Chapter 10

AGGREGATE EXPENDITURES

FUNDAMENTAL QUESTIONS

1. How are consumption and saving related?

Households do three things with their income: spend it, save it, and pay taxes on it. Since households have no choice about paying taxes, economists usually look at after-tax, or disposable, income. **Consumption** and **saving** are the two components of disposable income. So if we know that disposable income is \$1,000 and saving is \$200, then we know that consumption must be \$800.

It is possible to spend more than your disposable income by borrowing or using past saving. If disposable income is again \$1,000 and consumption is \$1,100, then saving is –\$100: you borrowed \$100 or used \$100 of past saving. Negative saving is called **dissaving.**

Because consumption and saving together equal disposable income, any change (Δ) in disposable income equals the change in consumption plus the change in saving:

$$\Delta C + \Delta S = \Delta Yd$$

If we divide both sides by the change in disposable income, we have

$$\Delta C/\Delta Yd + \Delta S/\Delta Yd = \Delta Yd/\Delta Yd$$

or

$$\text{MPC} + \text{MPS} = 1$$

The change in consumption divided by the change in disposable income is called the **marginal propensity to consume (MPC).** It tells us how much consumption changes when income changes. If the MPC is .80, when disposable income changes by \$100, consumption changes by \$80. Likewise, the change in saving divided by the change in disposable income is called the **marginal propensity to save (MPS).** It tells us how much saving changes when income changes. If the MPS is .20, when disposable income changes by \$100, saving changes by \$20. Since the only things households can do with disposable income is save it or spend it, MPC + MPS = 1.

There is another relationship between consumption and saving. Start with

$$C + S = Yd$$

and divide both sides by disposable income:

$$C/Yd + S/Yd = Yd/Yd \qquad \text{or} \qquad \text{ACP} + \text{APS} = 1$$

Consumption divided by disposable income is the **average propensity to consume (APC).** It tells us the proportion of disposable income that is consumed. Likewise, saving divided by disposable income is the **average propensity to save (APS)** and tells us the proportion of income saved. Since disposable income can only be spent or saved, the two proportions must equal 1.

2. What are the determinants of consumption?

The determinants of consumption are disposable income, **wealth,** expectations, demographics, and taxation. Consumption is a positive function of income, wealth, positive expectations about the economy, and population. If any of these determinants increase, consumption increases. Consumption is negatively related to negative expectations about the economy and taxes. If either of these factors increases, consumption decreases.

3. What are the determinants of investment?

The determinants of investment are the interest rate, profit expectations, technological change, the cost of capital goods, and the rate at which capacity is utilized. Investment is a positive function of expected profit, technological change that reduces costs, and the rate at which capacity is utilized. If any of these factors increase, investment will increase. Investment is a negative function of interest rates and the cost of capital goods. If either of these determinants increases, investment will decrease. Because these determinants of investment are so variable over the business cycle, investment is the most volatile component of aggregate spending.

4. What are the determinants of government spending?

Government spending is assumed to be autonomous of income. The government authorities set government spending according to political and other considerations at whatever level they choose.

5. What are the determinants of net exports?

Net exports are exports minus imports. The determinants of net exports are foreign and domestic income, tastes, trade restrictions, and exchange rates. Net exports are a positive function of *foreign* income, tastes that favor exports, favorable changes in government restrictions on trade, and depreciation of the domestic currency. Net exports are negatively related to *domestic* income, tastes that favor imports, unfavorable changes in government restrictions on trade, and appreciation of the domestic currency.

6. What is the aggregate expenditures function?

The aggregate expenditures function is the sum of the spending components in the economy: consumption plus investment plus government spending plus net exports.

$$AE = C + I + G + X$$

The aggregate expenditures function has a flatter (smaller) slope than $C + I + G$ because the net exports function has a negative slope.

Key Terms

consumption function
saving function
dissaving
autonomous consumption
marginal propensity to consume (MPC)
marginal propensity to save (MPS)
average propensity to consume (APC)
average propensity to save (APS)
wealth
marginal propensity to import (MPI)

Quick-Check Quiz

Section 1: Consumption and Saving

1. Consumption accounts for ________ percent of total expenditures in the U.S. economy.
   a. 20
   b. 15
   c. 69
   d. −1
   e. 35

2. Which of the following is a stock concept?
   a. GDP
   b. savings
   c. consumption
   d. investment
   e. net exports

3. Autonomous consumption
   a. depends on income.
   b. varies with the nonincome determinants of consumption.
   c. equals disposable income minus saving.
   d. occurs at the level of income at which all disposable income is being spent.
   e. occurs when consumption exceeds disposable income.

