

INCOME AND EXPENDITURES EQUILIBRIUM

FUNDAMENTAL QUESTIONS

1. What does equilibrium mean in macroeconomics?

Equilibrium means that plans and reality coincide, and therefore people have no need to change their behavior. When aggregate expenditures are equal to income, people are planning to buy all that is currently being produced. Inventories stay at the level at which producers like to see them, so there is no need to increase or decrease production. Equilibrium is reached.

2. How do aggregate expenditures affect income or real GDP?

Saying that aggregate expenditures exceed real GDP is the same as saying that planned expenditures exceed current output. If people are planning to buy more output than is currently being produced, the goods must come from somewhere. Producers replace their stock from inventories, and inventories fall. Since producers like to see a certain level of inventory, when inventories fall, producers increase production, increasing real GDP.

If aggregate expenditures are less than real GDP, it means that people are planning to buy fewer goods and services than are currently being produced. Since not all goods and services will be sold, inventories will pile up. When producers see inventories building up, they decrease production, and real GDP falls.

3. What are the leakages from and injections to spending?

Another way to determine macroeconomic equilibrium is to find where *leakages* from spending equal *injections* into spending. If injections are greater than leakages, aggregate expenditures are greater than real GDP. Inventories will fall, production will increase, and the increase in production leads to higher real GDP. If leakages are greater than injections, people are not planning to buy all the output that is produced. Inventories build up, production decreases, and real GDP falls.

Leakages reduce autonomous expenditures. *Saving* is a leakage from spending. The more households save, the less they spend. Less household spending means less consumption, and consumption is one of the components of aggregate demand. *Taxes* transfer income away from households, forcing them to consume less, and are another leakage from spending. *Imports* reduce spending on domestic goods and services, and constitute the third leakage from spending.

Injections into spending parallel the leakages. The saving of households is used by businesses for *investment*, which increases aggregate expenditures. The taxes collected by the government finance *government spending*, another component of aggregate expenditures. Besides U.S. spending on foreign goods, there is also foreign spending on U.S. goods. *Exports* also increase aggregate expenditures.

4. Why does equilibrium real GDP change by a multiple of a change in autonomous expenditures?

The basic reason is that the change in expenditures becomes income for someone, who spends part of it and saves part of it. The part that the person spends becomes income to someone else, who saves part and spends part, and so on. To see how this works, let's assume that businesses decide to increase investment by \$50 this year. Assume that the MPC is .75 and that this is a closed economy: exports and imports are both equal to zero. During the first round, the increase in investment is income to someone, so income increases by \$50. The initial increase in income of \$50 induces an increase in consumption of \$37.50 (.75 × \$50) and an increase in saving of \$12.50 (.25 × \$50). The \$37.50 spent on domestic goods and services becomes income to someone else, who spends \$28.13 (.75 × \$37.50) and saves \$9.38 (.25 × \$37.50). The spiral continues, and the increases to income get smaller and smaller. In this example, all the increases in income sum to \$200: four times the original increase in autonomous spending.

Round	Increase in Real GDP	Increase in Consumption	Increase in Saving
1—Increase in <i>I</i> of \$50	\$ 50	\$ 37.5 = .75(\$50)	\$12.5
2	\$ 37.5	\$ 28.125 = .75(\$37.5)	\$ 9.375
3	\$ 28.125	\$ 21.09375	\$ 7.03125
4	\$ 21.09375	\$ 15.820312	\$ 5.273438
.	.	.	.
.	.	.	.
.	.	.	.
Total	\$200	\$150	\$50

5. What is the spending multiplier?

The **spending multiplier** measures the change in real GDP produced by a change in autonomous expenditures, and is equal to $1/(MPS + MPD)$.

6. What is the relationship between the GDP gap and the recessionary gap?

The **GDP gap** is the difference between equilibrium GDP and potential GDP. It tells us the change in real GDP needed to get to potential GDP. The **recessionary gap** tells us the change in autonomous expenditures that is necessary to close the GDP gap.

7. How does international trade affect the size of the multiplier?

The simple multiplier understates the true multiplier because it does not take into account the foreign repercussions of domestic spending. If Americans spend money on foreign goods, foreign incomes increase. The increase in foreign incomes increases U.S. exports, but the change in exports is not picked up by the simple multiplier.

8. Why does the aggregate expenditures curve shift with changes in the price level?

The aggregate expenditures curve shifts with changes in the price level because of the wealth effect, interest rate effect, and international trade effect. When prices rise, purchasing power falls. Since wealth is a determinant of consumption, consumption falls. Likewise, an increase in prices tends to increase interest rates, and this increase lowers investment spending. Finally, an increase in domestic prices makes domestic goods expensive for foreigners and thus decreases exports. Since consumption, investment, and net exports are all components of aggregate expenditures, aggregate expenditures fall.

