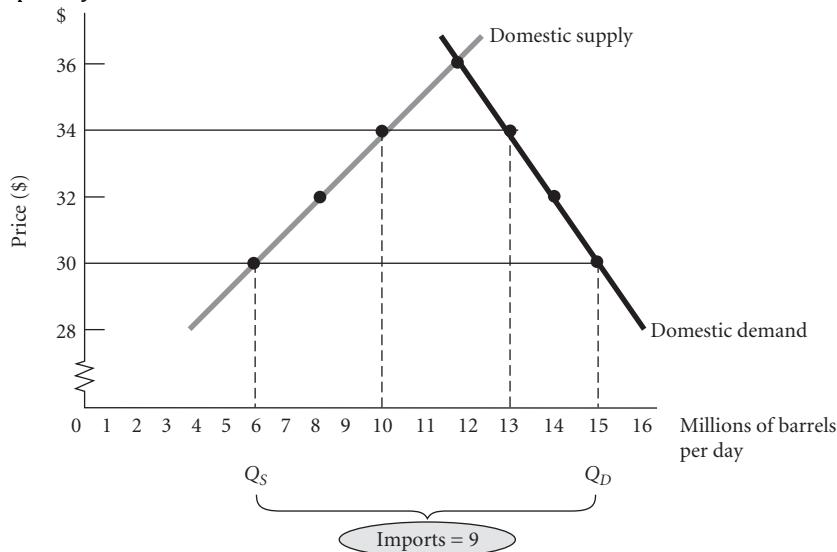


8. (a)



- (b) With free trade in oil, Americans would pay \$30 per barrel. At this price, the U.S. demand schedule shows that Americans would buy 15 million barrels per day. The U.S. supply schedule shows that U.S. producers would supply 6 million barrels per day, with the remainder—9 million barrels—imported from foreign sources.
- (c) With a tax of \$4 per barrel, Americans would have to pay \$34 for imported oil. Quantity demanded would decrease from 15 million to 13 million barrels. Of this, American producers would supply 10 million barrels, whereas imports would be cut back from 9 million to 3 million barrels. The U.S. government would collect a tax of $\$4 \times 3 \text{ million} = \12 million per day.
- (d) American oil consumers are harmed by the tax; they are paying a higher price for oil. American oil producers are helped by the tax; they receive a higher price for oil, and this induces them to produce more oil. Foreign oil producers are harmed, because Americans buy less imported oil. Finally, the U.S. government (and the U.S. taxpayer generally) benefit from the tax revenue.

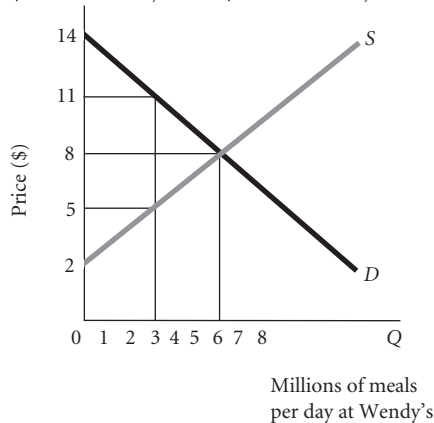
9. (a) Using demand and supply data for the United States only, the equilibrium price is \$36 and the equilibrium quantity is 12 million barrels.



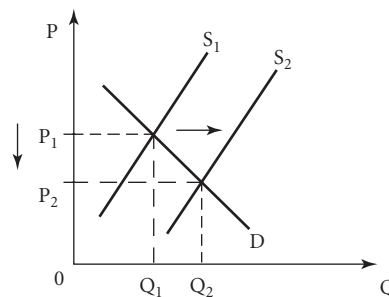
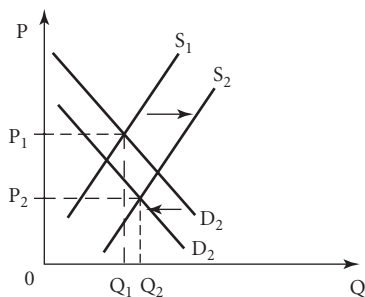
- (b) With a price ceiling of \$34, quantity demanded equals 13 million barrels, while quantity supplied equals 10 million barrels. There is an excess demand of 3 million barrels.

- (c) Quantity supplied will determine the quantity purchased. In a market system, no one can be forced to buy or sell more than he or she wants to. Under conditions of excess demand, suppliers will supply only as much as they want, and some consumer demand will go unsatisfied.

10. At \$8 and 6 million meals: CS = \$18 million; PS = \$18 million; total = \$36 million. At 3 million meals: CS = \$13.5 million; PS = \$13.5 million; total = \$27 million Deadweight loss = \$9 million



11. The figure on the left shows that legalization would reduce the cost of supplying drugs and shift the supply curve to the right. A successful advertising campaign would shift the demand curve to the left. The unambiguous result would be a lower price of drugs that would reduce the profitability of production. The relative sizes of the supply shift and the demand shift would determine whether consumption would rise or fall. If the advertising campaign failed to shift the demand curve (as in the figure on the right), the lower price would indeed lead to more consumption. One link between drugs and crime is that consumers who are addicts may commit crimes to pay for or obtain drugs. A lower price of drugs presumably reduces the incentive for this type of crime.

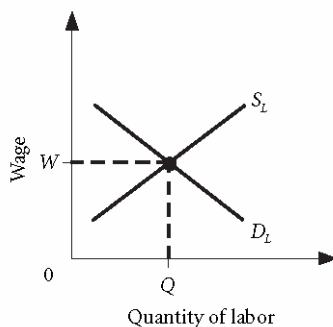


12. Answers will vary.

CHAPTER 5

- Inflation is an increase in the overall price level, and tax should reflect the prices of everything traded in the economy. In the simple economy described in the question, you might be tempted to look at the average price of the three goods to see how the overall price level has changed. On January 1, 1998 the average price was $(\$2.50 + \$3.00 + 1.50)/3 = \$2.33$, whereas at the end of the year it was $(\$5.00 + \$2.00 + 1.50)/3 = \$2.83$. From this you can conclude that on average prices are higher. This is a simple version of a price index. A better measure would include information about the relative importance of each of the three goods in consumer's budgets (you could then construct a weighted average as your price index).
- The unemployed are those who are not working for pay or profit but who have made specific efforts to find a job during the week of the employment survey. In simple terms, it is the excess of labor supplied over labor demanded in the market. The labor demand curve measures the quantity of labor (workers or hours) demanded by firms at each possible wage rate. Firms' demand for labor is derived from the demand for products. Firms will hire workers as long as the product of their labor sells for a price high enough to produce a profit. Thus, the "productivity" of workers is critical. Labor supply reflects the choices made by households to work and how much to work. The

alternative to working is leisure or “home production.” Home production can include child rearing, subsistence farming, or other unpaid work. The value of leisure and home production is the opportunity cost of working.



3. Although lower unemployment is certainly “good” for the economy, an unemployment rate that is too low means that labor markets are “tight” and that there is upward pressure on wages. Higher wages represent higher costs for firms, and are therefore likely to lead to higher prices. Thus very low rates of unemployment lead economists like Mr. Greenspan to be concerned about faster increases in the overall price level, i.e., higher inflation.
4. The productivity of workers must be increasing. If we are producing more output with fewer workers, output per worker is rising.
5. Answers will vary depending on the state(s) in which students live.
6. Macro looks at aggregates in the total economy while micro looks at individual markets and individual economic agents. It is often helpful (and more accurate) to base macroeconomic theories on the behavior of the individuals who make up the macroeconomy.
7. To stimulate expansion, the government could spend *more* or *lower* tax rates. Here, higher taxes reduce consumer spending, while the government itself spends less. Thus, total spending, or aggregate demand, drops. In times of slow economic growth, most people would expect the government to adopt an “expansionary fiscal policy” of cutting taxes and raising spending instead of this contractionary policy. In fact, the Federal Reserve conducted a relating expansionary monetary policy at the same time. The expansionary monetary policy helped to offset the effects of the contractionary fiscal policy.
8. Wars result in high levels of government spending, which helps to increase total spending in the economy.
9. Wrong. Incomes have actually risen faster than prices, so that the purchasing power of the average citizen has increased. Prices may now be higher in dollar amounts, but compared to people’s earnings, some goods may in fact be cheaper than they were in the 1940s.
10. Answers will depend on events.

CHAPTER 6

1. Using the expenditure approach: $C+I+G+(X-M) = 5000+1000+1000+(500-700) = 6800$.

Using the income approach:

$$\text{Compensation of employees} + \text{Profit-depreciation} = 5300 + 900 + 600 = 6800$$

Recall that depreciation has to be added in because it is taken out in the calculation of profit and we want to get back to “gross domestic product”

2. Every payment made by a buyer becomes revenue for the seller, which is paid to someone or held by the seller as profit. Thus, the dollar value of the purchases of new goods and services in a year must be equal to the dollar value of the income generated in that year.
3. Nominal GNP rises when real output rises and when prices rise. Between 1973 and 1975 the data shows that prices rose a lot. Thus, GNP rose faster than real GNP. Real GNP is simply GNP adjusted for inflation. Conditions in 1974 and 1975 were quite bad. The data shows substantial inflation and declining real GNP. The economy was

in recession and there was substantial inflation at the same time, a combination of circumstances called “stagflation.”

4. With fixed-weight indexes, the percentage change in the index from year to year depends on the weights chosen and thus on the base year.

Goods whose output decreases (or increases slowly) because of slowly- or backward-shifting supply curves will have their relative prices increase. If we use the old prices as weights, we will tend to understate the importance of this decrease. Likewise, if we use the new prices as weights, we overstate the importance of the production decline.

Fixed-weight price indexes that use old quantities as weights are generally taken as overestimates of the increase in the price level, because these indexes ignore consumers’ opportunities to find substitutes for goods whose relative prices rise. Those that use current-year quantities as weights are taken to underestimate changes in the price level because they implicitly assume that the substitutes people chose for the goods whose relative prices rose are considered just as good as the “real thing.”

The use of fixed-weight indexes poses special problems when used to make measurements over long periods of time because the use of, for example, 1950 weights for the 1995 economy is not desirable.

The BEA’s new approach does two things: First, it takes the (geometric) average of fixed-weight indexes to deal with the overestimation and underestimation issues. Second, it “updates” the base years for the fixed-weight indexes every time it makes a new calculation to ensure that the weights remain appropriate. That is, the indexes whose average it takes are those whose base years are the previous year and the current year.

5. Double counting occurs when intermediate goods are counted directly in calculating GDP. This means these intermediate goods will be counted more than once because they are also counted as part of the value of the final product. Total sales includes sales of intermediate goods that firms sell to each other. GDP includes only the sales of final goods and services.
6. Growth in real GDP: 3.2%.
Per capita GDP for 2005: \$35,615.
Per capita GDP for 2006: \$36,457.
Growth in real per capita GDP: 2.3%.
7. This is a current events question; answers will vary.
8. Consumption as measured by retail sales is just part of GDP. Using the expenditure approach, real GDP is made up of consumption plus investment plus net exports plus government purchases. If the sum of I , G , and $(X - M)$ grows more rapidly than C , real GDP will rise more rapidly than retail sales.
9. (a) not counted—financial transaction (b) counted—investment spending
(c) not counted—financial transaction (d) not counted—financial transfer
(e) counted—consumption spending
(f) not counted—used goods (unless you are in the book-rental business, and declare your income to the government.
(g) not counted—transfer payment (h) counted—investment spending
(i) the pizza is counted—consumption (the cheese is part of the value of the final good)
(j) not counted—nonmarket activity (k) not counted—illegal goods
10. The pizza is entirely consumed in the year it was produced while the car will last many years. A car is in reality a capital good. To correct for this, we could count just the value of the services provided by the car *each year*. For example, if the car lasts five years, then 20 percent of its value could be counted in each year’s GDP.
11. Consumption, investment, and government spending (C , I , and G) include expenditures on goods produced both domestically and by foreigners, and so $C + I + G$ overstates domestic production. Imports have to be subtracted to obtain the correct figure.
12. There is no right or wrong answer here. But counting environmental damage requires a dollar estimate of this damage, about which there will be little consensus.

