

Learning Objectives

- 8.1 Name the components of aggregate spending.
- 8.2 Analyze the relationship between consumption and income using a basic aggregate expenditures graph.
- 8.3 Analyze consumption and saving using marginal propensity to consume (MPC) and marginal propensity to save (MPS).
- 8.4 Describe the determinants of consumption, saving, and investment.
- 8.5 Determine macroeconomic equilibrium in the simple aggregate expenditures model of the private domestic economy.
- 8.6 Explain the multiplier process, how it is computed, and why it operates in both directions.
- 8.7 Describe macroeconomic equilibrium in the full aggregate expenditures model when government and the foreign sectors are added.
- 8.8 Explain why, at equilibrium, injections equal withdrawals in the economy.
- 8.9 Describe the differences between recessionary and inflationary gaps.

Madawaska, Maine, near the northern end of U.S. 1 that extends all the way south to Key West, Florida, is like many other idyllic small towns in the United States—picturesque, friendly, and highly dependent on one industry to provide jobs for its residents. For Madawaska, it is the local paper mill, which provides jobs to 620 of its 4,100 residents. The salaries earned by its workers help to keep the rest of the town employed, including workers in restaurants and cafés, pharmacies, banks, and gas stations that serve the paper mill workers and their families.

During the depth of the 2007–2009 recession, when Madawaska's paper mill was on the brink of closure, not only did its workers face potential unemployment, but so did the rest of the community, which depends on people with jobs at the paper mill to support their businesses. Towns such as Madawaska highlight the interdependency of the economy in which the loss of one job results in a reduction in spending that affects other jobs. In 2010 the workers at the paper mill took the unusual step of accepting an 8.5% wage cut in order to keep the company (and town) from closing down. And the plan worked—the plant survived and was sold to an investment firm in 2013 that promised to keep the paper mill running in Madawaska, where it remains in operation today.

The economic crisis that Madawaska faced during the last recession was one that many cities, big and small, experienced. As unemployment rose, people had less money to spend on clothing, electronics, travel, and cars, which caused a chain reaction downward in consumption, leading to further unemployment and slow or negative economic growth. This chain reaction is what John Maynard Keynes alluded to when he published *The General Theory of Employment, Interest and Money* in 1936, which discussed the importance of aggregate spending and the government's role in stabilizing the macroeconomy.

Today, the U.S. economy (along with the majority of its cities) has recovered from the last recession. As employment opportunities grew during the recovery, more money was earned and subsequently spent, which generated more economic activity and jobs. The chain reaction in recent years has worked in a positive direction. Sometimes, however, consumers and businesses alone cannot pull an economy out of recession, and government policies are needed to speed up growth. But *how* should government act and to *what extent* should it act?

These are the more contentious questions that are debated today. Stimulus packages, tax cuts, farm subsidies, laws and regulations, and even financial aid for college students are all part of a huge arsenal of tools available to government policymakers. The goal of government stimulus programs is to put money into the hands (through jobs, tax cuts, and cash benefits) of those most likely to spend it in their communities, thus carrying a positive ripple effect through to other businesses that depend on consumer spending.

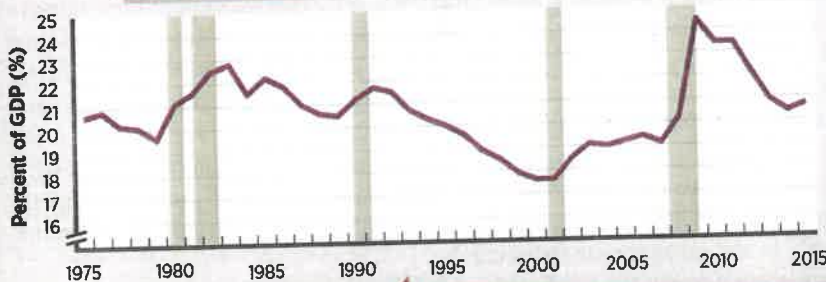
But Keynesian policies have not been without their critics as the size of government grew. Spending by government (federal, state, and local) has increased from 10% of GDP

BY THE NUMBERS

The Role of Spending in the Economy

Spending plays a vital role in spurring economic activity and creating growth and jobs. Spending occurs by consumers, investors, foreigners, and government. During economic downturns, government plays an increasingly important role in trying to influence the economy.

Go to [LaunchPad](#) to use the latest data to recreate this graph.



Government spending as a percentage of GDP rises during economic recessions (shaded).

Average government spending per person varies significantly across countries. The U.S. government spends less per person than governments of other developed countries.