Key Terms

spending multiplier

recessionary gap

Quick-Check Quiz

Section 1: Equilibrium Income and Expenditures

- Actual expenditures always equal
 - planned income.
 - planned output.
 - consumption.
 - income and output.
 - planned expenditures.
- When aggregate expenditures exceed real GDP, inventories (rise, fall), production (increases, decreases), and national income (increases, decreases).
 - rise; increases; increases
 - rise; increases; decreases
 - rise; decreases; increases
 - fall; increases; increases
 - fall; increases; decreases
- The equilibrium level of real GDP is that point at which
 - aggregate expenditures equal real GDP.
 - real GDP equals output.
 - unplanned spending equals aggregate expenditures.
 - the aggregate expenditures curve lies above the 45-degree line.
 - the aggregate expenditures curve lies below the 45-degree line.
- Which of the following is *not* a leakage from spending?
 - saving
 - investment
 - taxes
 - imports
 - saving and taxes

5. For equilibrium to occur,
 - a. investment must equal saving.
 - b. government spending must equal taxes.
 - c. exports must equal imports.
 - d. leakages must equal injections.
 - e. all of the above must occur.

6. When leakages exceed injections, planned spending is (less than, greater than) current real GDP, so production and real GDP (rise, fall).
 - a. less than; rise
 - b. less than; fall
 - c. greater than; rise
 - d. greater than; fall
 - e. There is no relationship between planned spending and the equality of leakages and injections.

Section 2: Changes in Equilibrium Income and Expenditures

1. Assume that the MPC is .85 and the MPI is .10. What is the multiplier?
 - a. 1.1764705
 - b. 10
 - c. 1.0526315
 - d. 1.3333333
 - e. 4.0

2. Suppose the MPC = .9 and the MPI = .15. If government spending decreased by \$25, real GDP would _____ by _____.
 - a. increase; \$100
 - b. decrease; \$100
 - c. increase; \$25
 - d. decrease; \$25
 - e. decrease; \$23.81

3. The equation for the recessionary gap is
 - a. potential GDP + real GDP.
 - b. real GDP - actual GDP.
 - c. GDP gap/spending multiplier.
 - d. spending multiplier/GDP gap.
 - e. potential GDP/spending multiplier.

4. Suppose the potential GDP is \$400 and the economy is at equilibrium at \$350. The MPC = .8 and the MPI = .05. The GDP gap is \$ _____, the spending multiplier is _____, and the recessionary gap is \$ _____.
 - a. 50; 4; 12.50
 - b. 12.50; 4; 50
 - c. 50; 1.18; 42.50
 - d. 42.58; 1.18; 50
 - e. 50; .7692307; 65

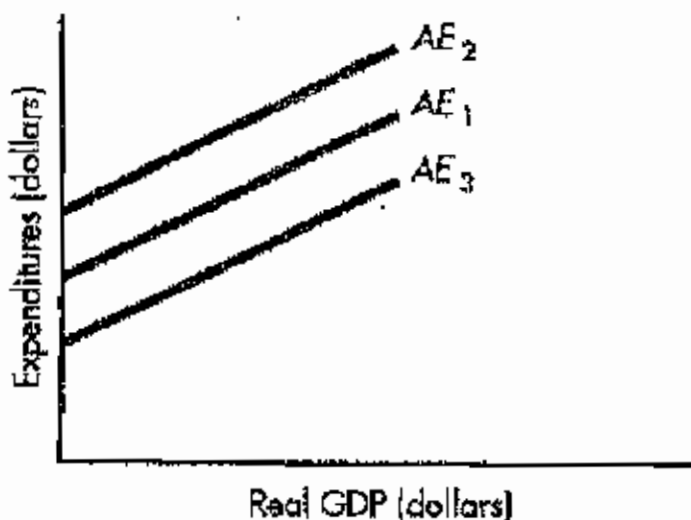
5. Which of the following statements is true?
- The simple multiplier understates the actual multiplier in a closed economy.
 - The simple multiplier overstates the actual multiplier in a closed economy.
 - The simple multiplier understates the true multiplier because it does not take into account the foreign repercussions of domestic spending.
 - The simple multiplier overstates the true multiplier because it does not take into account the foreign repercussions of domestic spending.
 - The multiplier effect is lower with foreign repercussions than without.
6. If the U.S. spending multiplier for Germany is .2 and U.S. investment decreases by \$40, German equivalent real GDP will _____ by _____.
- increase; \$40
 - decrease; \$40
 - increase; \$8
 - decrease; \$8
 - decrease; \$200
7. Consider an economy described by $AE = 600 + .85Y$ (all figures in millions). Assume the economy is initially in equilibrium. Now the government spends \$5 million on a program to improve homeland security. This implies that equilibrium GDP will
- decrease by \$5 million.
 - increase by \$5 million.
 - decrease by \$33.33 million.
 - increase by \$33.33 million.
 - decrease by \$600 million.
8. Assume potential GDP is \$180 billion and the multiplier is 2.5. The recessionary gap is \$50 billion. What is the actual level of equilibrium income?
- \$55 billion
 - \$180 billion
 - \$305 billion
 - \$125 billion
 - \$450 billion