CHAPTER 7

- Answers will vary, but should indicate that a depression is a prolonged and deep recession. The precise definitions of prolonged and deep are debatable. Answers should include data on the unemployment rate and real GDP and indicate the time frame over which those measures are recorded.
- Full employment* is another term for the natural rate of unemployment. The idea behind this terminology is that if the only unemployment in the economy is the unemployment that comes about as the result of the normal working of the labor market, then there is no “unnecessary” unemployment. Labor is being “fully” utilized because the only unemployment that exists is the natural consequence of an efficiently working market. Unemployment essentially means that people are looking for a job. Every day, people finish school or training, firms in some sectors are expanding and in others contracting, technology is changing, and firms need people with different skills. The normal functioning of the economy means that at any moment some people will be in the process of transition even if the economy is running at full capacity. Thus, the economy can be at full employment with a 4.1 percent unemployment rate, provided that the 4.1 percent unemployment is frictional and structural only.
- Answers will depend on what happened.
- This is structural unemployment, which can sometimes exist for long periods, especially when workers must learn new skills to find jobs. The social costs of this unemployment might be greater than the costs of retraining these workers, providing some justification for government assistance.
- Answers will vary depending on the state(s) in which students live.
- Yes, inflation would still be a problem. There are other costs of inflation besides the redistribution of income that occurs when incomes are not indexed. One example is the waste of time and resources spent coping with inflation. See the section on “Administrative Costs and Inefficiencies” under the heading “Costs of Inflation.”
- The CPI is intended to measure the cost of living—the price of a typical market basket. This is the figure that tells us how well off in real terms a given wage or pension makes someone. It is used by the government in setting social security payments, by unions in bargaining over wages, by workers in evaluating their incomes, by economists in studying the standard of living, and as the basis of wage and pension indexation. The PPI measures the prices of the bundles of goods that firms buy, i.e., the prices of intermediate goods and raw materials. Since these items are not directly consumed, PPIs are not a good measure of the cost of living, but they can be used to predict the increase in the price of consumer goods.

8.

	2000	2001	2002
Bundle price	\$400	\$531.25	\$550
Index	1.00	1.328	1.375
% change		32.8	3.54

Yes. There was a modest increase in the price level between 2001 and 2002.

- (a-b) Yes, both statements can be true. The labor force of Tappania may have grown faster than the number of employed, implying an increase in the number of people who are looking for work but not working, and an increase in the unemployment rate.
- Clearly, in the long run, output can only grow if the quantity of inputs grows or the productivity of those inputs increases. The capacity at any point in time is given by the available capital stock (plant and equipment) and the available labor force. Ultimately, the labor force is limited by the working age population. Since there are always firms going out of business and new firms being born, there are always people looking for work that further limits the number of workers that can actually be working at any given moment of time. Economists often look at the unemployment rate and the “capacity utilization rate” as indicators of how close we are to capacity. When demand exceeds the capacity constraints in an economy, the result is usually an increase in the price level or inflation.
- This is a current events question, so answers will vary.

12. In the short run, this can easily happen if more of the labor force becomes employed...the unemployment rate falls . . . or more of the existing capital stock is used . . . capacity utilization rises. In the long run, it can happen if technological advance increases factor productivity . . . each unit of labor and capital produces more output over time.
13. The only way the unemployment rate can rise if employment is increasing is through labor force growth.

CHAPTER 8

1. Actually, real GDP growth did not slow, rather it increased into 2006. In fact during the first quarter of 2006, GDP growth hit 5.3% at annual rates. Why then did inventories increase in 2005? It may be that firms anticipated the increase and that it was planned. On the other hand, the increase in inventories may have been unplanned, and that the economy simply turned around quickly. It was a period when interest rates were very low and fiscal policy was very expansionary.
2. *MPC*: Marginal propensity to consume; the fraction of additional income that is spent on consumption. Multiplier: the concept that a sustained increase in one component of aggregate expenditure (like I) could lead to an increase in the equilibrium level of income that is a multiple of the initial increase in expenditure. In a simple economy, the multiplier is equal to $1/MPS$ or $1/(1 - MPC)$. Actual investment: The actual amount of investment that takes place; it includes items such as unplanned changes in inventories. Planned investment: Those additions to the capital stock and inventory that are planned by firms. Actual investment and planned investment are equal only in equilibrium; at levels of output below equilibrium actual investment will be less than planned investment, and at levels of output above equilibrium, actual investment will be greater than planned investment. Aggregate expenditure: The total amount the economy spends in a given period. Real GDP: The value of gross domestic product corrected for the effect of higher prices. At equilibrium, planned aggregate expenditure is equal to the level of real GDP. Aggregate output: The total quantity of goods and service produced (or supplied) in an economy in a given period. Aggregate income: The total income received by all factors of production in a given period. Aggregate output and aggregate income are the same (just seen from two different points of view).
3. We know that $C = .75Y = 150$ billion. $C + I = 150 + 75 = 225$ billion. Thus, $C + I > Y$. Aggregate spending is greater than aggregate output. Inventories will fall (which firms will take as a signal to increase production) and in the coming months Y (real GDP) will rise. GDP will stop rising when $C + I = Y$. That is when $.75Y + 75 = Y$ or $75 = .25Y$ or $Y = 300$ billion Yuck dollars.
4. Answers will depend on future events.

5. (a)

	Aggregate Output/Income	Consumption	Planned Investment	Saving	Unplanned Inventory
	2,000	2,100	300	-100	-400
	2,500	2,500	300	0	-300
	3,000	2,900	300	+100	-200
	3,500	3,300	300	+200	-100
	4,000	3,700	300	+300	0
	4,500	4,100	300	+400	+100
	5,000	4,500	300	+500	+200
	5,500	4,900	300	+600	+300

Equilibrium Output $Y^* = 4,000$. When $Y < 4,000$, inventories are lower than desired (unplanned investment is negative). Firms will increase production to increase their inventories, causing aggregate output/income to rise. When $Y > 4,000$, the opposite will happen, causing output/income to fall.

- (b) Over all ranges $MPC = 4/5 = .80$ and $MPS = 1/5 = .20$. The multiplier is $1/MPS = 1/.20 = 5$.
 - (c) If I increases by 200 to 500, Y^* goes up by $5 \times 200 = 1,000$. Thus, the new equilibrium level of output (income) is 5,000. Yes, the two are consistent.
6. Think of the adjustment that occurs when, with the economy at the equilibrium level of output, an increase in planned investment occurs. Inventories are drawn down, and output increases. If firms increase output by the amount of the increase in planned investment, equilibrium will not be reestablished. The increased output (income) will also increase consumption. Thus, there will have been an increase in Y of ΔI , but an increase in aggregate

expenditure of more than ΔI . Y must increase further to establish equilibrium. The multiplier is finite because a fraction of income is saved. Thus, as Y grows, S grows; so we will eventually reach a level of Y at which the new planned investment just offsets the leakage into savings. This will be a new equilibrium. At this point, $\Delta S = \Delta I$. Because $\Delta S = MPS \times \Delta Y$, we can solve for ΔY :

$$\Delta Y = \frac{1}{MPS} \times \Delta I.$$

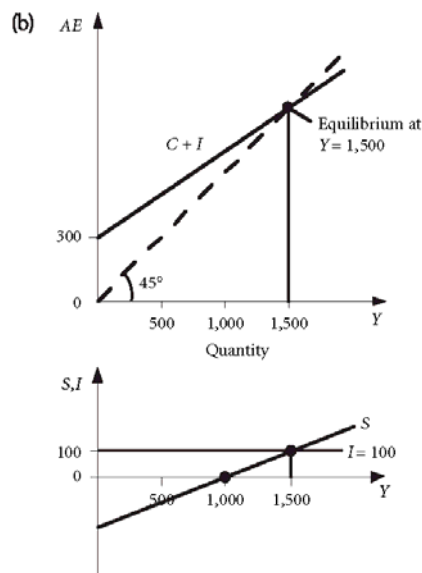
7. (a) $MPC = .8$; $MPS = .2$.

(c) $\Delta Y = (1/MPS) \Delta I$

Multiplier = $1/MPS = 1/(.2) = 5$. In this case, with the multiplier equal to 5 and an increase in investment of 10, $\Delta Y = (5)(10) = 50$. Equilibrium Y increases from 1,500 to 1,550.

(d) $S = Y - C = Y - (200 + .8Y)$
 $= -200 + .2Y$

The equilibrium must be the same in both graphs because $Y = C + I$ and $S = I$ are the same condition. To see this, remember that $Y = C + S$ always. Substitute $C + S$ for Y in the equilibrium condition $Y = C + I$ to obtain $C + S = C + I$, which simplifies to $S = I$.



8. $Y = 600$, $C = 500$, $S = I = 100$; $Y = 680$, $C = 580$, $S = I = 100$. Wealth accumulation increases Y . If the stock market gets overvalued, it inflates GDP on the way up and could deflate it on the way down adding to cyclical.
9. No. AE is *planned* aggregate expenditure. If you add unplanned changes in inventory to AE , the sum equals aggregate output (income).

CHAPTER 9

1. The debt starts at 1 million lavs at the end of year one and grows to 10 million lavs at the end of year ten. In year ten the interest on the debt will be 5% of the 10 million lavs: 500,000 lavs. Thus, government spending will be 10,500,000 lavs and taxes will be 9,000,000 lavs.

[The key to the problem is that taxes are raised to cover the interest payments each year. Thus, the annual deficit remains at 1,000,000. If the interest were added to the expenditure side but taxes were not raised each year, the total debt would grow from 1 million to over 12.5 million and the interest payment would be 629,000 in year 10.]

2. Answers will depend on events.
3. $Y = 1,000$; $C = 750$; $S = 50$; $Y = 1,060$; $C = 810$; $S = 70$.
 Pro: Higher GDP, higher employment, and saving.
 Con: If the economy is running at or near full employment, it could overheat and cause inflation as you will see later.
4. (a) Disagree. During periods of budget surplus, government debt shrinks. The debt grows only if expenditures exceed taxes.
- (b) Disagree. A tax cut will increase the equilibrium level of GDP whether the budget is in surplus or deficit. The only exception might be if the economy were at full employment.

- (c) Disagree. The expenditure multiplier is always greater than the tax multiplier if $MPC < 1$. If $MPC < MPS$, the tax multiplier is < 1 . If $MPS = .90$, the expenditure multiplier is 1.11 and the tax multiplier, MPC/MPS is 0.11.
5. *Saving* is that part of annual disposable income not spent: $S = (Y - T) - C$. *Investment* is the value of planned purchases of plant, equipment and inventory by business firms. Equilibrium occurs when $C + I + G \equiv AE = Y$. This can only occur if leakages from the circular flow, S and T , are exactly matched by injections of demand, I and G . In other words, at equilibrium, $S + T = I + G$. If $S > I$ and $G = T$, it follows that $S + T > I + G$. Leakages exceed injections, aggregate spending must be lower than aggregate output, inventories will rise and Y will fall. In other words when $C + S + T \equiv Y > C + I + G$, inventories rise and Y falls: Newt will experience a recession. If, however, $G > T$ and $S = I$, $S + T < I + G$. Injections exceed leakages, aggregate expenditure exceeds aggregate output, so inventories will fall and Y will rise.
6. (a) $Y = 1,000$, $Y_d = 800$, $C = 600$, $S = 200$, $I = 100$, $G = 200$.
Because total spending = $C + I + G = 600 + 100 + 200 = 900$ is less than total output of 1,000, one would predict that inventories will pile up, and firms will decide to reduce output.
- (b) Y would settle at 600. At this level of output, we would have $C = 300$, $I = 100$, and $G = 200$ so that $Y = C + I + G = 600$.
- (c) Cutting government purchases would make the fall in output worse! In particular, a cut of 25 would cause equilibrium Y to decline by $25(1/MPS) = (25)(4) = 100$. This would mean Y would decline to 500.
7. Dollar for dollar, an increase G has a bigger effect on output than a decrease in T . However, there are also political controversies about the efficiency and appropriate size of the government sector that would lead some to favor the tax cut even though it raises the deficit by more. In addition, taxes may create economic inefficiencies, so lower taxes may reduce these inefficiencies.
8. (a) Equilibrium with government requires that output = spending, or that $Y = C + I + G$. Since we know that $Y = C + S + T$ by definition, then equilibrium also requires that $I + G = S + T$. To see if $Y = 200$ is an equilibrium, add $C + I + G$ to obtain $160 + 30 + 0 = 190$. This is not an equilibrium because spending (190) is less than output (200). Alternatively, saving + taxes = $40 + 0 = 40$, while investment + government spending = $30 + 0 = 30$. Thus, $S + T$ is not equal to $I + G$. (Notice that there is no autonomous consumption.) In the coming months, we can expect output (Y) to decline and workers to be laid off. Equilibrium $Y = 150$. At $Y = 150$, $C + I + G = 0.8(150) + 30 + 0 = 150$.
9. If G goes up and T does not, the equilibrium level of Y rises. $C + I + G > Y$, inventories fall, and Y increases! In 1946 gross federal debt was 127.5% of GDP. Recent data (2006) put the figure at just under 65 percent.
10. There would be no automatic stabilizers. (At least none that have been presented in the text thus far. In future chapters, we will see that interest rate changes and price level changes also act as automatic stabilizers.)
There would be no distinction between the actual and full-employment deficit because changes in income would have no impact on the budget deficit.
11. (a) Govt. spending multiplier = $1/.4 = 2.5$. (b) Govt. spending multiplier = $1/(1 - .9) = 10$.
(c) Govt. spending multiplier = $1/(1 - .5) = 2$. (d) Tax multiplier = $.75/(1 - .75) = -3$.
(e) Tax multiplier = $.9/(1 - .9) = -9$.
(f) MPC must be .833. Tax multiplier = $-.833/(1 - .833) = -5.0$.
(g) MPC must be .666. Government spending multiplier = $1/(1 - .666) = 3.0$.
(h) Output will increase by \$100 billion (use the balanced-budget multiplier, which has a value of 1).