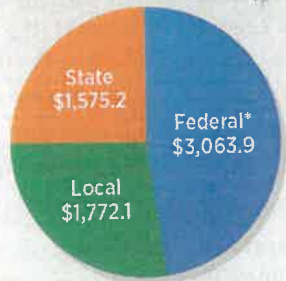
\$3,032,500,000,000
Total U.S. private domestic investment spending in 2015

\$2,223,618,000,000
Total U.S. spending by foreign consumers (exports) in 2015

The top categories of personal consumption expenditures in the United States in 2015:

- Goods:**
1. Food/Groceries: \$899.5 billion
 2. Motor Vehicles/Parts: \$455.0 billion
 3. Recreational Goods: \$383.8 billion
 4. Clothing/Footwear: \$376.3 billion
 5. Gasoline/Energy: \$294.7 billion
- Services:**
1. Housing/Utilities: \$2,232.0 billion
 2. Health Care: \$2,099.8 billion
 3. Financial Services/Insurance: \$931.0 billion
 4. Restaurants/Hotels: \$827.1 billion
 5. Recreational Services: \$479.3 billion

Combined spending among state and local governments roughly equals federal spending. Total spending among all governments was about \$6.4 trillion in 2015. (Values in billions.)



*Federal spending excludes intergovernmental transfers (money given to state and local governments).

in the 1930s to over 30% today as the size and scope of government programs expand. Although many people benefit from these programs, some believe government has overreached and they would prefer something smaller and simpler.

This sort of thinking is not new. In fact, over a century ago, government policies were rarely used to intervene in the workings of the economy, even when the economy entered a downturn. Classical economists, as they are called, viewed the role of the government as providing the necessary framework upon which the market could operate—maintaining competition, providing central banking services, providing for national defense, administering the legal system, and so forth. But government was not expected to play a role in promoting full employment, stabilizing prices, or stimulating economic growth—the economy was supposed to do this on its own. The belief at the time was that economic downturns were *self-correcting*, meaning that if the economy were left alone, the forces of supply and demand would naturally bring the economy back into equilibrium.

The classical perspective was challenged during the Great Depression by Keynes, who turned away from the classical framework with its three separate and distinct competitive markets operating through prices, wages, and interest rates. He focused instead on the economy as a whole and on aggregate spending.

In this chapter, we develop the aggregate expenditures model, which is commonly referred to as the Keynesian model. It can be used to analyze short-run macroeconomic fluctuations and how policymakers counteract the effects caused by the business cycle. Keynes's focus was on aggregate spending, and how consumption spending is a key component to explaining how the economy reaches short-term equilibrium employment, output, and income. Using this model, we will see why an economy can get stuck in an undesirable place, and why policies are useful in smoothing out the business cycle.

AGGREGATE EXPENDITURES

Recall that when we discussed measuring gross domestic product (GDP), we concluded that it could be computed by adding up either all spending or all income in the economy. We saw that the expenditures side consists of consumer spending, business investment spending, government spending, and net foreign spending (exports minus imports). Thus, **aggregate expenditures** are equal to

$$GDP = AE = C + I + G + (X - M)$$

Some Simplifying Assumptions

In this chapter, we first will focus on a simple model of the private economy that includes only consumers and businesses. Later in the chapter, we will incorporate government spending, taxes, and the foreign sector into our analysis. Second, we will assume that all saving is personal saving as opposed to national saving, which includes business saving and government saving. Third, because Keynes was modeling a depression economy, we follow him in assuming that there is considerable slack in the economy, much like the economy during and in the years following the 2007–2009 recession. Unemployment is high and other resources are sitting idle, which means that if demand were to rise, businesses could quickly increase output without any upward pressure on costs. We will assume therefore that the aggregate price level (the CPI, PPI, or GDP deflator) is fixed. Taking into account these assumptions, which make the analysis easier but do not affect the key points, let us begin by looking at consumption and saving.

Consumption and Saving

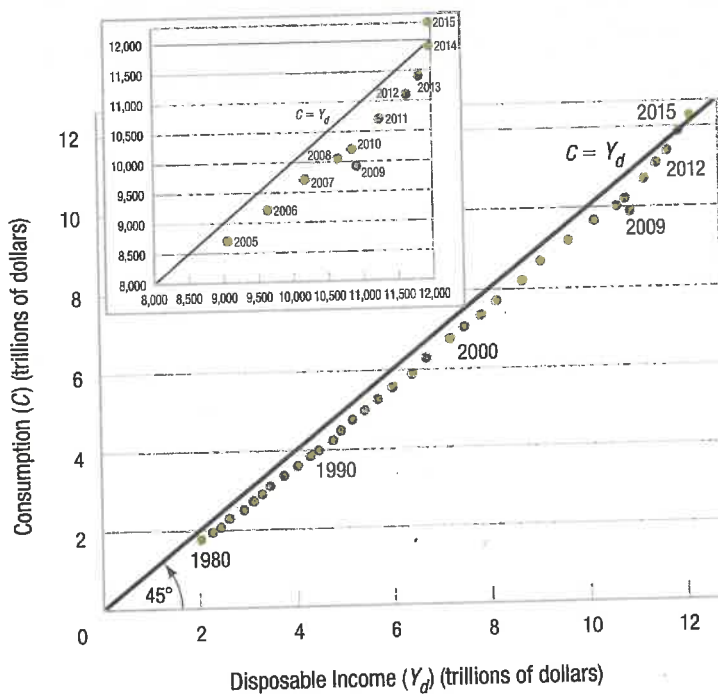
Personal consumption expenditures (C) represent about 68% of GDP, and for this reason **consumption** is a major ingredient in our model. Figure 1 shows personal consumption expenditures for the years since 1980. Notice how closely consumption parallels disposable income.