Section 3: Aggregate Expenditures and Aggregate Demand

1. A drawback of the Keynesian model is that it
- assumes that shortages of goods and services will be met by rising prices.
 - assumes that surpluses of goods and services will be met by rising prices.
 - assumes that shortages of goods and services will be met by rising prices and increased production.
 - assumes that shortages of goods and services will be met by rising prices and decreased production.
 - is a fixed-price model.

2. Which of the following is a reason for the aggregate expenditures curve to shift with changes in the level of prices?
- the substitution effect
 - the income effect
 - the interest rate effect
 - the expectations effect
 - the foreign price level effect
3. When prices increase, people and businesses need _____ money. They _____ bonds, causing interest rates to _____ and aggregate expenditures to _____.
- more; buy; fall; rise
 - more; sell; fall; rise
 - more; buy; rise; fall
 - more; sell; rise; fall
 - less; buy; fall; rise
4. When the price level falls, domestic goods become _____ for foreigners. Net exports _____, and aggregate expenditures _____. This is called the _____ effect.
- cheaper; rise; rise; international trade
 - cheaper; fall; fall; international trade
 - cheaper; rise; fall; international trade
 - more expensive; fall; fall; international trade
 - cheaper; rise; rise; wealth
5. When the price level falls, the value of household and business assets _____. Households and firms spend _____, and aggregate expenditures _____. This is called the _____ effect.
- increases; more; rise; income
 - increases; more; rise; wealth
 - decreases; less; fall; income
 - decreases; less; fall; wealth
 - decreases; more; rise; wealth

6. A higher price level _____ autonomous consumption, autonomous investment, and net exports, causing aggregate expenditures to _____. The aggregate expenditures curve would shift from AE_1 to _____ on the graph below.



- increases; rise; AE_2
 - increases; rise; AE_3
 - increases; fall; AE_3
 - decreases; fall; AE_2
 - decreases; fall; AE_3
7. The Keynesian fixed-price model
- is represented by a vertical aggregate supply curve.
 - describes an economy with substantial unemployment and excess capacity.
 - is a comprehensive model used extensively by modern economists.
 - assumes that increases in aggregate demand will be met by both increased output and higher prices.
 - assumes that increases in aggregate demand will be met by increased output and lower prices.

Practice Questions and Problems

Section 1: Equilibrium Income and Expenditures

- In macroeconomics, _____ is the level of income and expenditures that the economy tends to move toward and remain at until autonomous spending changes.
- The aggregate expenditures function represents _____ expenditures at different levels of real GDP.
- _____ expenditures always equal income and output because they reflect changes in inventories.

4. When planned spending on goods and services _____ the current value of output, the production of goods and services and real GDP increase.
5. When aggregate expenditures are less than real GDP, inventories _____ (become depleted, accumulate), production _____ (increases, decreases), and real GDP _____ (rises, falls).
6. The equilibrium level of real GDP is at the point where _____ equal _____.
7. Leakages _____ autonomous aggregate expenditures.
8. The three types of leakages from spending are _____, _____, and _____.
9. The three types of injections of spending into the income stream are _____, _____, and _____.
10. For equilibrium to occur, total leakages must equal total _____.
11. When leakages exceed injections, real GDP _____ (rises, falls).