CHAPTER 9 APPENDIX B

1. $Y = C + I + G = 85 + .5(Y - T) + 85 + 60 = 85 + .5(Y - [-40 + .25Y]) + 85 + 60$
 $= 85 + .5Y + .5(40) - .5(.25Y) + 85 + 60 = 85 + .5Y + 20 - .125Y + 85 + 60$
 $.625Y = 250$
 $Y = 250/.625 = 400$
 Taxes = $-40 + .25(400) = 60$. The budget deficit is $G - T = 60 - 60 = 0$.

CHAPTER 10

1. (a) The debt increases by 5 million Rags in total; the privately held debt increases by only 4.5 million Rags because the Central Bank bought 500,000 Rags worth.
 (b) The treasury sale has no effect on the money supply; the Treasury goes to the public to borrow money that it immediately spends.
 (c) When Central Bank buys in the open market it pays with new high-powered money that becomes a part of the banking system's reserves; it pays essentially with newly printed money. The money multiplier is $1/RR$ or $1/0.2$ or 5. Thus the money supply expands by $5 \times 500,000$ or 2.5 million Rags.
2. Paying down the debt by buying bonds with tax receipts has no impact on the supply of money. Money that comes to the Treasury in tax payments is immediately returned to the economy as the bonds are paid for by the Treasury. The result is that there is no change in reserves. When the Fed buys bonds in open market operations, it uses what is essentially printed money. The whole point is to expand reserves and, thus, the money supply.
3. *Cash*: Asset—Bank has it on hand.
Demand Deposits: Liability—claims by depositors can be withdrawn at any time.
Savings deposits: Liability—same logic.
Reserves: Assets—They are in the vault as cash or on deposit with the Fed.
Loans: Assets—They represent claims of the *bank* on borrowers.
Deposits at the Fed: Assets—They can be withdrawn at any time; they are owned by the bank.
4. Decrease the reserve ratio: that would immediately free up reserves (create excess reserves) system-wide. Banks could lend more, expanding the money supply.
 Decrease the discount rate: encouraging banks to borrow reserves and lend more money, expanding the money supply.
 Buy government bonds. The Bank of Japan pays with cash or by increasing deposits in banks' accounts. This increases reserves in the system and expands the money supply.
5. Reducing the reserve requirement means that reserves of 6.24 million hurls can support 62.4 million in total deposits. The money supply could increase by as much as 10.4 million hurls. The Central Bank could counter with open market sales of bonds, withdrawing reserves from the economy.
6. If banks are loaned up and the money supply is \$1,148 billion, the 10 percent reserve requirement would imply \$114.8 billion in reserves. If the reserve requirement were raised to 11 percent, \$114.8 billion is 11 percent of \$1,044 billion. Raising the reserve requirement to 11 percent would reduce the money supply by \$104 billion.
7. If the army is unaware of the king's scheme, the plan will work temporarily, but it will also lead to an increase in the money supply, with all of the macroeconomic effects that will be studied in the next few chapters. (It will be shown that this plan will cause inflation.) If the army is aware of the king's scheme, there will be immediate inflation. The army would demand that the king pay them ten percent more coins for their wages.
8. $M2$ includes everything in $M1$, plus savings accounts, money market accounts, and some other categories. A shift of funds between, for example, savings accounts and checking accounts, will affect $M1$ but not $M2$, because both savings accounts and checking accounts are part of $M2$.
9. (a) Agree. The two sentences are correct. When the Fed sells bonds, the proceeds do not go back into circulation. Rather, the proceeds are withdrawn from the economy, reducing the quantity of reserves in the system and reducing the supply of money. Fed open market operations change the money supply.
 (b) Disagree. The expenditure (fiscal) multiplier is equal to $1/MPS$. The expenditure multiplier and the money multiplier are very different. The expenditure multiplier gives the change in equilibrium output (income) that would result from a sustained change in some component of aggregate expenditure.
10. Money injected through open market operations results in a multiple expansion of the money supply only if it leads to loans, and loans can be made only if the new money ends up in banks as reserves. If the Fed buys a bond from James Q. Public, who immediately deposits the proceeds into a dollar-denominated Swiss bank account, the U.S. money supply won't expand at all. If the money ends up in his pockets or in his mattress, the expansion of the money supply will stop right there. If he had deposited the proceeds in a U.S. bank, excess reserves would have been created, stimulating lending and further money creation.

11. (a) The bank is required to hold $.1(\$3,500) = \350 in reserves.
 (b) Excess reserves = $\$500 - \$350 = \$150$.
 (c) Assuming that money lent out by the bank gets deposited in this same bank, the bank can lend out an additional $\$150(1/.1) = \$1,500$.
 (d) New T-account:

Assets		Liabilities	
Reserves	\$300	Deposits	\$3,300
Loans	\$3,000		

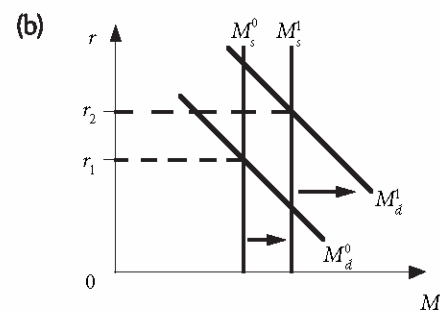
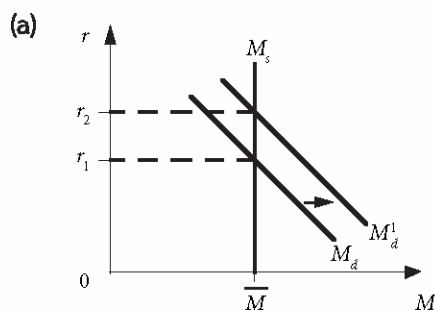
Required reserves are now \$330. The bank has deficit reserves of \$30. The bank will need to reduce its loans and increase its reserve by at least \$30. This would result in reserves of \$300, loans of \$2,700, and deposits of \$3,000.

CHAPTER 11

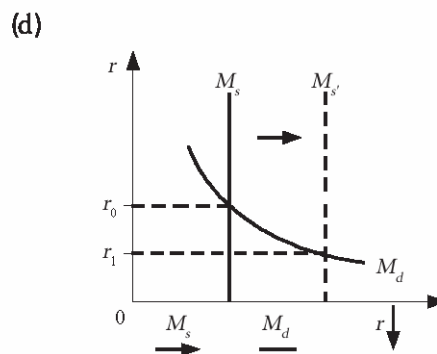
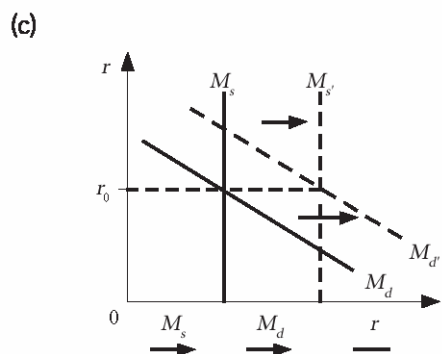
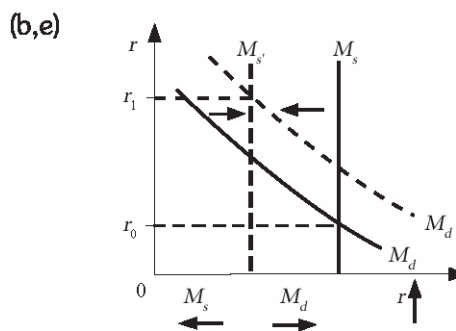
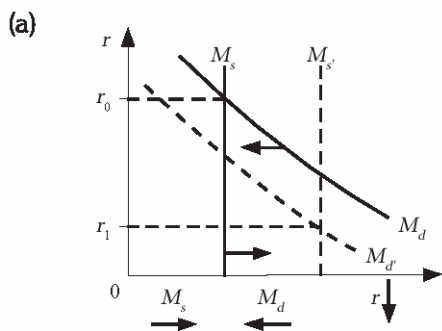
- (a) Disagree. A rise in Y increases the demand for money as more transactions take place, but the supply of money is unaffected.

(b) Disagree. *Ceteris paribus*, a rise in P means that each transaction is more expensive and households and firms need to hold more money, not less.

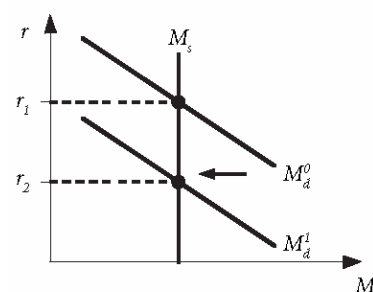
(c) Disagree, again. When the Fed buys bonds, it expands the money supply. The supply curve shifts to the right. When we experience a recession (Y falls) the demand for money falls, shifting the demand curve to the left. Both tend to push interest rates lower.
- A decline in P would shift the money demand curve to the left since transactions would require less money. If the Fed held the money stock constant, interest rates would fall.
- Back in 1981, when interest rates were very high (The Federal Funds rate actually went over 22 percent per year at one point), people with accumulated assets were more likely to hold their wealth in “bonds” in lieu of money. High interest rates mean high opportunity costs of holding cash balances. When you see safe bonds paying 18% they are hard to resist. Also, people expected rates to fall. When rates fall, bond prices will rise and that implies owners of bonds will enjoy an increase in the value of their bonds. Again, high interest rates are associated with low money demand. At the same time low interest rates are often associated with periods of high money demand since opportunity costs of holding cash are low, and people may anticipate that bond prices are likely to fall in the future. Remember that when people think that interest rates are likely to rise they want to stay out of the bond market since rising interest rates will cause bond prices to drop. This was the case in 2005 and 2006.
- This is what Keynes called a “liquidity trap” Expanding money supply would not push interest rates lower. The public would essentially hold as much money as we inject into the system. Since, as you will see, monetary policy works through lowering or raising interest rates, it will not work to stimulate the economy if the money demand curve is flat.



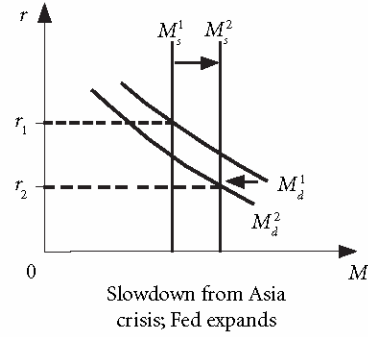
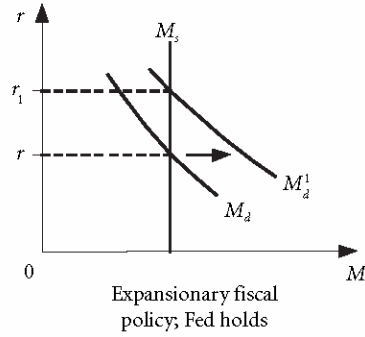
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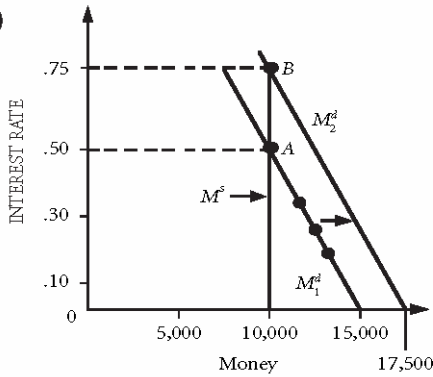
7. A recession is a decline in real GDP. When output falls, there is less economic activity and fewer transactions. Fewer transactions means that (ceteris paribus) money demand will fall. This will cause a leftward shift in the M_d curve, which results in a lower equilibrium interest rate (assuming that the money supply remains fixed).



8. Ceteris paribus, an expansionary fiscal policy at a time when the Fed wants to hold the rate of growth of the money supply steady, will drive up interest rates. First, the added expenditure will push up the growth of real GDP. The increased spending and GDP would increase the demand for money, M_d . If the Fed holds the line, $M_d > M_s$ and rates will rise. At the same time these policies hit taxpayers, the Asia crisis of 1998 hit the U.S. economy and slowed down the growth of real GDP as exports to Asia fell. By early 1998, the Fed was even thinking of expanding M_s to push r down to restore GDP growth.



9. (a,b)



The equilibrium is at $r = .5$ or 50 percent, which is found as the intersection of the money demand and money supply curves. Alternatively, we can solve for r algebraically by setting $M^d = M^s$:

$$10,000 - 10,000r + 5,000 = 10,000$$

$$\rightarrow r = 5,000/10,000 = .5.$$

(c) With $Y = 7,500$, the intersection occurs at $r = .75$. Algebraically, $10,000 - 10,000r + 7,500 = 10,000$
 $\rightarrow r = 7,500/10,000 = .75$ or 75 percent.