4. Which of the following is an expression for the marginal propensity to consume?
   a. change in consumption/change in income
   b. consumption/income
   c. change in consumption/change in disposable income
   d. consumption/disposable income
   e. 1 + MPS

5. Which of the following is an expression for the average propensity to save?
   a. change in saving/change in income
   b. saving/income
   c. change in saving/change in disposable income
   d. saving/disposable income
   e. 1 − MPC

Use the table below to answer questions 6 through 11.

Disposable Income	Consumption
$ 0	$1,000
2,000	2,700
4,000	4,400
6,000	6,100
8,000	7,800
10,000	9,500

6. Dissaving occurs at levels of income below
   a. $10,000.
   b. $8,000.
   c. $6,000.
   d. $4,000.
   e. $2,000.

7. Autonomous consumption is
   a. $1,000.
   b. $2,700.
   c. $4,400.
   d. $6,100.
   e. $7,800.

8. When disposable income is $6,000, saving is
   a. –$100.
   b. $100.
   c. $200.
   d. $500.
   e. $1,000.

9. The MPC is
   a. 1.35.
   b. 1.10.
   c. .975.
   d. .95.
   e. .85.

10. The MPS is
   a. .35.
   b. .15.
   c. .105.
   d. .05.
   e. .025.

11. If disposable income is $10,000, the APC is
    a. 1.11.
    b. 1.35.
    c. .975.
    d. .95.
    e. .85.

12. Which of the following will *not* increase consumption?
    a. Consumers expect the economy to pull out of the recession in the near future, as evidenced by the Consumer Confidence Index.
    b. An increase in property values increases household wealth.
    c. Medical advances allow many elderly people to live who otherwise would have died.
    d. Congress enacts a deficit reduction bill that increases taxes.
    e. A "baby boomlet" occurs when the original baby boomers grow up and have children.

13. The higher the MPC,
    a. the greater the MPS.
    b. the greater the fraction of any additional disposable income consumers will save.
    c. the greater the slope of the savings function.
    d. the flatter the slope of the consumption function.
    e. the greater the fraction of any additional disposable income consumers will spend.

14. Which of the following does *not* shift the consumption function?
    a. increases in wealth
    b. optimistic expectations about the economy
    c. an increase in disposable income
    d. an increase in taxes
    e. an increase in population

Refer to the table below to answer questions 15 and 16.

Disposable Income (*Yd*) (in millions)	**Consumption (*C*) (in millions)**
$ 0	$ 15
50	62.5
100	110
150	157.5
200	205
250	252.5
300	300
350	347.5
400	395

15. The MPS is equal to
    a. .5.
    b. .05.
    c. .95.
    d. 1.
    e. .095.

16. The data suggest that the consumption function lies below the 45-degree line at levels of disposable income between
    a. \$0 million and \$300 million.
    b. \$300 million and \$400 million.
    c. \$0 million and \$400 million.
    d. \$350 million and \$400 million.
    e. \$50 million and \$300 million.

Section 2: Investment

1. Which of the following does *not* affect the equilibrium level of aggregate expenditures?
    a. business spending on capital goods
    b. planned inventory
    c. unplanned inventory
    d. capital purchases
    e. All of the above affect the equilibrium level of aggregate expenditures.

2. A firm must borrow \$1,000 to buy a bottling machine and must pay 10 percent interest on the funds. The firm expects the machine to yield \$1,188 in output. The rate of return on the investment is
    a. 1.188.
    b. 1.08.
    c. 1.088.
    d. .08.
    e. .088.

3. Which of the following will *not* increase investment?
    a. lower interest rates
    b. lower costs for capital goods
    c. expectations of a recession
    d. reinstatement of investment tax credits
    e. government subsidies to key industries

4. Which of the following will increase investment?
    a. expectations that the government will nationalize selected firms
    b. higher interest rates due to the Fed's fight against inflation
    c. repeal of investment tax credits
    d. decreases in capacity utilization
    e. invention of a powerful new computer chip

5. Which of the following is *not* a volatile component of investment?
    a. interest rates
    b. expectations
    c. technological change
    d. rate of capacity utilization
    e. All of the above are volatile components of investment spending.