Section 2: Changes in Equilibrium Income and Expenditures

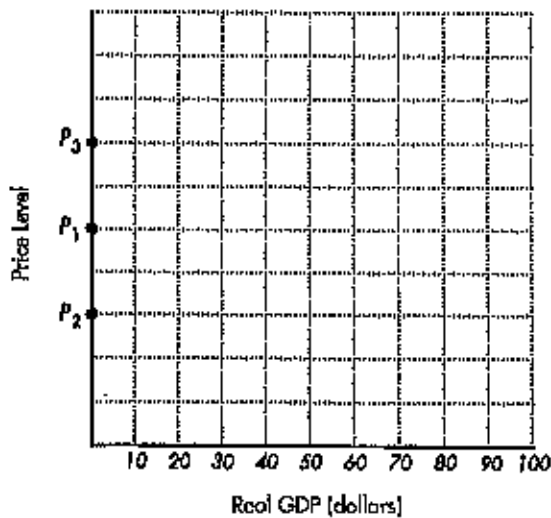
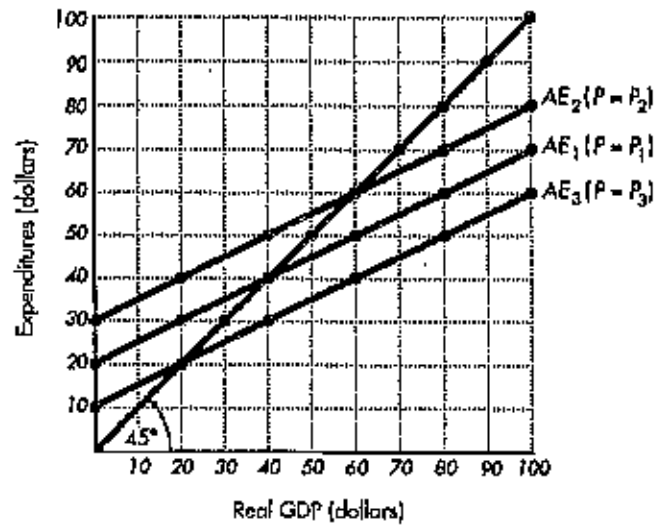
1. Consumption changes by the _____ multiplied by the change in real GDP.
2. Imports change by the marginal propensity to import multiplied by the _____.
3. The percentage of a change in income that is spent domestically is equal to _____ (use abbreviations).
4. The multiplier is equal to _____ (use abbreviations).
5. The greater the leakages, the _____ (greater, smaller) the multiplier.
6. An economy that does not trade with the rest of the world is called a(n) _____ economy.
7. According to the Keynesian view, equilibrium _____ (does, does not) necessarily occur at potential GDP.
8. The _____ is how much real GDP needs to change to yield equilibrium at potential real GDP. It is the _____ (horizontal, vertical) distance between equilibrium real GDP and potential real GDP.
9. The _____ is the change in spending necessary for equilibrium real GDP to rise to potential real GDP. It is the _____ (horizontal, vertical) distance between the aggregate expenditures curve and the 45-degree line at the potential real GDP level.
10. The simple multiplier $[1/(MPS + MPI)]$ _____ (overstates, understates) the true multiplier effects of increases in autonomous spending because of the foreign repercussions of domestic spending.
11. U.S. spending increases have a _____ (larger, smaller) effect on foreign real GDP than foreign spending increases have on U.S. real GDP.
12. The _____ measures the change in real GDP produced by a change in autonomous spending.

Section 3: Aggregate Expenditures and Aggregate Demand

1. A drawback of the Keynesian model is that it assumes that the supply of goods and services in the economy always adjusts to aggregate expenditures. It is a _____ model.
2. Shortages of goods and services may be met by increased production or by _____.
3. List the three reasons why the aggregate expenditures curve shifts with changes in the price level.

4. As the level of prices increases, the purchasing power of money _____ (increases, decreases) and the real value of assets _____ (increases, decreases). The _____ effect, or real-balance effect, predicts that the real value of aggregate expenditures will _____ (rise, fall).
5. When prices increase, people _____ (buy, sell) bonds to get money. Bond prices _____ (increase, decrease), and interest rates _____ (rise, fall). The _____ effect suggests that aggregate expenditures will _____ (rise, fall).
6. If domestic prices rise while foreign prices and foreign exchange rates remain constant, domestic goods will become _____ (less expensive, more expensive) for foreigners. Net exports will _____ (rise, fall), causing aggregate expenditures to _____ (rise, fall).
7. When the price level falls, aggregate expenditures _____ (rise, fall).
8. The _____ shows how the equilibrium level of expenditures changes as the price level changes.

9. Use the aggregate expenditures curves below to derive and plot the aggregate demand curve. Be sure to label your axes.