- (d) The demand for money curve slopes downward because at higher interest rates, holding money entails a higher opportunity cost (foregone interest). Individuals will try to economize on money holdings at higher interest rates. We need money supply equal to what money demand would be when $r = .5$. Money Demand = $10,000 - 10,000(.5) + 7,500 = 12,500$. Increase the money supply by \$2,500, to \$12,500.
- (e) One possibility is that the price level has fallen, shifting the money demand curve back to its original position.

CHAPTER 11 APPENDIX A

1. Rates in 1980 were much higher due to higher inflation and higher expected inflation. The higher interest rates in 1980 were due to a higher “inflation premium” based on this expected inflation.

In 1980, most debt holders believed that the inflation rate would decrease in the future. Long-term debt thus had a lower inflation premium than short-term debt. In 1993, the situation was reversed: inflation was unusually low, but many debt holders were wary of higher inflation rates in the future. Thus, it was long-term debt in this case that carried the higher inflation premium.

CHAPTER 11 APPENDIX B

1. (a) Peabody should hold the amount of money that maximizes the “net profit” from holding money, balancing the convenience of money against the opportunity cost of foregone interest.
(b) At $r = 10\%$ per month:

Number of Switches	Average Holding	Average Bond	Interest Earned	Cost of Switch	Net Profit
0	\$750	0	0	0	0
1	375	375	37.5	4	33.5
2	250	500	50	8	42
3	187.5	562.5	56.25	12	44.25
4	150	600	60	16	44

The optimal number of switches is 3, with average money holdings of \$187.50.

- (c) At $r = 15\%$ per month:

Number of Switches	Average Holding	Average Bond	Interest Earned	Cost of Switch	Net Profit
	\$750	0	0	0	0
1	375	375	56.2	4	52.25
2	250	500	75	8	67
3	187.5	562.5	84.38	12	72.38
4	150	600	90	16	74
5	125	625	93.75	20	73.75

The optimal number of switches is 4, with average money holdings of \$150.

- (d) At $r = 20\%$ per month, the optimal number of switches would increase to 5 and money holdings would decrease to \$125. An increase in the interest rate increases the opportunity cost of holding money.

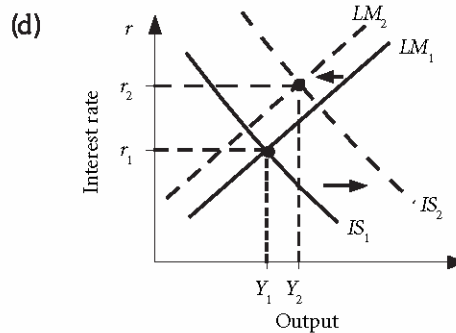
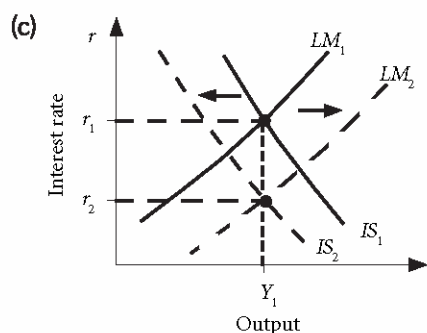
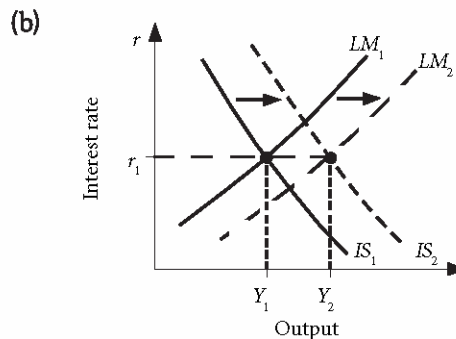
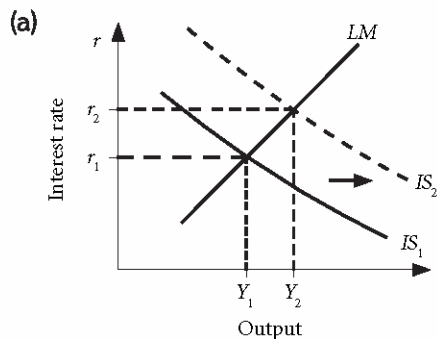
CHAPTER 12

1. The bank hoped that the rate cut, brought about by an increase in the money supply, would increase investment spending (I). This would cause $C + I + G > Y$, inventories would fall and GDP (Y) would rise. Y increasing would set off a multiplier effect with C rising.
2. Answers will depend on what happens, and markets are hard to forecast. While in some areas price increases slowed by the end of 2005, there was as yet no evidence of a decline. Residential investment similarly showed no sign of a significant downturn by early 2006. But many believe the market will show more softness as 2006 and 2007 unfold.
3. Taxes (T) rise, causing disposable income (Y_d) to fall. When Y_d falls, C falls, causing $AE < Y$. When $AE < Y$, inventories rise and firms cut back on output/income: Y falls and unemployment rises. If I were the central bank and I wanted to counteract these effects, I might lower interest rates to try to stimulate investment with expansionary money policy.
4. (a) If investment depended in no way on interest rates, planned investment in Figure 12.2 would be represented as a vertical line.
(b) A change in interest rates would cause no change in planned aggregate expenditure because planned investment would not change. (One could argue that consumption spending might change, but we have not yet discussed the impact of interest rates on consumption spending.)

- (c) Fiscal policy would become more effective than monetary policy. Fiscal policy directly influences aggregate output by changing government spending or consumption and would still be effective. (Indeed, it would be more effective since, in this case, there would be no crowding out.) Monetary policy depends on the responsiveness of investment to changes in interest rates to influence aggregate output and would become completely ineffective.
5. (a) Because these two policies have opposite effects on aggregate spending, the result is ambiguous. The tax cut raises Y_d and thus C . $C + I + G < Y$. Inventories fall and Y rises. At the same time, if M_s is cut by the Fed, r rises. Higher r leads planned investment (I) to fall. Lower I implies $C + I + G < Y$ inventories rise and Y falls. The only thing certain is that r will rise because the tax cut leads to an increase in M_d .
- (b) In 2003, the tax cuts caused disposable income to rise. When Y_d rises, C increases and $C + I + G > Y$. Inventories contract, causing Y to rise. Higher Y causes money demand M_d to rise. If M^s is fixed, that will cause r to rise. This will cause I to fall, partially offsetting some of the rise in aggregate expenditure and Y .
- (c) The tax increase reduces disposable income and thus consumption. $C + I + G < Y$, so inventories build and output falls. A lower Y means lower money demand. At the same time, since the Fed is increasing the money supply, interest rates will fall, causing I to rise, perhaps offsetting the effects of the initial tax increase on Y . (Final result: ambiguous Y , lower r .)
- (d) The drop in consumption cuts aggregate expenditure: $C + I + G < Y$, so inventories rise and Y falls. As Y falls, money demand drops. If the Fed holds M^s constant, r will fall. Here again, the lower r may stimulate I , causing I to rise, partially offsetting the initial decline in Y . (Final result: lower Y , lower r .)
- (e) The Fed expands the money supply. $M^s > M_d$, so r falls. Normally, the lower r might be expected to cause I to rise, but gloomy expectations and no need for new plant and equipment keep I low. Thus the link to the goods market is broken, and the monetary policy doesn't have much impact. (Final result: lower r , little or no change in Y .)
6. (a) Increased investment spending would cause an increase in output (income), which would increase money demand and drive up the interest rate. The Fed could be expected to respond with an increase in the money supply to hold down the interest rate. Output, consumption, saving, and investment spending would increase. The interest rate would remain constant.
- (b) The money supply would decrease, causing an increase in the interest rate. The Fed would respond with an increase in the money supply, bringing the interest rate back down to its original level. In the end, there would be no change in output, consumption, saving, investment, or money demand.
7. (a) The decline in investment would be a reduction in aggregate expenditure, causing equilibrium output (income) to decrease in the goods market. In the money market, the drop in income would decrease the demand for money (shift the M^d curve to the left), causing the interest rate to fall and investment spending to rise back up somewhat. However, the net effect would be a decline in output (income) and the interest rate.
- (b) Option 3 is the most expansionary, because the increase in the money supply works to offset the crowding-out effect. Option 2 would come next, but would involve some crowding out. Option 1 would be at least expansionary, because the tax increase would decrease consumption spending. (Option 1 relies on the balanced-budget multiplier, which has a value of 1. Option 2 relies on the government spending multiplier, which is larger than 1.)
8. Investment may not respond positively to low interest rates during a recession because decreased production may have left the firm's existing capital underutilized. In this case, there would be no incentive to buy new plant and equipment. Investment may not respond negatively to high interest rates during a boom because the increased consumer demand arising from increased income may make expansion profitable despite the higher cost of borrowing.

CHAPTER 12 APPENDIX

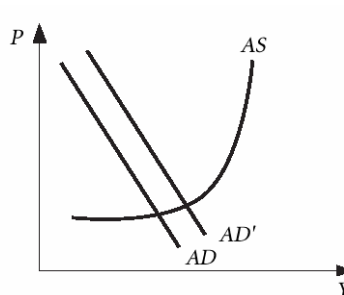
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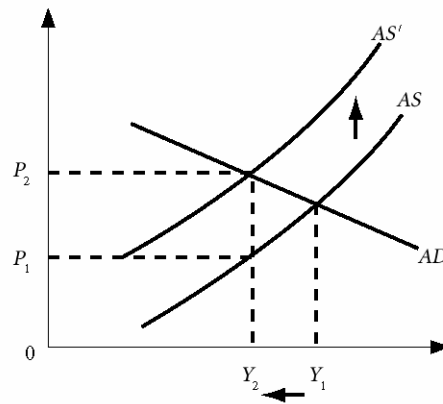
(For part (c) and (d), output can either increase or decrease, depending on the relative shifts of the two curves.)

CHAPTER 13

1. Both monetary expansion to push (and hold) down interest rates and expansionary fiscal policy (G up and T down) shift AD to the right. Because the price level did not rise but Y did, we know we are on the flat part of the AS curve.

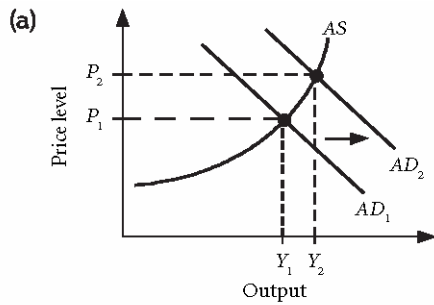


2. An increase in the price of timber and building products increases the cost of production in the housing and real estate sectors. Higher costs will mean that building firms slow down. A cost increase pushes up the aggregate supply curve (the same as a shift to the left). This has the effect of pushing up the price level and reducing the level of aggregate output in the short run. Assuming the Fed does nothing to the money supply, interest rates could rise or fall. The increase in the price level will cause money demand to shift to the right while falling real output will cause it to shift to the left.

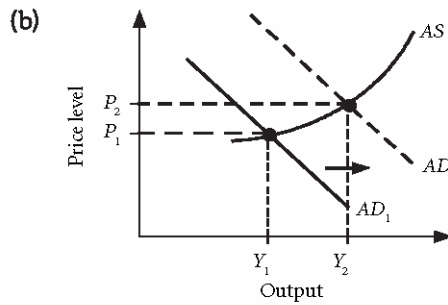


3. This is not a good explanation for the downward slope of the AD curve. The curve actually slopes down because an increase in the price level causes the demand for money to rise, driving up the interest rate and discouraging investment, which causes aggregate income to fall. The higher interest rate may also discourage consumption and the higher price level may lower the value of some types of wealth. The AD curve is not like a market demand curve.

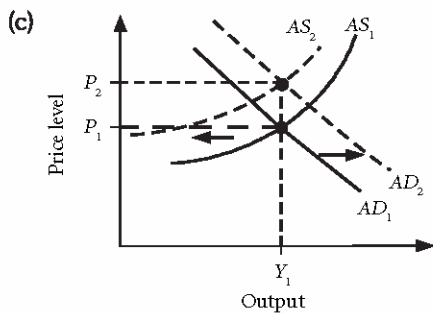
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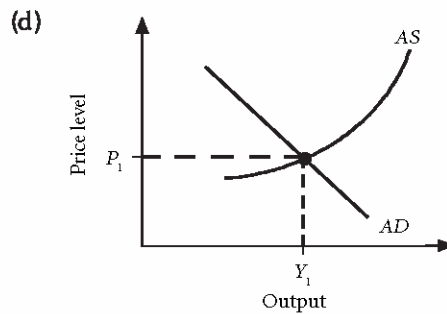
The price level will rise considerably. Equilibrium GDP will rise only a little.



GDP will rise considerably; prices will rise only a little.