Section 3: Government Spending

1. Government spending on goods and services is the __________ component of aggregate expenditures in the United States.
   a. largest
   b. second largest
   c. third largest
   d. fourth largest
   e. smallest

2. Government spending on goods and services is
   a. positively related to domestic income.
   b. positively related to interest rates.
   c. negatively related to disposable income.
   d. negatively related to interest rates.
   e. assumed to be autonomous of disposable income.

3. When plotted against disposable income, the government expenditures function has a(n) __________ slope.
   a. positive
   b. negative
   c. zero
   d. increasing
   e. decreasing

Section 4: Net Exports

1. Which of the following is *false?*
   a. Net exports cannot be negative.
   b. Net exports decline as domestic income increases.
   c. The net exports function has a negative slope.
   d. The net export function shifts with changes in foreign income.
   e. Imports are a positive function of domestic income.

2. Which of the following will *not* cause an increase in exports?
   a. an increase in foreign incomes
   b. domestic currency depreciation
   c. a favorable change in tastes
   d. domestic currency appreciation
   e. a lowering of trade restrictions

3. Which of the following is an expression for the marginal propensity to import?
   a. change in imports/change in income
   b. imports/income
   c. change in imports/change in disposable income
   d. imports/disposable income
   e. 1 – MPS

4. Which of the following will *not* shift the net exports function?
   a. changes in foreign income
   b. changes in tastes
   c. changes in domestic disposable income
   d. changes in exchange rates
   e. changes in government trade restrictions

Section 5: The Aggregate Expenditures Function

1. Which of the following is *not* a component of aggregate expenditures?
   a. consumption
   b. saving
   c. investment
   d. government spending
   e. net exports

2. Which of these functions is *not* drawn parallel to the others?
   a. C
   b. $C + I$
   c. $C + I + G$
   d. $C + I + G + X$
   e. All of the above are parallel lines.

3. Net exports
   a. are autonomous of disposable income.
   b. increase aggregate expenditures at relatively low levels of income.
   c. increase aggregate expenditures at relatively high levels of income.
   d. increase with disposable income.
   e. have the same slope as consumption.

Practice Questions and Problems

Section 1: Consumption and Saving

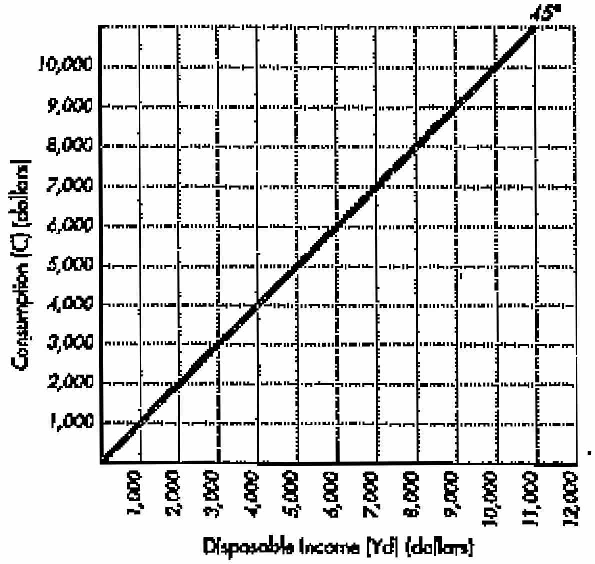
1. ___________ equals consumption plus saving.
2. ___________ is "not consuming" and is defined over a unit of time. ___________ are an amount accumulated at a particular point in time.
3. GDP, consumption, saving, investment, government spending, and net exports are all ___________ (stock, flow) concepts.
4. The primary determinant of consumption over any given period of time is ___________ .
5. The ___________ is the relationship between disposable income and consumption.
6. The ___________ is the relationship between disposable income and saving.
7. ___________ occurs when a households spends more than it earns as income, either by borrowing or by using savings.