Thinking About and Applying Income and Expenditures Equilibrium

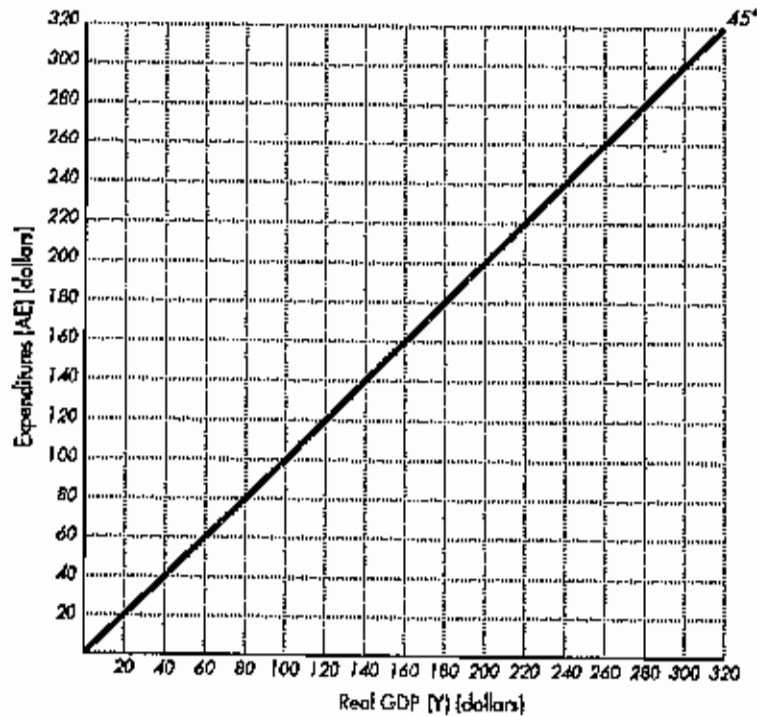
I. Aggregate Expenditures = Real GDP Approach

1. Complete the table below and answer the following questions.

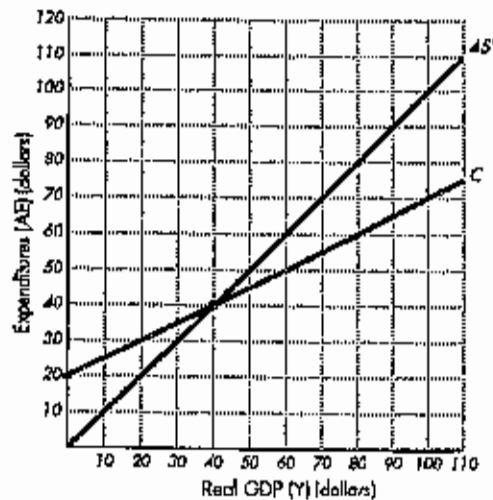
<i>Y</i>	<i>C</i>	<i>I</i>	<i>G</i>	<i>X</i>	<i>AE</i>	Unplanned Change in Inventories	Change in Real GDP
\$ 0	\$ 40	\$20	\$30	\$30	\$ 120	\$ -120	Increase
160	136	20	30	14	_____	_____	_____
180	148	20	30	12	_____	_____	_____
200	160	20	30	10	_____	_____	_____
220	172	20	30	8	_____	_____	_____
240	184	20	30	6	_____	_____	_____
260	196	20	30	4	_____	_____	_____
280	208	20	30	2	_____	_____	_____
300	220	20	30	0	_____	_____	_____
320	232	20	30	-2	_____	_____	_____

- The equilibrium level of real GDP is _____.
- The MPC is _____, and the MPS is _____.
- The MPI is _____.
- The spending multiplier is _____.
- If the potential GDP is \$300, the GDP gap is _____ and the recessionary gap is _____.

- f. Plot aggregate expenditures on the graph below. Show the GDP gap and the recessionary gap.



2. Use the graph below to answer the following questions. Assume that this is a closed economy and that government spending is \$15 and investment is \$5. Plot aggregate expenditures.



- The equilibrium level of real GDP is _____.
- The MPC is _____, and the MPS is _____.
- The spending multiplier is _____.
- If the potential GDP is \$100, the GDP gap is _____ and the recessionary gap is _____.

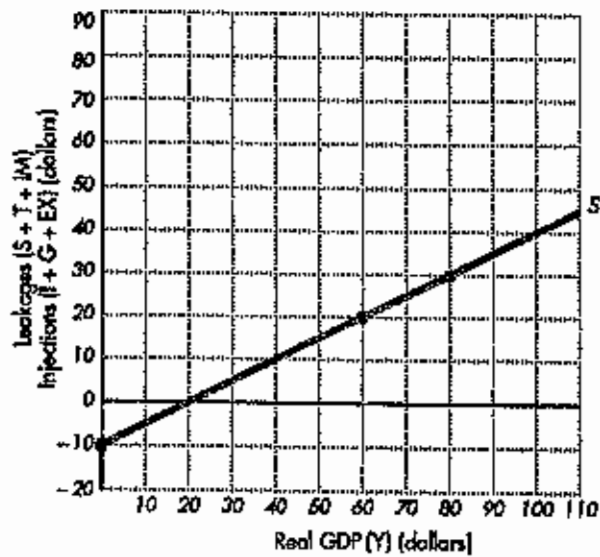
II. Leakages = Injections Approach

1. Complete the table below and answer the following questions. Assume that investment equals \$10, government spending is \$20, and exports are \$20.