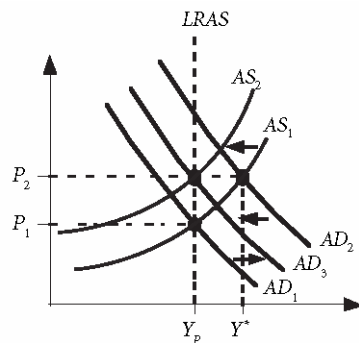


The price level will rise considerably. Equilibrium GDP may fall, but by less than it would if the Fed did not accommodate.

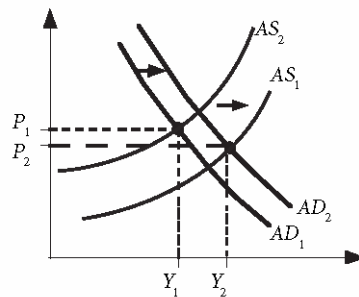


Neither the price level nor output would change. The fiscal and monetary policies have opposing effects on the AD curve. If they are of equal strength, there will be no shift in the curve.

5. (a) *AD* shifts to the right pushing equilibrium beyond Y_p (potential GDP). The price level rises. Costs rise causing the *AS* curve to shift upwards. The Fed belatedly contracts driving r up shifting the *AD* curve back down, down, pushing Y^* back to Y_p at a higher level of P .

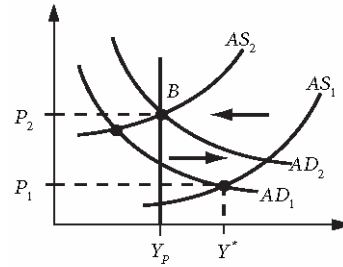


- (b) Aggregate supply shifts right. Aggregate demand also shifts to the right, but not as far, so the price level falls.

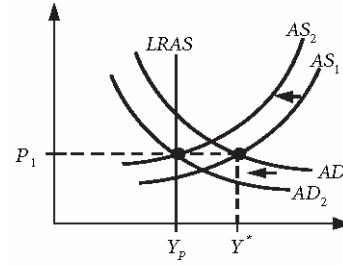


6. Answer will depend on events.

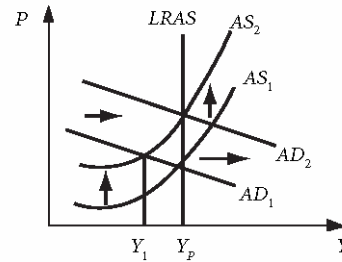
7. (a) If the short-run aggregate supply and aggregate demand curves intersect to the right of Y_p , wages and other input prices will rise, causing aggregate supply to shift left. If at the same time there is an increase in the money supply, aggregate demand will shift right. The expansionary monetary policy increases the rise in the price level that will occur in the long run as the economy adjusts back to full employment at Point B .



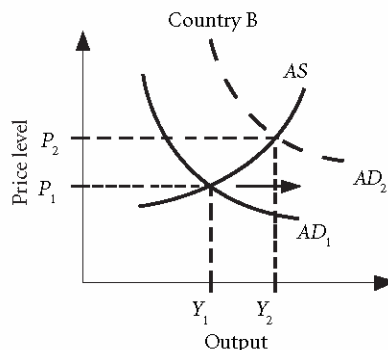
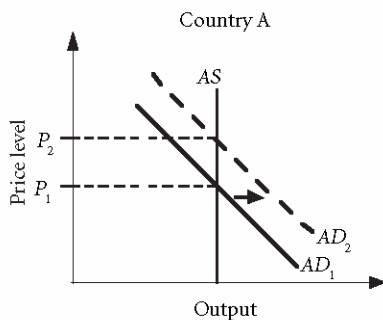
- (b) If the short-run aggregate supply and aggregate demand curves intersect to the right of Y_p , wages and other input prices will rise, causing aggregate supply to shift left. If at the same time a decrease in government spending and in the money supply occurs, aggregate demand will shift left. If the shift in aggregate demand is great enough, the price level will not have to rise during the adjustment process.



- (c) The increase in oil prices pushes the aggregate supply curve up. Without Fed accommodation, the higher price level would raise interest rates and GDP would drop below Y_p – a recession. But the Fed accommodates the rise in price level, shifting the AD curve to the right and holding GDP at Y_p . In the long run, if oil price return to their originals level, and the Fed returns to its original policy, AD and AS will shift back to their original positions.



8. The actual physical capacity of existing plants represents the maximum output level the economy could produce in the short run. It is where the short-run AS curve becomes vertical. Potential GDP is the maximum output the economy could maintain in the long run without exacerbating inflation. It is less than full-capacity output because the bottlenecks and labor shortages that would exist at full-capacity output would cause wages and input prices to rise, leading to worsening inflation.
9. Expansionary monetary policy is likely to have a greater effect in country B. Because production costs adjust automatically to price increases in country A, the AS curve will be vertical. A rightward shift in the AD curve would cause an increase in prices without increasing output because costs increase at the same time as prices. In country B, input prices lag behind output prices, so the short-run AS curve is not vertical. In the short run, a rightward shift in the AD curve will cause an increase in output.



CHAPTER 14

1. An improved trade-off between inflation and unemployment could be the result of a leftward shift in the Phillips Curve. This could be the result of increased productivity, a more efficient labor market, falling world prices, or other supply-side factors. The tradeoff would be worsened by decreases in productivity and increases in resource prices (like the increased price of oil at the end of 2000 and beginning of 2001).
2. Answers will vary.
3. Answers will vary depending on what occurs.

4. (a) If the minimum wage is 9 slugs per hour, then:

$$Q_D = 100 - 5(9) = 55 \text{ million workers}; Q_S = 10(9) - 20 = 70 \text{ million workers.}$$

The excess supply of labor (number of unemployed) would be $70 - 55 = 15$ million workers. The unemployment rate would be $15/70 = .214$ or 21.4%.

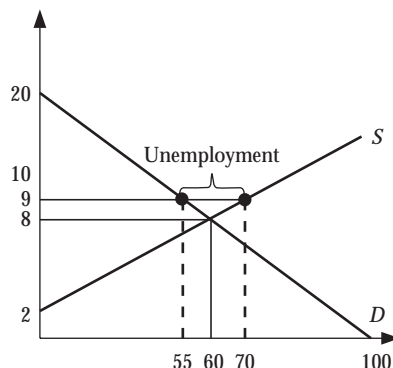
- (b) With no minimum wage, the equilibrium wage is found by setting labor demand equal to labor supply:

$$100 - 5W = 10W - 20 \rightarrow 120 = 15W \rightarrow W = 8 \text{ slugs per hour.}$$

Equilibrium employment is found by substituting $W = 8$ into either the labor-demand or labor-supply equation:

$$Q_D = 100 - 5(8) = 60 \text{ million workers}; Q_S = 10(8) - 20 = 60 \text{ million workers.}$$

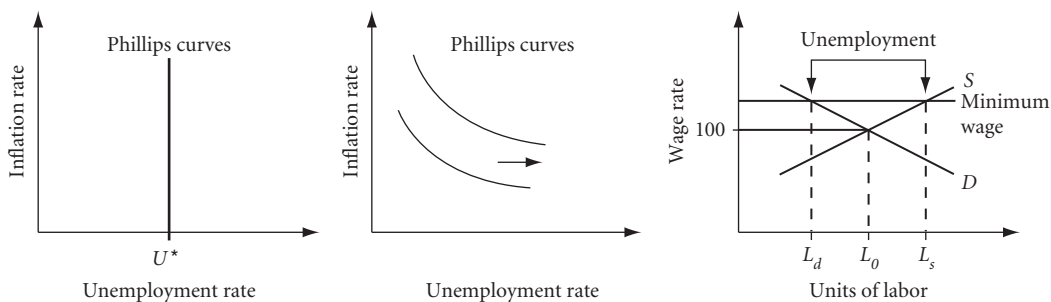
The labor force shrinks from 70 million to 60 million workers. Total employment rises from 55 million to 60 million workers. The unemployment rate shrinks from 21.4% to zero. (The model assumes no frictional unemployment.)



- (c) The labor market might not adjust so quickly due to wage rigidity, which has a number of possible causes, including implicit and explicit contracts, worker concerns over their relative wages, and firms' concerns over the decline in productivity that might follow a wage cut.
5. (a) This policy would decrease frictional unemployment by helping employers and workers find each other. The time spent in job hunting would be reduced.
- (b) This policy would decrease structural unemployment by making it profitable to hire workers who would otherwise not be productive enough to employ. (To some extent, however, teenage workers might be substituted for existing workers, thus lessening the impact on unemployment.)
- (c) This policy would reduce structural unemployment by providing workers with skills needed in new or expanding industries.
- (d) Typically this policy is a means to cope with cyclical unemployment, although it could also address structural unemployment (at a cost) if the government was willing to maintain the policy.
- (e) This policy is similar to the policy in (a).
- (f) This is an attempt to reduce cyclical unemployment by encouraging workers to accept relatively small wage increases, which means relatively more of them will be hired.
6. The wage increase may be inefficient to compensate for rising prices. If a wage increase is less than the tax rate of inflation, real wages fall.

7. (a) The effect of a higher wage tax on household labor force behavior is ambiguous. Workers may respond to the decrease in after-tax wage by consuming more leisure, which now has a lower opportunity cost, so that labor supply will fall. However, workers are worse off. Since leisure is normal good, consumption of it might fall and thus labor supply might rise. At the same time, lower Social Security benefits might force the elderly back into the workforce. With higher benefits, some elderly may stay out of the workforce or be able to continue their retirement.
- (b) Improved child care reduces the opportunity cost of working. It is likely to attract more parents to the work force, increasing the labor force and labor supply. It would also reduce the demand for labor by increasing the full costs of hiring a worker. Over the short run, during which some wage rigidity is likely, the effect of an increase in labor supply and a decrease in labor demand would be an increase in the unemployment rate.
- (c) Increased immigration will increase labor supply at a given wage rate without a corresponding increase in jobs. With short-run wage rigidity, unemployment will rise.
- (d) Labor supply (and the labor force) should increase as more workers begin to seek even low-paid work to support themselves. With short-run wage rigidity, unemployment will rise.
- (e) Increased investment might increase or decrease labor demand, depending on whether the new capital is more complementary to or substitutable for labor. There would be no immediate impact on labor supply. The effect on employment and unemployment would be ambiguous.

8.



9. Answers will vary.

10. The trade-offs would likely not be identical largely because of differences in institutions in the two countries. For example, Japan had a tradition of "lifetime" employment for male workers in the country's largest industries. As a result, there are fewer layoffs in Japan, and it probably has a lower natural rate of unemployment than does the United States.

CHAPTER 15

1. The Fed began cutting interest rates in June of 2000 when the Fed Funds Rate was 6.5%. Rates were cut steadily through mid 2003 when The Fed Funds Rate hit 1%. The federal budget was in surplus in 2001 as a whole when the surplus was \$40 billion according to the Bureau of Economic Analysis. In 2002 the deficit was \$354 billion. There seems to be a bigger response lag for fiscal policy.
2. Answers will depend on events.
3. When the economy contracts, both taxable income and corporate profits fall, causing a decrease in tax revenues. In addition, some government expenditure categories, such as unemployment insurance benefits, tend to rise. With decreased tax revenues and increased government expenditures, the government deficit typically rises when the economy contracts.
4. (a) $Y = C + I + G = 100 = .8Y_d + 60 + 80 = 100 + .8[Y - (-150 + .25Y)] + 60 + 80$
 $= 100 + .8Y + 120 - .2Y + 60 + 80 = 360 + .6Y$

$$Y = 360/.4 = 900$$

$$D = G - T = 80 - [-150 + .25(900)] = 5$$

(b) With $G = 75$

$$Y = C + I + G = 100 = .8Y_d + 60 + 75 = 100 + .8[Y - (-150 + .25Y)] + 60 + 75$$

$$= 100 + .8Y + 120 - .2Y + 60 + 75 = 355 + .6Y$$

$$Y = 355/.4 = 887.5$$

$$D = G - T = 75 - [-150 + .25(887.5)] = 3.125$$

The deficit is not zero because the cut in government spending shifts the AD curve to the left, decreasing aggregate output and causing a drop in the net tax revenue. Although the original cut in government spending would seem to eliminate the deficit, the resulting drop in GDP tends to raise the deficit, so the net effect is a deficit that is smaller, but not zero.

(c) The deficit response index (DRI) is the amount by which the deficit changes in response to a one-dollar change in GDP. In this example, the deficit changed for two reasons. The decrease in G had a direct effect of decreasing the deficit by \$5 billion. The decrease in GDP of 12.5 billion caused the deficit to increase by $.25(12.5) = \$13.125$ billion due to the loss in tax revenue. This latter effect is what is measured by the DRI. $DRI = 3.125/12.5 = .25$.