8. Consumption and saving are ___________ (positive, negative) functions of disposable income.
9. The level of consumption that does not depend on income is called ___________ .
10. The relationship between change in consumption and change in disposable income is the ___________ .
11. The ___________ is equal to the change in saving divided by the change in disposable income.
12. MPC + MPS = ___________ .
13. The MPC is the ___________ of the consumption function.
14. The steeper the consumption function, the ___________ the MPC.
15. The slope of the saving function is the ___________ .
16. The ___________ the saving function, the larger the MPS.
17. The ___________ equals consumption divided by disposable income.
18. The APS equals ___________ divided by ___________ .
19. APC + APS = ___________ .
20. The APS ___________ (rises, falls) as disposable income rises.
21. Fill in the table below and answer the following questions.

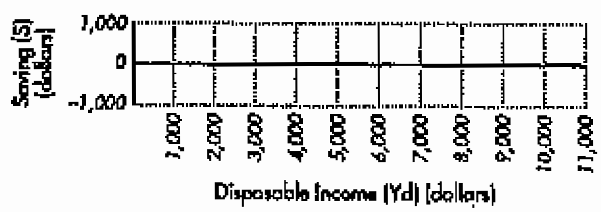
Disposable Income	Consumption	Saving	APC	APS
$ 0	$1,000	$ ______	______	______
1,000	1,800	______	______	______
2,000	2,600	______	______	______
3,000	3,400	______	______	______
4,000	4,200	______	______	______
5,000	5,000	______	______	______
6,000	5,800	______	______	______
7,000	6,600	______	______	______
8,000	7,400	______	______	______
9,000	8,200	______	______	______
10,000	9,000	______	______	______

a. What is the MPC? ___________ the MPS? ___________

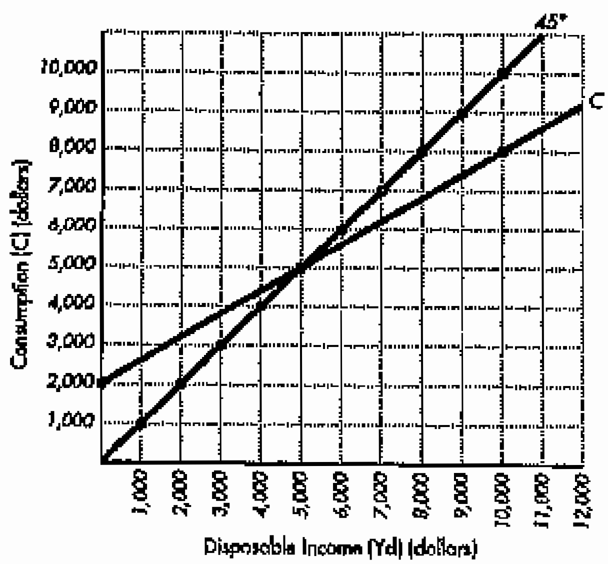
b. Plot the consumption function on the graph below. Show on the graph the level of saving when disposable income is $9,000.



c. Plot the saving function on the graph below.



22. Use the graph below to answer the following questions.



a. What is autonomous consumption? ___________

b. What is the MPC? ___________

c. What is savings when disposable income equals $10,000? ___________

23. Disposable income is __________ income.
24. __________ is the value of all the assets owned by a household.
25. As household wealth increases, consumption __________ (increases, decreases) at every level of income.
26. The __________ is a measure of consumer opinion regarding the outlook for the economy.
27. When consumers expect future income to increase, autonomous consumption __________ (increases, decreases, does not change).
28. *Ceteris paribus*, economists expect consumption to __________ (rise, fall, not change) as the population increases.
29. Young households have __________ (larger, smaller, the same) MPCs than/as older households.
30. As taxation increases, autonomous consumption __________ (rises, falls, does not change).
31. List the five determinants of consumption.

____

____

____

____

____

32. Changes in the nonincome determinants of consumption affect the __________ (slope, intercept) of the consumption function.

Section 2: Investment

1. __________ is business spending on capital goods and inventories and is the most variable component of total spending.
2. The text assumes that investment is __________ of current income.
3. __________ investment combines with consumer, government, and foreign-sector spending to determine national income.
4. The higher the interest rate, the __________ (higher, lower) the rate of investment.
5. __________ is the profit from an investment divided by its cost.
6. As the interest rate falls, the rate of return from an investment __________ (rises, falls).
7. As the cost of capital goods rises, the amount of investment __________ (rises, falls).
8. When capacity utilization is high, investment tends to __________ (rise, fall).