<i>Y</i>	<i>S</i>	<i>T</i>	<i>IM</i>	Leakages	Injections	Change in Real GDP
\$ 0	\$-20	\$0	\$15	\$ -5	\$ 50	Increase
100	-5	0	25	_____	_____	_____
120	-2	0	27	_____	_____	_____
140	1	0	29	_____	_____	_____
160	4	0	31	_____	_____	_____
180	7	0	33	_____	_____	_____
200	10	0	35	_____	_____	_____
220	13	0	37	_____	_____	_____
240	16	0	39	_____	_____	_____
260	19	0	41	_____	_____	_____

- The equilibrium level of real GDP is _____.
- The MPS is _____, and the MPC is _____.
- The MPI is _____.
- The spending multiplier is _____.
- If the potential GDP is \$300, the GDP gap is _____ and the recessionary gap is _____.

2. Use the graph below to answer the following questions. Assume a closed economy with investment = \$10, government spending = \$20, and taxes = 0. Plot leakages and injections.



- What is the MPS? _____ the MPC? _____
- What is the spending multiplier? _____
- What is the equilibrium level of real GDP? _____

Chapter 11 Homework Problems

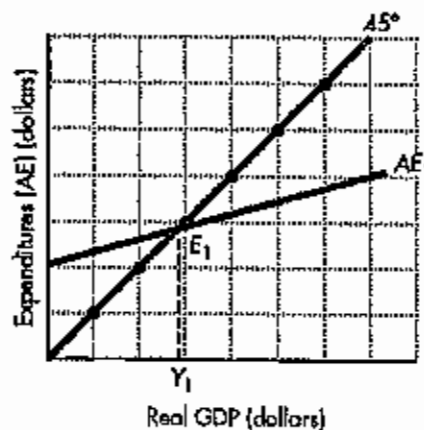
Name _____

1. In the Keynesian model, what does aggregate expenditures have to equal for the economy to be in equilibrium?
2. List the leakages from spending in the Keynesian model.
3. List the injections into spending in the Keynesian model.
4. Suppose the economy is currently in equilibrium. Businesses decide they want to increase investment spending by \$50 billion per year. Briefly explain why this \$50 billion increase in spending will increase equilibrium real GDP by more than \$50 billion.

5. In the United States, the president frequently gets the blame or the credit when the economy changes, although he has relatively little control over the economy. A growing economy is good for a president's chances of reelection, while an economy in recession makes winning reelection harder.

The Federal Reserve System, an independent part of government that you'll learn more about in later chapters, has some control over interest rates through its control over monetary policy.

Suppose that the Federal Reserve is thinking about raising interest rates in the near future. Use your knowledge of aggregate expenditures, and the diagram below, to determine the effect of an increase in interest rates on real GDP and figure out why a president would want to convince the Federal Reserve not to raise interest rates.



If your instructor assigns these problems, write your answers above, then tear out this page and hand it in.

Answers

Quick-Check Quiz

Section 1: Equilibrium Income and Expenditures

1. d; 2. d; 3. a; 4. b; 5. d; 6. b

If you missed any of these questions, you should go back and review Section 1 of Chapter 11.

Section 2: Changes in Equilibrium Income and Expenditures

1. e; 2. b; 3. c; 4. a; 5. c; 6. d; 7. d; 8. a

If you missed any of these questions, you should go back and review Section 2 of Chapter 11.

Section 3: Aggregate Expenditures and Aggregate Demand

1. e; 2. e; 3. d; 4. a; 5. b; 6. e; 7. b

If you missed any of these questions, you should go back and review Section 3 of Chapter 11.