To find the required change in G to eliminate the deficit, note that in this example $\Delta \text{deficit} = \Delta G - \Delta T = \Delta G - .25(\Delta \text{GDP})$. We also know that $\Delta \text{GDP} = 2.5(\Delta G)$. Combining these two equations give us $\Delta \text{deficit} = \Delta G - .25(2.5 \Delta G) = .375 \Delta G$. We need $\Delta \text{deficit}$ to equal -5 , so $-5 = .375(\Delta G)$ or $\Delta G = (-5/.375) = -13.33$. Government spending must be cut by \$13.33 billion.

(d) With $I = 55$

$$Y = C + I + G = 100 = .8Y_d + 55 + 80 = 100 + .8[Y - (-150 + .25Y)] + 55 + 80$$

$$= 100 + .8Y + 120 - .2Y + 55 + 80 = 355 + .6Y$$

$$Y = 355/.4 = 887.5$$

$$D = G - T = 80 - [-150 + .25(887.5)] = 8.125$$

Following the methodology of part (c), we need $\Delta \text{deficit}$ to equal -8.125 so $-8.125 = .375(\Delta G)$ or $\Delta G = (-8.125/.375) = -21.67$.

5. States that must have balanced budgets are unable to use spending and taxing to offset local economic shocks. Moreover, an adverse shock that sends the state budget into deficit requires the state to raise taxes or cut spending, which will cut local spending and exacerbate the impact of the shock. The effect is therefore destabilizing.

If all states followed this philosophy, the effect would be destabilizing on a national basis. Adverse shocks would send the economy into recession, causing the federal deficit to swell. If states cannot pursue expansionary policies to help a nation out of the recession, then they must rely more heavily on the federal government to do so. Thus, a larger increase in the federal deficit will be necessary to stimulate the economy than would otherwise be the case.

6. The Fed “leans against the wind” when it increases the money supply to lower interest rates to counteract contraction of the economy, and decreases the money supply to raise interest rates to counteract rapid expansion. These policies are designed to stabilize the economy.

7. Stabilization policy may be difficult to carry out because there are time lags in the economy’s response to such policies. Stabilization policies can thus be destabilizing because they may affect the economy much later, when the adjustments are no longer desirable.

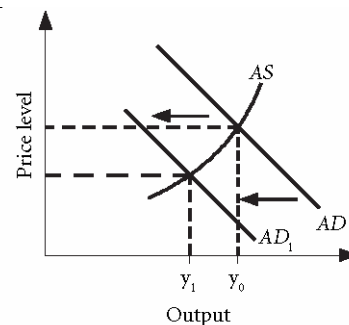
8. It takes a full year for the spending multiplier to take effect because neither individuals nor firms alter their spending plans immediately. It takes time for the additional income derived from increased government spending to be translated into additional purchases, and when taxes are cut, there are also decisions to be made about what portion of the tax cut to spend and what to spend it on. This makes correct timing of fiscal policy more difficult.

CHAPTER 16

1. (a–g) Answers will vary.
2. (a–d) Answers will vary.
3. Bond prices depend on the duration of the loan and the risk. Since the duration is exactly the same in both cases, the entire differences must be due to risk. Treasury bonds are backed by the “full faith and credit of the United States Government,” and are considered to be risk free. There is a slight probability that GM will not be able to pay off the bonds in 10 years. Buyers are demanding a higher interest rate because GM is not doing well and could default.
4. Certainly such big drops have large effects on the wealth of households in these countries. Consumers in these countries are, therefore, likely to spend less, dropping C and eventually Y . Recessions are likely to result. There are several possible problems for the United States. First, Americans are invested in foreign stock markets so there is a modest wealth effect in the United States. Second, recessions in foreign countries mean that their consumers buy less from the United States and export demand drops. Finally, prices of imports from these countries could fall, competing with U.S. firms.
5. Answers will vary.
6. Answers will depend on events.

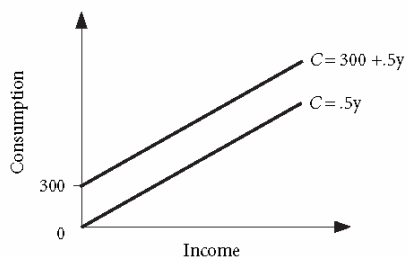
CHAPTER 17

1. Productivity must have increased. It must be the case that the United States was producing more output with fewer workers. This could be in part the result of firms holding onto excess labor after the peak of the cycle. Holding excess labor and capital may be efficient if a downturn is seen to be short. The 2001 recession led to slow growth particularly in terms of profits. Firms may just have been slow to cut their workforces.
2. Certainly, there was some relief from government programs such as TANF (Temporary Aid for Needy Families) that replaced some of the lost income. Second, people have to spend a certain amount for things like food, shelter, and health care using savings or temporary employment to pay for them. Third, most people expected to return to their lives eventually and to earn a higher permanent income. In the meantime, they do not fully adjust their lifestyles to their temporary drop in income.
3. (a) When the cost of borrowing is higher, households are less likely to buy items for which they must borrow money such as consumer durables (automobiles and houses). Firms face a higher cost of capital when r rises, thus the rate of investment spending is likely to fall.
 (b) A fixed rate bond paying 7 percent for the next 10 years is simply worth less to its holder if potential buyers can now get 8 percent by buying a new bond.
 (c) When wealth falls, consumers are less well off. Their net worth is lower and they are inclined to spend less. Thus, higher interest rates have a secondary effect on consumer spending by reducing wealth, which leads to lower consumption spending. The AD curve shifts further to the left than the direct effect on investment would suggest.

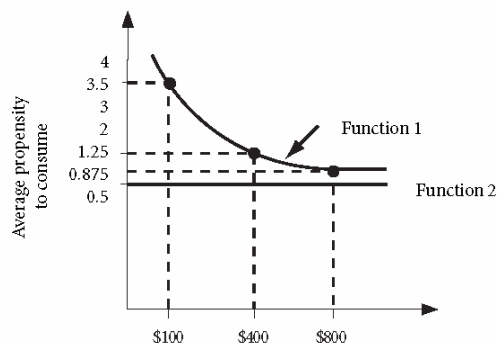


4. When taxes are cut, after-tax wages rise. People keep a larger portion of their wages. The substitution effect refers to the fact that the opportunity cost of leisure is higher after the after-tax wage increase. That would imply that people would work more in response to the Bush tax cuts. On the other hand, when tax rates are cut, people have higher incomes after tax. To the extent that leisure is a normal good—higher income leads to more consumption of normal goods—people would consume more leisure and work fewer hours. The ultimate effect will depend on how strong the two effects are. In reality, some people will work more and others less. Since the two act to offset each other, the aggregate effect is likely to be small.

5.



(a)



For the first consumption function:

If $Y = \$100$, $C = 300 + .5 \times 100 = 350$, $APC = 350/100 = 3.5$

If $Y = \$400$, $C = 300 + .5 \times 400 = 500$, $APC = 500/400 = 1.25$

If $Y = \$800$, $C = 300 + .5 \times 800 = 700$, $APC = 700/800 = .875$

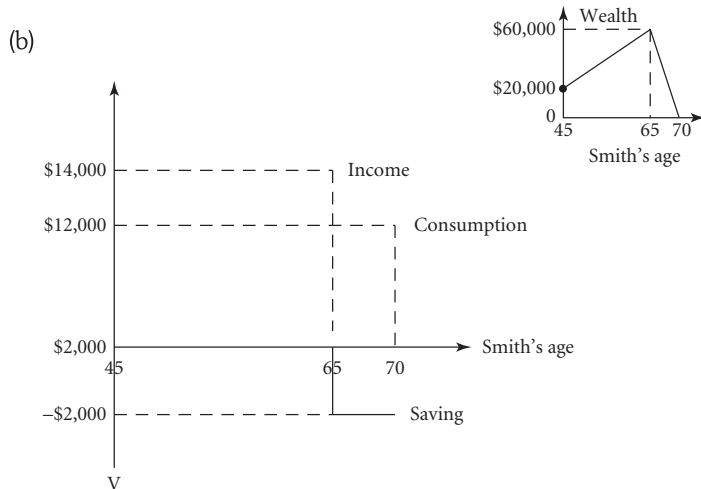
For the second consumption function:

If $Y = \$100$, $C = .5 \times 100 = 50$, $APC = 50/100 = .50$

If $Y = \$400$, $C = .5 \times 400 = 200$, $APC = 200/400 = .50$

If $Y = \$800$, $C = .5 \times 800 = 400$, $APC = 400/800 = .50$

- (b) For the first consumption function (with the constant term 300), as income increases, APC decreases. For the second consumption function (with no constant term), the APC remains constant as income increases.
- (c) For the first consumption function, the APC is always larger than the MPC . For the second consumption function, the APC is equal to the MPC .
- (d) When income changes, it is the MPC (not the APC) that determines how consumption spending changes. Even though the $APCs$ for the two families differ, the $MPCs$ are the same. Thus, the decrease in consumption in one family is the same as the increase in consumption in the other.
6. (a) The value of homes is an important component of household wealth. When home prices rise, household wealth rises and consumption tends to increase. When home prices fall, household wealth falls and consumption decreases.
- (b) Because changes in consumption are changes in aggregate expenditure, they lead to changes in output and employment in the same direction.
7. (a) Over his life, Smith will have a total of $\$20,000 + 20 \times 14,000 = \$300,000$ available for spending. He has 25 years to consume, so each year his consumption will equal $\$300,000/25 = \$12,000$.
- (b) Smith's annual saving is equal to the annual increase in his wealth. When Smith is 65, his wealth starts to decline because his consumption continues to be $\$12,000$ while his income goes to zero. When he dies, Smith has zero wealth.



{Notes: Income goes to zero at age 65. Saving goes to -\$2,000 at age 65}

- (c) The permanent tax rebate will give additional lifetime income of $\$100 \times 20 = \$2,000$. This must be spread out over 25 years, so consumption each year will be $\$2,000/25 = \80 higher than before.
 - (d) The temporary tax rebate increases lifetime income by only \$100. Each year, consumption will be $\$100/25 = \4 higher than it was before.
8. A given consumption path requires a given amount of lifetime income to pay for it. But, given initial wealth, lifetime income is determined by working hours. This implies that income is not really an “independent” variable in the consumption function. Rather, the desire to consume and the desire to enjoy leisure together will determine how much income one will earn.
 9. Investments is the creation of new capital. Expectations of future sales determine how much capital a firm will want to have in place in the future. To have this capital when it is needed, investment spending must take place in earlier periods. Because expectations of future sales are affected by government policy announcements, release of economic data, and “animal spirits”—all of which can change rapidly—the resulting investment spending is quite volatile.
 10. Maintaining inventory stocks helps a firm maintain a smooth production level. When sales unexpectedly increase, goods can be sold out of inventory. When sales unexpectedly decrease, goods can be added to inventories. By smoothing production, a firm can save on the adjustment costs associated with frequent changes in capital stock and employment levels. The cost of this policy is the forgone interest from investing funds in inventory stocks instead of lending out the money in financial markets.

CHAPTER 18

1. The new technology clearly enhances productivity. There are countless examples. Just imagine writing a paper or doing research without a search engine. Law clerks can do in ten minutes what would have taken a hundred hours to do reading printed documents and looking through newspapers. There are also the effects of E-mail and on-line banking, and the list goes on. Any time you get over expansion in a sector, inventory builds and output falls. We upgraded and changed most of the systems in the country for the Y2K bug. Everyone and every business put up a website during that period. The economy ‘overbuilt’ the new technology and a downturn was inevitable.
- 2.

Table 1		Table 2		Table 3	
Y/L	Growth Rate	Y/L	Growth Rate	Y/L	Growth Rate
4.28	—	4.28	—	4.28	—
4.23	3.7	4.41	3.9	4.45	5.0
4.17	3.6	4.53	3.9	4.63	5.0
4.12	3.7	4.66	3.9	4.81	5.0

In Table 1, *L* is growing rapidly while *K* is growing slowly. It is likely that much of the growth in *Y* is due to growth in *L*. Because of diminishing returns to *L*, it is not surprising that *Y/L* is declining. In Table 2, *L* is growing slowly while *K* is growing rapidly. In this case, it seems that the growth in *Y* is caused mainly by growth in *K*. The ratio *Y/L* is increasing because each worker has more capital with which to work.

Finally, in Table 3, both L and K are growing slowly relative to Y . Technology must be the cause of most of the growth in Y in this case. This technological improvement also has the effect of increasing the amount of output per worker (Y/L).