9. List the five determinants of investment.

____

____

____

____

____

Section 3: Government Spending

1. Government spending on goods and services is the __________ largest component of aggregate expenditures in the United States.
2. The text assumes that government spending, like investment, is __________ of disposable income.

Section 4: Net Exports

1. __________ equal exports minus imports.
2. When net exports are positive, there is a __________ (deficit, surplus) on the merchandise and services accounts.
3. The text assumes that exports are __________ of current domestic income.
4. List the factors that affect exports.

____

____

____

____

5. When the domestic currency appreciates, exports __________ (rise, fall).
6. The greater domestic incomes, the __________ domestic imports.
7. The __________ equals the change in imports divided by the change in disposable income.
8. When the domestic currency depreciates, imports __________ (rise, fall).
9. The higher the domestic income, the __________ (higher, lower) net exports.
10. List the four determinants of net exports.

____

____

____

____

Section 5: The Aggregate Expenditures Function

1. ___________ equals $C + I + G + X$.
2. Net exports ___________ (increase, decrease) aggregate expenditures at relatively low levels of domestic income and ___________ (increase, decrease) aggregate expenditures at relatively high levels of domestic income.
3. The aggregate expenditures function has a ___________ (larger, smaller) slope than the consumption function.
4. The components of aggregate expenditures that are *not* autonomous are ___________ and ___________.
5. Complete the table below and answer the following questions.

Y	C	I	G	X	AE
$1,000	$1,000	$30	$70	$ 100	$___________
2,000	1,900	30	70	0	___________
3,000	2,800	30	70	–100	___________
4,000	3,700	30	70	–200	___________
5,000	4,600	30	70	–300	___________
6,000	5,500	30	70	–400	___________

a. What is the MPC? ___________

b. What is the MPS? ___________

c. What is the MPI? ___________

Thinking About and Applying Aggregate Expenditures

I. Sorting Out the Determinants of Aggregate Expenditures

Put the determinants of aggregate expenditures in their proper places in the table. Some determinants may be used in more than one place.

Trade restrictions
Technological change
Tastes
Disposable income
Foreign income
Expectations
Profit expectations
Capacity utilization
Wealth
Interest rate
Exchange rates
Domestic income
Demographics
Cost of capital goods
Taxation

Consumption	Investment	Government Spending	Net Exports

II. Aggregate Expenditures and Its Determinants

Now that you have finished this chapter, you should be able to predict the effect on aggregate expenditures when one of its determinants changes. In the exercise on the following page, decide which of the spending components each event affects, whether it increased or decreased the component, and whether it increased or decreased aggregate expenditures. Remember the determinants of each component of expenditures:

Consumption: disposable income, wealth, expectations, demographics, taxation
Investment: interest rate, profit expectations, technological change, cost of capital goods, capacity utilization
Government spending: set by government authorities
Net exports: foreign and domestic income, tastes, trade restrictions, exchange rates

Events

1. Companies in Russia are hesitant to "put money in the ground and produce" because they "are put off by ever-changing tax laws, undependable partners, and political turmoil."
2. "Midsize firms plan to . . . spend more on capital equipment this year. . . ."
3. "There is considerable concern that the pileup of debt may act as a serious drag on the business expansion. . . . But . . . another consideration . . . is the level of savings. It is woefully low for what is presumed to be the early stages of a long expansion. . . . The U.S. rate is far below comparable rates prevailing in other major nations. . . . Consumers presumably will be reluctant to let their savings shrink very much more. . . ."
4. The president's proposed $38 billion in new personal income taxes and $10 billion of additional corporate taxes is enacted.
5. The president's $16 billion-plus increase in government spending bill is enacted.
6. "Industry operated at 79.9% of capacity last month, up from 79.7% in January."