Practice Questions and Problems

Section 1: Equilibrium Income and Expenditures

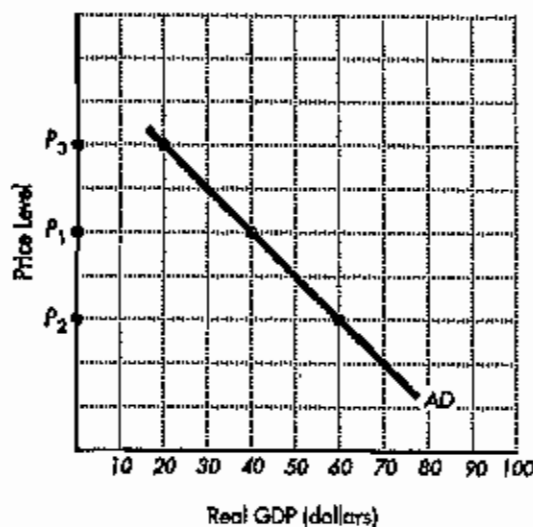
1. equilibrium
2. planned
3. Actual
4. exceeds
5. accumulate; decreases; falls
6. aggregate expenditures; real GDP (or output)
7. reduce
8. saving; taxes; imports
9. investment; government spending; exports
10. injections
11. falls

Section 2: Changes in Equilibrium Income and Expenditures

1. marginal propensity to consume (MPC)
2. change in real GDP
3. $MPC - MPI$
4. $1/(MPS + MPI)$
5. smaller
6. closed
7. does not
8. GDP gap; horizontal
9. recessionary gap; vertical
10. understates
11. larger
12. spending multiplier

Section 3: Aggregate Expenditures and Aggregate Demand

1. fixed-price
2. rising prices
3. wealth effect
interest rate effect
international trade effect
4. decreases; decreases; wealth; fall
5. sell; decrease; rise; interest rate; fall
6. more expensive; fall; fall
7. rise
8. aggregate demand curve
- 9.



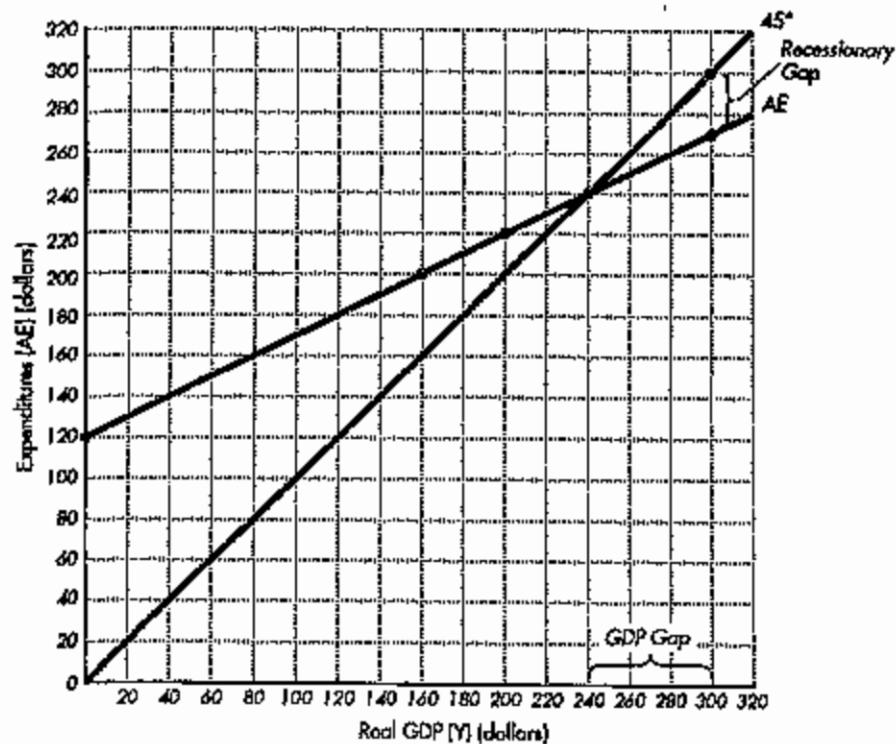
Thinking About and Applying Income and Expenditures Equilibrium

I. Aggregate Expenditures = Real GDP Approach

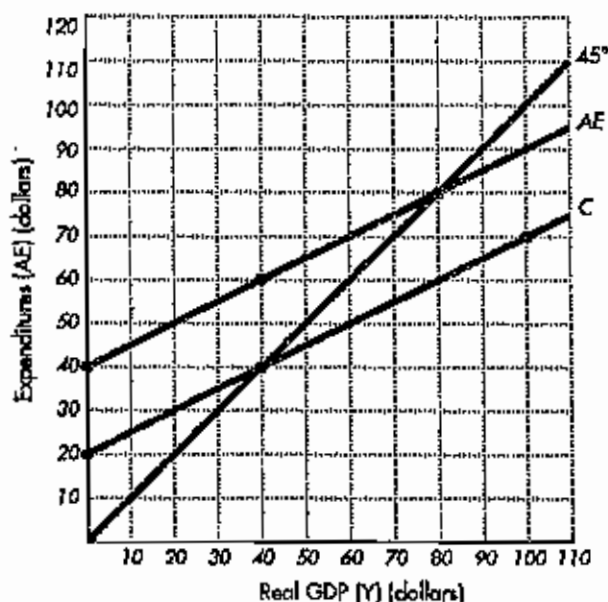
1.