3. This is a current events question. Answers will vary.
4. The key focus of the tax law proposals is on capital. When the capital stock grows, output is likely to grow and labor productivity is likely to increase. This can be accomplished by increasing investment directly or by influencing saving. A number of provisions are designed to encourage saving. Lower taxes on capital gains, dividends, and interest income are designed to increase the after-tax returns that people can earn on their saving. That increases the opportunity cost of present consumption. Higher savings increases the pool of available resources to firms and brings down the cost of capital. The investment tax credit is a direct reduction in the cost of capital... a 10% ITC reduced taxes by 10% of the amount of investment. This is a direct stimulus to investment.
5. In the short run, output responds to aggregate expenditure, and an increase in consumption will cause output and employment to increase. In the long run, output will gravitate to potential output, so fluctuations in aggregate expenditure are less relevant. However, higher levels of consumption spending in the long run use up funds and resources that would otherwise be available for the purchase of capital equipment by business firms. Thus, in the long run, high consumption spending slows down economic growth.
6. Assuming that the economy stays at full employment, the bill would cause the economy to produce more capital goods and fewer consumption goods. This would lead to a higher growth rate over time. The trade-off is less consumption today. There are also distributional consequences. Capital income earners (who have higher incomes on average) would benefit. Higher-income households (who spend a smaller fraction of their incomes) would bear relatively less of the consumption-tax burden, while low-income households (who spend a higher fraction of their incomes) would bear relatively more of the consumption-tax burden.
7. (a–d) There is no right answer in each case. In vegetable farming and airline transportation, obvious candidates are bushels of vegetables and air passenger miles, respectively. In these two sectors, productivity can be measured with at least some degree of accuracy. However, even these present problems. For example, vegetables are now genetically engineered, and air travel is much faster. A trip from Boston to Paris on the Concorde takes 3 hours and has a high cost in dollars. The same trip costs much less and takes many more hours on a more conventional aircraft. Output measures for software firms are very difficult to arrive at. Every application is different, and every program provides a different set of services. Education is similar. One could imagine measuring “contact hours” or number of classes, but consider the difference between an hour of biochemistry at Stanford and an hour of hair dressing at a proprietary school. The product in each case is human capital. How to measure it is a problem in both theory and practice.
8. High budget deficits are financed with private saving. That saving otherwise would have found its way through financial markets into private capital production. If the deficit is used to finance current expenditures such as paying judges and congresspeople, it is not contributing to an expansion of output in the long run. The same is true of a tax cut, which is used to increase current consumption expenditures. But if the government used the money to build capital, such as roads and bridges, or to increase human capital through better education and job training, it would at least offset part of the reduction in private investment spending. Whether the net result for output growth is positive or negative depends on whether private capital or public capital has a higher rate of return. This is a subject of much debate and would depend on the specific capital expenditures undertaken by the government.
9. One principal stimulus to growth is capital accumulation. Capital investment requires saving and saving come mostly from the rich rather than the poor. Also, growth requires high incentives for those who work and invest in the “right” way (the way that matches consumer desires most closely), and this means that the rewards for work and investment will be unequally distributed. It is possible for the poor to benefit from economic growth because capital accumulation ultimately raises wages. Also higher average incomes can mean more tax revenues, which can be used to finance government programs aimed at helping the poor.
10. Answers will vary.

CHAPTER 19

1. (a) It's hard to make predictions based on two numbers, but if you took them as signs of a trend you would worry anytime the money supply (M_1) was growing more rapidly than the rate of real growth (rate of growth of real GDP). Thus Canada and Japan seem to have the biggest problem, followed by Australia and Britain. Money supply growth in the United States is much less than its rate of growth of real GDP.
- (b) If you were a Keynesian, and assuming an activist central bank, you might interpret high rates of money growth as indicators of expansionary policies (for example in Japan).
2. (a) Graph I: Supply-side economics: It focuses on the supply-side effects of a tax cut and tends to ignore the demand-side impacts. Tax cuts should increase the incentive to work, save, and invest. If work effort, saving, and investment all increase, the AS curve will shift to the right, increasing output and reducing the price level. The extent to which the supply curve is likely to shift depends on the responsiveness of behavior to the tax cuts. This is the subject of much controversy.

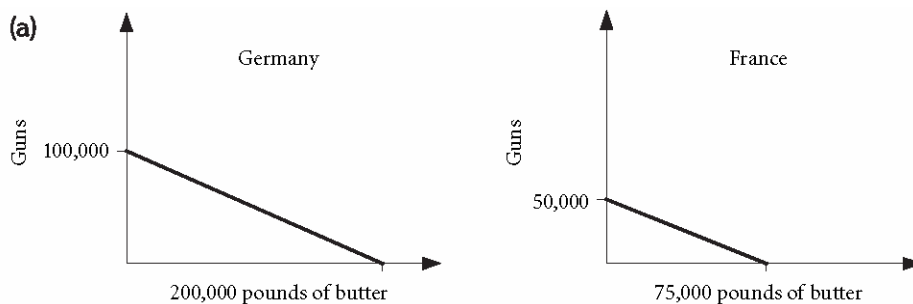
Graph II: Monetarism/New classical economics. Both schools believe that fiscal policy cannot have an impact on the level of real output. Monetarism believes that nominal GDP cannot change as long as the money supply and the velocity of money remain constant. Thus, real GDP will not respond to a tax cut. New classical theories predict that "anticipated" fiscal policies will have no effect on real GDP, which remains at the potential output level determined in the long run in markets such as the labor market.

Graph III: Keynesian economics. As long as the economy is not operating at capacity, and as long as the Fed accommodates somewhat by increasing the money supply, a permanent tax cut can increase the level of real GDP and is likely to be inflationary. The impact on the price level is determined by how close to capacity the economy is operating.
- (b) Individual response.
3. Answers will vary.
4. The supply-side logic is that cutting taxes increases the incentive to work, save, and invest. Expanding the workforce and the capital stock clearly can have an expansionary effect allowing the economy to grow more rapidly. But a lower T means that disposable income, Y_d , rises. Higher disposable income increases C and, thus, aggregate expenditure. If $AE > Y$, inventories contract and Y rises. Thus, the AD curve shifts; there is an expansionary demand-side effect.
5. Answers will vary based on where students reside.
6. Nominal income = $M \times V = (\$1,000)(5) = \$5,000$. If we select the current year as our base year, real income is also \$5,000. If you are a strict monetarist you believe V is constant. Therefore, a doubling of the money supply to \$2,000 will cause a doubling of nominal GDP to $(\$2,000)(5) = \$10,000$. If, however, velocity is a function of the interest rate as well as institutional factors, then it cannot be assumed a constant. In this case, an increase in the money supply (which reduces interest rates) would lower velocity, so $M \times V$ would not increase by as great a percentage as M itself increased, and nominal GDP would rise by a smaller percentage than the money supply increased. If the money supply doubles (rises by 100 percent), nominal GDP will rise by less than 100 percent. (We cannot know how the rise in nominal GDP is apportioned between a rise in P and a rise in real GDP without knowing more about the current state of the economy).
7. (a) Clinton's tax increases and spending cuts would be a fiscal contraction. With no change in Fed policy, output would decrease and unemployment would increase. The Fed's policy to match the fiscal contraction with a monetary expansion, lowering interest rates to stimulate investment, was an attempt to avoid the decline in output.
- (b) Monetarists would worry about imperfect policy timing. Fed stimulation might take effect at the wrong time (e.g., after the economy has recovered from the impact of the fiscal contraction). Supply-siders would worry that higher tax rates would decrease the incentive to work and invest.
- (c) To evaluate the supply-side argument, you would need to see what happened to tax revenues and labor supply after the tax rate increases. An increase in tax revenues, *ceteris paribus*, would contradict the view of extreme supply-siders. If labor supply did not decrease much, general supply-side arguments would be weakened. To evaluate the monetarist argument, you would need to see if investment spending increased as consumption spending declined (proper policy timing), or only after consumption began to recover (poor timing).

8. Quite simply, it is because the labor market clears if wages are fully flexible. If there is unemployment, wages will fall, the quantity of labor demanded will rise, and the quantity of labor supplied will fall until there is no more excess supply.
9. A policy of cutting taxes and increasing expenditures on national defense should be inconsistent with balancing the budget. However, supply-side economists believe that cutting tax rates can actually result in greater tax revenues, and so it would be possible to have all three. The question really turns on how tax revenues respond to reductions in tax rates. Reagan believed that lower taxes would cause a substantial increase in work effort and investment. He was clearly wrong about this.
10. A tax cut from .25 to .20 is a 20 percent reduction, and if labor supply did not change, tax revenues would fall 20 percent. Tax revenue = tWL . In order for tax revenues not to change, we need to have $.25WL_{OLD} = .2WL_{NEW}$. This implies $L_{NEW} = .25WL_{OLD}/.2W = 1.25L_{OLD}$. Thus, the new supply of labor must be 25 percent higher than the old supply of labor. What does this tax cut mean to net wages? It means that net wages rise from $.75W$ to $.80W$, an increase of $.05/.75 = .0667$ or 6.67 percent. Thus, in order to keep revenues constant, a 6.67 percent increase in net wages would have to generate a 25 percent increase in labor supply, implying an elasticity of $25/6.67$ or 3.75. This is much larger than any empirical estimates of the actual elasticity of labor supply.

CHAPTER 20

1. (a)



- (b) Yes. The opportunity cost of a gun in Germany is 2 pounds of butter. The opportunity cost of a gun in France is only 1.5 pounds of butter. France has a comparative advantage in guns. Similarly, the opportunity cost of a pound of butter in Germany is $1/2$ of a gun, whereas the opportunity cost of a pound of butter in France is $2/3$ of a gun. Germany has a comparative advantage in the production of butter.
 - (c) As long as the agreement specifies between 1.5 pounds of butter and 2 pounds of butter per gun, specialization and trade will benefit both countries. For example, an agreement to exchange 1.75 pounds of butter per gun would benefit both countries.
2. Answers will vary.
 3. (a) You cannot tell from the information given which country has an absolute advantage because you are not given any information that would indicate the actual quantities of inputs used in production in either country.
 - (b) If resources are fully mobile between sectors, the opportunity cost of a cap is $2/3$ of a bushel of wheat in Russia; the opportunity cost of a cap is $7/10$ of a bushel of wheat in the United States. Russia has a comparative advantage in cap production. The opportunity cost of a bushel of wheat in Russia is 1.5 caps. The opportunity cost of a bushel of wheat in the United States is $10/7$ or 1.43 caps. The United States has a comparative advantage in wheat.
 - (c) At $\$1 = 1$ Ru, both goods in the United States are cheaper to everyone. That would mean that there was a big demand for dollars and no supply on foreign exchange markets. The price of the dollar would rise. When a dollar was valued at between 1.43 and 1.50 Ru, caps would be cheaper in Russia and wheat would be cheaper in the United States. If the price of a dollar rises to more than 1.50 Ru, everyone would buy both goods in Russia.
 4. Clearly, clothing is produced with cheap labor, and we buy most of our clothing from abroad because of the relatively high cost of labor in the United States. Airplanes are produced on the other hand with highly skilled workers, and the United States does enjoy a comparative advantage there. The United States does not have as large an endowment of oil reserves as the rest of the world, yet we are a big consumer. Both vehicles and agricultural goods are very heterogeneous. Automobiles lend themselves to "acquired comparative advantage." While the

United States has a lot of very fertile land for crop production, many things that we consume are not suited for production: coffee, tea, dates, tropical fruits (like bananas), and so forth. The table demonstrates the enormous complexity of the pattern of international trade.

5. (a) Illinois would have an absolute advantage in both wheat and soybeans.
 (b) In Illinois, taking 1 acre out of wheat and moving it into soybeans sacrifices 48 bushels of wheat for 39 bushels of soybeans. This is $48/39 = 1.23$ bushels of wheat for each bushel of soybeans. In Kansas, the sacrifice is $40/24 = 1.67$ bushels of wheat for each bushel of soybeans.
 (c) Based on the calculations in (b) above, Kansas has a comparative advantage in wheat, and Illinois has a comparative advantage in soybeans.
 (d) Yes, the data are consistent with the conclusions in (c) above. Kansas has more acreage devoted to wheat than soybeans, whereas in Illinois there is more acreage devoted to soybeans than to wheat. Although neither state completely “specializes,” each state seems to be devoting more of its resources to producing the good in which it has a comparative advantage.
6. Answers will vary.
7. (a) The opportunity cost of a bottle of red wine is 1.5 bottles of white in the U.S. and 2 bottles of white in Australia. The U.S., therefore, has a comparative advantage in red wine. The opportunity cost of a bottle of white wine is .66 bottles of red in the U.S. and .5 bottles of red in Australia. Australia, therefore, has a comparative advantage in white wine.
 (b) No. At the current exchange rate, both white and red wine are cheaper in Australia. U.S. citizens will want to import both types of wine from Australia, but Australians will not want to import U.S. wine.
 (c) In this situation, we would expect the price of the dollar to decrease until U.S. red wine became attractive to Australians whereas Australian white wine is still attractive to Americans. (An exchange rate between 1.5 and 2 U.S. dollars to one Australian dollar would accomplish this.)
 (d) In the long run, we would expect exchange rates to adjust until Americans are exporting red wine to Australia and Australians are exporting white wine to the U.S.