	Component	Effect on Component	Effect on Aggregate Expenditures
1.	Investment	Decrease	Decrease
2.	________	________	________
3.	________	________	________
4.	________	________	________
5.	________	________	________
6.	________	________	________

III. Determinants of Saving

The determinants of saving are the same as the determinants of consumption, since saving is "not consuming." There are reasons why Americans don't save. Translate the wording into the determinants of consumption (wealth, expectations, demographics, taxation). Here are some examples for you to try:

1. Members of Congress passed a proposal to allow families to put money into a savings plan tax free.

   ____

2. Tax laws generally benefit borrowing more than saving. __________
3. The spread of pension plans, social security benefits, and other items has reduced the need felt by many Americans to save. __________
4. Edward Yardeni says that the aging population will cause an increase in saving. __________

Chapter 10 Homework Problems

Name ________________________________

1. State the five determinants of consumption.

2. State the five determinants of investment.

3. State the four determinants of net exports.

4. What determines government spending?

5. One of the purposes of economics is to help people analyze events in the real world and predict the effects of those events. Listed below are four brief quotations from *Wall Street Journal* stories about economic events in the 1990s. Use your knowledge about the determinants of aggregate expenditures to predict which component of aggregate expenditures would be affected by each event listed, whether that component would be increased or decreased by the event, and whether the event would increase or decrease aggregate expenditures.
   a. "Foreigners, who poured billions of dollars into U.S. factories, real estate, and companies [in the 1980s], began pulling out some of that money. . . ."

   b. "Interest rates shot up following the jobs report. . . ."

   c. "The U.S. trade deficit deteriorated to $10.21 billion in March, the widest gap in nearly four years. . . ."

   d. "Consumer confidence plunged to its lowest level since [late 1992]. . . ."

   e. "Businesses stockpiled significantly more goods during the first quarter than originally thought, leading the Commerce Department to boost its estimate of the economy's growth rate. . . ."

   f. "The Commerce Department also said that the rise in personal consumption in the first quarter was stronger than previously thought—6.1%. . . ."

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: Consumption and Saving

1. c; 2. b; 3. b; 4. c; 5. d; 6. b; 7. a; 8. a; 9. e; 10. b; 11. d; 12. d; 13. e; 14. c (An increase in disposable income would be reflected in a movement along the consumption function, not a shift in the curve.) 15. b; 16. b

If you missed any of these questions, you should go back and review Section 1 of Chapter 10.

Section 2: Investment

1. c; 2. d (Rate of return = profit/cost. The cost is $1,000 + $100 in interest, so the rate of return is $88/$1,100 = .08.); 3. c; 4. e; 5. e

If you missed any of these questions, you should go back and review Section 2 of Chapter 10.

Section 3: Government Spending

1. b; 2. e; 3. c

If you missed any of these questions, you should go back and review Section 3 of Chapter 10.

Section 4: Net Exports

1. a; 2. d; 3. c; 4. c (A change in domestic disposable income would be represented by a movement along the curve, not a shift in the curve.)

If you missed any of these questions, you should go back and review Section 4 of Chapter 10.

Section 5: The Aggregate Expenditures Function

1. b; 2. d; 3. b

If you missed any of these questions, you should go back and review Section 5 of Chapter 10.

Practice Questions and Problems

Section 1: Consumption and Saving

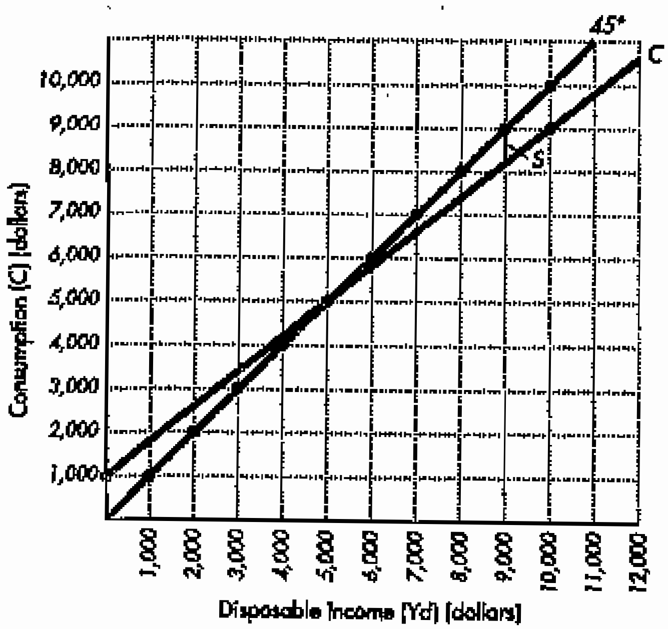
1. Disposable income
2. Saving; Savings
3. flow
4. disposable income
5. consumption function
6. saving function
7. Dissaving
8. positive
9. autonomous consumption
10. marginal propensity to consume (MPC)
11. marginal propensity to save (MPS)
12. 1
13. slope
14. larger

15. marginal propensity to save (MPS)
16. steeper
17. average propensity to consume (APC)
18. saving; disposable income
19. 1
20. rises
21. Note: The APC + APS will not always equal 1 due to rounding.