Y	C	I	G	X	ΔE	Unplanned Change in Inventories	Change in Real GDP
\$ 0	\$ 40	\$20	\$30	\$30	\$120	\$-120	Increase
160	136	20	30	14	200	-40	Increase
180	148	20	30	12	210	-30	Increase
200	160	20	30	10	220	-20	Increase
220	172	20	30	8	230	-10	Increase
240	184	20	30	6	240	0	No change
260	196	20	30	4	250	10	Decrease
280	208	20	30	2	260	20	Decrease
300	220	20	30	0	270	30	Decrease
320	232	20	30	-2	280	40	Decrease

- a. \$240
- b. $MPC = \text{change in consumption} / \text{change in real GDP}$
 $= \$12 / \$20 = .6$
 $MPS = 1 - MPC = 1 - .6 = .4$
- c. $MPI = \text{change in imports} / \text{change in real GDP} = 2 / 20 = .1$
 (Since exports are autonomous, the change in net exports equals the change in imports.)
- d. $\text{Spending multiplier} = 1 / (MPS + MPI) = 1 / (.4 + .1) = 1 / .5 = 2$
- e. $\text{GDP gap} = \text{potential GDP} - \text{real GDP}$
 $= \$300 - \$240 = \$60$
 $\text{Recessionary gap} = \text{GDP gap} / \text{spending multiplier} = \$60 / 2 = \$30$
- f.



2.



- a. \$80
 b. .5; .5
 c. 2
 d. \$20; \$10

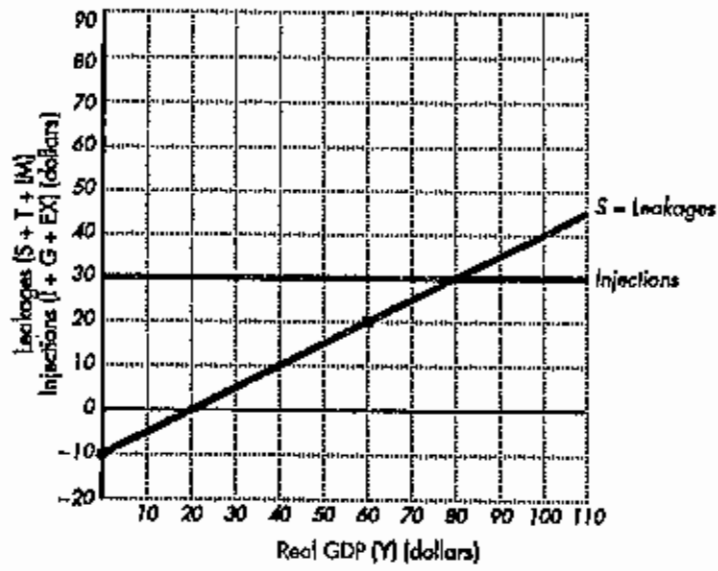
II. Leakages = Injections Approach

1.

Y	S	T	IM	Leakages	Injections	Change in Real GDP
\$ 0	\$-20	\$0	\$15	\$-5	\$50	Increase
100	-5	0	25	20	50	Increase
120	-2	0	27	25	50	Increase
140	1	0	29	30	50	Increase
160	4	0	31	35	50	Increase
180	7	0	33	40	50	Increase
200	10	0	35	45	50	Increase
220	13	0	37	50	50	No change
240	16	0	39	55	50	Decrease
260	19	0	41	60	50	Decrease

- a. \$220
 b. $MPS = \text{change in saving}/\text{change in real GDP}$
 $= \$15/\$100 = .15$
 $MPC = 1 - MPS = 1 - .15 = .85$
 c. $MPI = \text{change in imports}/\text{change in real GDP} = \$10/\$100 = .1$
 d. $\text{Spending multiplier} = 1/(MPS + MPI) = 1/(.15 + .1) = 1/.25 = 4$
 e. $\text{GDP gap} = \text{potential GDP} - \text{real GDP}$
 $= \$300 - \$220 = \$80$
 $\text{Recessionary gap} = \text{GDP gap}/\text{spending multiplier} = \$80/4 = \$20$

2.



- $\frac{1}{2}; \frac{1}{2}$
- 2
- \$80