CHAPTER 21

1. (a) Disagree. The opposite is true. The Fed had been expanding the money supply to push rates down to help stimulate the economy during a period of slow growth. Low interest rates mean that the buyers stay away from low yielding U.S. securities, reducing the value of the dollar.
 (b) Disagree. This is good news of U.S. exporters whose goods are now cheaper on world markets. Demand for U.S. exports should rise. The real point is that foreigners now pay less for the dollars that they need to buy U.S. exports.
 (c) Disagree. This is bad news for European exporters. A weak dollar means that for Americans, European goods are more expensive. This is likely to reduce the demand for exports from Europe.
2. Answers will vary.
3. (a) Answers can include, an increase in British interest rates, a decrease in U.S. interest rates, a decrease in the British price level, and an increase in the U.S. price level.
 (b) All of the above, would also cause the supply curve to shift left.
 (c) The two changes in interest rates listed in (a) above (which would raise the value of the pound without any other simultaneous change in import or export demand) would make British goods relatively more expensive and decrease Britain’s trade balances (shrink the surplus or increase the deficit).
4. Answers will vary. The trade balance is simply made up of exports and imports of goods and services. A country with a trade deficit is one that imports more than exports. The current account balance takes into account investment income paid to foreigners as well as foreign investment income paid to a country’s citizens. Investment income earned abroad is added to exports, and investment income paid to foreigners is added to imports.
5. Answers will vary. It is clear that a good part of the U.S. trade deficit story is the result of strong demand for U.S. assets. Many countries are buying up U.S. bonds and stocks including U.S. Treasury securities sold to finance what have become very large Federal budget deficits. The countries that have been buying such debt instruments in the

U.S. include Japan and China who together own over a trillion dollars worth of American debt. As long as foreigners (like the Chinese and the Japanese) continue to buy our debt at very low interest rates, rates may stay low. But many are worried that if the large debt holders stop buying new issues of U.S. bonds, the interest rate may have to go up substantially to get people to buy them.

Specifically the U.S. buys about \$20 billion a month worth of goods and services from the Chinese while the Chinese buy a fraction of that amount from the U.S. Rather than holding the dollars that we pay for Chinese goods, the Chinese are using them to buy into dollar denominated assets like Treasury bills and notes. The purpose is to maintain a relatively low (depreciated) value of the Chinese currency, the Yuan, so that Chinese goods will continue to be purchased by U.S. citizens.

Optimists believe that there is a surplus of savings in the world and that much of it will come to the U.S. seeking higher returns. Others, however, see a collapse of the stock market, a bursting of the real estate market, and bigger deficits on the horizon with deep consequences.

6. (a) The consumption function does not change so instead of spending their money on Japanese goods, U.S. citizens will spend it on domestic goods. All else equal, this will stimulate U.S. output and decrease U.S. unemployment, and decrease output and employment in Japan.
 - (b) If income rises, consumers are likely to buy more imports as well as more domestic goods. Imports from Japan will increase somewhat after the initial decrease.
 - (c) If imports decrease, then the demand for yen will also decrease because importers will not need as many yen to purchase Japanese goods.
 - (d) The yen will depreciate and the dollar will appreciate. This gives U.S. consumers more buying power in the market for foreign goods. Consumers will buy more imports, causing a decrease in aggregate expenditure on domestic output. Output and employment in the United States will fall. The current account deficit will rise, but the total balance of payments will still sum to zero.
 - (e) The quota would have to increase U.S. output and employment, at least in the short run. The increase in the U.S. trade balance increases U.S. output and employment. This causes the dollar to appreciate, which works to decrease output.
7. (a) Under fixed rates, higher U.S. income would increase the demand for imports. The U.S. current account balance would decrease (i.e., the trade surplus would decrease or the trade deficit would increase). Under floating rates, there would be two forces acting on the exchange rate. Higher U.S. income would increase the demand for imports, increasing the supply of dollars on foreign exchange markets and causing the dollar to depreciate. However, with higher income, assuming the Fed is not fully accommodating, the interest rate in the United States would rise due to the higher demand for money. This increase in the interest rate would increase the demand for (and decrease the supply of) dollars on foreign exchange markets, causing an appreciation of the dollar. The net effect on the value of the dollar is ambiguous. However, because of the increase in U.S. income, the demand for imports would increase and the current account balance would decrease, although this change in the current account balance may be partially offset if the dollar depreciated.
 - (b) Under fixed rates, higher U.S. prices would make U.S. goods less attractive. U.S. imports would increase, and exports would decrease, causing a decrease in the current account balance. Under floating rates, the dollar would depreciate, with no effect on the current account balance.
 - (c) Because U.S. interest rates fall, foreigners will take their money out of U.S. financial markets and the demand for dollars will decrease. U.S. citizens will find foreign financial markets more attractive, so the supply of dollars will increase. At the same time, U.S. income increases so the demand for foreign goods also increases, further increasing the supply of dollars. Under fixed rates, all this would decrease the current account balance. Under floating rates, the dollar would depreciate, causing a decrease in imports and increase in exports. As imports would increase due to the higher U.S. income, the net effect on the current account balance is ambiguous.
 - (d) Imports will decrease and consumers will buy more domestic goods, so the demand for foreign currency decreases. Under fixed rates, this would increase the current account balance. Under floating rates, this would cause the dollar to appreciate, and the impact on the current account balance would be ambiguous.
8. (a) $Y = C + I + G + (EX - IM) = 100 + .8(Y - 40) + 38 + 75 + 25 - .05(Y - 40)$
 $= 238 + .8Y - .8(40) - .05Y + .05(40) = 208 + .75Y = 832$
 Government deficit = $G - T = 75 - 40 = 35$.

$$\text{Current account balance} = EX - IM = 25 - .05(832 - 40) = -14.6$$

(b) The multiplier = $1/[1 - (MPC - MPM)] = 1/[1 - (.8 - .05)] = 4$

When G increases from 75 to 80, Y will increase by $5(4) = 20$. Imports will rise by $.05(20) = 1$.

With the quota, the MPM is zero so the multiplier = $1/(1 - .8) = 5$. Y will rise by $5(5) = 25$. (This assumes that IM is greater than or equal to 40 without the quota, before the increase in G . Actually, it is 39.6, but assuming $MPM = 0$ is a very close approximation.) Imports that rise with income act as a leakage and reduce the size of the multiplier.

(c) With $EX = 25$, we need $IM = .05(Y - 40) = 25$. This implies $Y = 540$. Income is currently 832 so it must be decreased by $832 - 540 = 292$. With a multiplier of 4, this will require a decrease in government spending of $292/4 = 73$.

CHAPTER 21 APPENDIX A

1. **A.** The diagram below shows the market for Wimps: When exports suddenly drop the demand for wimps shifts to the left, US citizens are buying less from Atlantis. At the pegged exchange rate, Atlantis is in balance of payments deficit...they are buying more from the U.S. than the U.S. is buying from them.
- B.** To maintain the peg Atlantis must buy Wimps...supply dollars at the old exchange rate. In the longer run, it is obligated to do what it can to correct the deficit...for example, contractionary monetary policy would slow inflation and raise interest rates both of which will attract demand for the Wimp (export demand and demand for securities) back to Atlantis (shift the demand for wimps to the right and the supply to the left).
- C.** If originally Atlantis were operating at full employment, unemployment would rise: Exports (X) is part of $AE! C + I + G + (X - M) < Y$ inventories rise and Y falls causing U to rise.
- D.** Expansionary monetary policy would imply lower interest rates in Atlantis. That would reduce the demand for wimps and increase the supply of wimps as citizens of both countries would buy bonds in the U.S. to get higher interest rates. But that would make the balance of payments deficit worse. Atlantis would have to dig deeper into their basket of reserve assets to maintain the peg. With fiscal policy, rates might even rise if the Fed is not fully accommodative. The tax cut would raise incomes which would increase imports and also make the current account deficit worse.
- E.** If the Wimp were floating, the exchange rate (price of wimps) would fall immediately. As it fell, the quantity of exports rise in Atlantis, and the quantity of imports would rise restoring balance. Atlantis would not have to sell reserve assets (dollars) to maintain the peg, nor would it have to use contractionary monetary policy although it might want to. The GDP decline would be offset by the increase in X due to the exchange rate adjustment.

CHAPTER 22

1. Answers will vary.
2. Answers will vary.
3. Answers will vary.
4. If the Chinese economy is running a huge trade surplus, you would think that there would be a big surplus of dollars on the market and that the value of the dollar against the Chinese currency would fall. But the Chinese are using the dollars paid for their goods to buy dollar-denominated assets: Government bonds, U.S. companies, etc. While this maintains a balance of payments equilibrium for a while, there is much debate about how long it can go on.
5. Public goods, sometimes called social goods, are goods or services that bestow collective benefits on members of society. Generally, no one can be excluded from enjoying the benefits of public goods once they are produced. Classic examples are clean air and national defense.

Stopping the AIDS pandemic would provide numerous public benefits, not the least of which is a lower probability of being infected. In addition, the United States would save millions in foreign aid, and increase the productivity of parts of the world that are not producing enough to grow.

Private goods such as hamburgers are produced by the private sector because a firm can exclude those who don't pay. If exclusion is impossible, two problems arise for markets: the "free rider problem" and the "drop in the bucket problem." The free rider problem refers to the individual incentive not to pay for a good since everyone benefit regardless of who pays. The drop in the bucket problem refers to the individual incentive not to pay be-

cause each individual contribution is so small as not to matter. As a result, the private sector is powerless because it is in peoples' interest to not pay, and it falls to government to provide public goods. This is compounded when governments of many nations are involved.

CHAPTER 23

1. Answers will vary but should include the direct cost of health care, the loss of workforce, declining productivity, shortage of saving and capital investment, uncertainty, etc.
2. Answers will vary. There is no clear "right answer" to this problem, only trade-offs. Capital accumulation requires saving (reduced consumption), and when most citizens are earning subsistence wages, reducing consumption is not an option for many.
3.
 - (a) Capital increases the productivity of labor. A given-sized labor force can produce more output, and output per capita rises.
 - (b) In a market economy, individual household saving decisions determine the pool of aggregate saving. Aggregate saving, in turn, is the amount made available for firms to purchase capital. Saving is matched to investment projects in financial markets, where the interest rate adjusts to equate total desired investment with total desired saving.
 - (c) In developing countries, a greater fraction of output is needed just to ensure the current population's survival. An increase in investment—which requires a decrease in current consumption—cuts dangerously close to this survival level of consumption, and at a minimum causes more discomfort than it would in developed countries.
 - (d) Answers will vary. Market-oriented economists would stress increased incentives for private investment (political stability, lower government budget deficit, and perhaps loans from abroad). Planning-oriented economists might stress government-directed projects, taxes on luxury goods, and capital controls designed to prevent capital flight to developed countries.
4. Answer will depend on events.
5. It is true that poor countries must accumulate capital in order to grow, but many poor countries do indeed have little or no extra output available for saving. One problem is that the available saving goes abroad (capital flight). Increased political stability and a more stable investment climate can help stimulate investment in the domestic economy. In addition, poor countries can get loans and other assistance from developed countries to help them accumulate capital.
6. Many recent famines have resulted from government policies. In some cases, keeping farm prices artificially low has led to a decrease in production. In other cases, a failure to invest in a distributional infrastructure has led to famine in outlying rural areas.
7. This situation changes daily. Among the interesting developments to watch are the development of a ruble zone among the former republics of the USSR and the continuing economic integration of Central Europe (Czech Republic, Poland, Slovakia, Slovenia) with Western Europe. One approach could be to contrast incremental reform (Hungary) with drastic reform (Poland). Another approach could be to contrast reform imposed by democratically elected officials (Czech Republic) with that imposed by more autocratic figures (Russia, Ukraine).
8. The speaker confuses political systems with economic systems. The Soviet economic system was one of socialism (government ownership of land and capital) and central planning (government direction of resource allocation). Totalitarianism is a political—not an economic—system in which the ruler exercises authoritarian control without the consent of those governed.
9. Socialism is an economic system in which the "means of production" (land and capital) are owned and controlled by government. The possible strengths: rapid growth from planned capital accumulation, internalization of external costs, and more fair distribution of income (because no property income).
10. There are arguments on both sides. Firms that acquire market power tend to overprice and underproduce relative to the efficient price and output levels. Market power, it is argued, stifles both price and quality competition. Microsoft was charged with anticompetitive behavior by packaging its Web browser with its dominant operating system, Windows. After knocking out the competition, they can raise prices without competitive pressure. But what about foreign competition? Isn't it a bigger, tougher game when the competition is a foreign firm receiving government support? The real problem is that the government is likely to be lousy at picking winners. What makes

us think that the government can pick winners better than the market? Even recent Japanese attempts to subsidize a winner (fifth-generation computers) have failed.

11. In a capitalist economy, wages and profits are “market signals” that direct resources to where they produce the most economic value. Those with skills most in demand will receive higher rewards, even if they work no harder than others with less needed skills. The result is an efficient allocation of resources, but unequal rewards to the members of society. If efforts to reduce inequality rely on high tax rates on labor or capital income, there may be a tension between equality and efficiency.