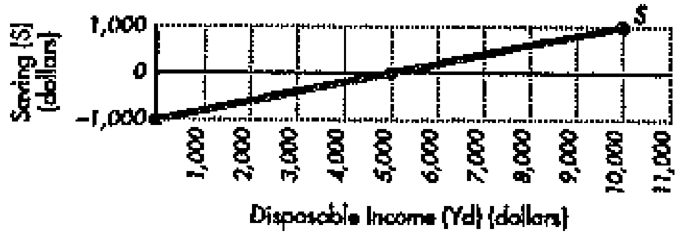
Disposable Income	Consumption	Saving	APC	APS
$ 0	$1,000	$–1,000	—	—
1,000	1,800	–800	1.8	–.8
2,000	2,600	–600	1.3	–.3
3,000	3,400	–400	1.13	–.13
4,000	4,200	–200	1.05	–.05
5,000	5,000	0	1.00	0
6,000	5,800	200	.97	.03
7,000	6,600	400	.94	.06
8,000	7,400	600	.93	.07
9,000	8,200	800	.91	.09
10,000	9,000	1,000	.90	.10

a. MPC = change in consumption/change in disposable income
= $800/$1,000 = .8
MPS = change in saving/change in disposable income
= $200/$1,000 = .2 (or MPS = 1 – MPC = 1 – .8 = .2).

b.



c.



22. a. $2,000
    b. 3/5, or .6
    c. $2,000
23. after-tax
24. Wealth
25. increases
26. Consumer Confidence Index
27. increases
28. rise
29. larger
30. falls
31. disposable income
    wealth
    expectations
    demographics
    taxation
32. intercept

Section 2: Investment

1. Investment
2. autonomous (independent)
3. Planned
4. lower
5. Rate of return
6. rises
7. falls
8. rise
9. the interest rate
   profit expectations
   technological change
   the cost of capital goods
   the rate of capacity utilization

Section 3: Government Spending

1. second
2. autonomous (independent)

Section 4: Net Exports

1. Net exports
2. surplus
3. autonomous (independent)
4. foreign incomes
   tastes
   government trade restrictions
   exchange rates
5. fall
6. greater
7. marginal propensity to import (MPI)
8. fall
9. lower
10. foreign and domestic income
    tastes
    government trade restrictions
    exchange rates

Section 5: The Aggregate Expenditures Function

1. Aggregate expenditures (*AE*)
2. increase; decrease
3. smaller
4. consumption; net exports
5.

Y	*C*	*I*	*G*	*X*	*AE*
$1,000	$1,000	$30	$70	$ 100	$1,200
2,000	1,900	30	70	0	2,000
3,000	2,800	30	70	–100	2,800
4,000	3,700	30	70	–200	3,600
5,000	4,600	30	70	–300	4,400
6,000	5,500	30	70	–400	5,200

a. MPC = change in consumption/change in disposable income
   = $900/$1,000 = .9
b. MPS = 1 – MPC = 1 – .9 = .1
c. MPI = change in imports/change in disposable income
   = $100/$1,000 = –.1

Thinking About and Applying Aggregate Expenditures

I. Sorting Out the Determinants of Aggregate Expenditures

Consumption	Investment	Government Spending	Net Exports
Tastes	Technological change		Tastes
Disposable income	Expectations		Trade restrictions
Expectations	Profit expectations		Foreign income
Wealth	Capacity utilization		Exchange rates
Demographics	Interest rate		Domestic income
Taxation	Cost of capital goods		

II. Aggregate Expenditures and Its Determinants

	Component	Effect on Component	Effect on Aggregate Expenditures
1.	Investment	Decrease	Decrease
2.	Investment	Increase	Increase
3.	Consumption	Decrease	Decrease
	(The thought is that consumers will choose to distribute more of their incomes to savings, and therefore spend less at every level of income and save more out of additional income.)		
4.	Consumption and investment	Decrease	Decrease
5.	Government spending	Increase	Increase
6.	Investment	Increase	Increase

III. Determinants of Saving

1. taxation
2. taxation
3. expectations about future incomes
4. demographics