aggregate expenditures Consist of consumer spending, business investment spending, government spending, and net foreign spending (exports minus imports):
 $GDP = C + I + G + (X - M)$.

consumption Spending by individuals and households on both durable goods (e.g., autos, appliances, and electronic equipment) and nondurable goods (e.g., food, clothing, and entertainment).

FIGURE 1

CONSUMPTION AND DISPOSABLE INCOME



This graph shows personal consumption spending (C) for the years since 1980. The 45° line represents an economy that spends its entire income each year, resulting in no saving. Annual saving (S) is equal to the vertical difference between the 45° line and annual consumption ($S = Y_d - C$). The inset shows more clearly that consumption fell in 2009 when the economy was at the trough of the business cycle, but has since recovered.

The 45° line inserted in the figure represents all points where consumption is equal to disposable income (Y_d). If an economy spends its entire annual income, saving nothing, the 45° line would represent consumption. Consequently, annual saving (S) is equal to the vertical difference between the 45° reference line and annual consumption ($S = Y_d - C$). After all, what can you do with income except spend it or save it?

Notice that consumption spending increased every year since 1980 except in 2009, when disposable income rose but consumption dropped. This was an important contributor to the depth of the 2007–2009 recession. In fact, the last time annual consumption spending dropped occurred in 1933, during the depth of the Great Depression.

Keynes began his theoretical examination of consumption by noting the following:

The fundamental psychological law, upon which we are entitled to depend with great confidence both a priori from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the change in their income.¹

Consumption spending grows, in other words, as income grows, but not as fast. Therefore, as income grows, saving will grow as a percentage of income. Notice that this approach to analyzing saving differs from the classical approach. Classical economists assumed that the *interest rate* is the principal determinant of saving and, by extension, one of the principal determinants of consumption. Keynes, in contrast, emphasized *income* as the main determinant of consumption and saving.

Table 1 portrays a hypothetical consumption function of the sort Keynes envisioned. As income grows from \$4,000 to \$4,200, consumption increases by \$150 (\$4,150 – \$4,000) and saving grows from \$0 to \$50. Thus, the *change* in income of \$200 is divided between consumption (\$150) and saving (\$50). Note that at income levels below \$4,000, saving is negative; people are spending more than their current income either by using credit or drawing on existing savings to support consumption.

¹ John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt Brace Jovanovich), 1936, p. 96.

saving The difference between income and consumption; the amount of disposable income not spent.

TABLE 1

HYPOTHETICAL CONSUMPTION AND SAVING AND PROPENSITIES TO CONSUME AND SAVE

(1) Income or Output Y (in \$)	(2) Consumption C (in \$)	(3) Saving S (in \$)	(4) APC $C \div Y$	(5) APS $S \div Y$	(6) MPC $\Delta C \div \Delta Y$	(7) MPS $\Delta S \div \Delta Y$
3,000	3,250	-250	1.08	-0.08	0.75	0.25
3,200	3,400	-200	1.06	-0.06	0.75	0.25
3,400	3,550	-150	1.04	-0.04	0.75	0.25
3,600	3,700	-100	1.03	-0.03	0.75	0.25
3,800	3,850	-50	1.01	-0.01	0.75	0.25
4,000	4,000	0	1.00	0.00	0.75	0.25
4,200	4,150	50	0.99	0.01	0.75	0.25
4,400	4,300	100	0.98	0.02	0.75	0.25
4,600	4,450	150	0.97	0.03	0.75	0.25
4,800	4,600	200	0.96	0.04	0.75	0.25
5,000	4,750	250	0.95	0.05	0.75	0.25
5,200	4,900	300	0.94	0.06	0.75	0.25
5,400	5,050	350	0.94	0.06	0.75	0.25
5,600	5,200	400	0.93	0.07	0.75	0.25

average propensity to consume

The percentage of income that is consumed ($C \div Y$).

average propensity to save

The percentage of income that is saved ($S \div Y$).

marginal propensity to consume

The change in consumption associated with a given change in income ($\Delta C \div \Delta Y$).

marginal propensity to save The change in saving associated with a given change in income ($\Delta S \div \Delta Y$).

Average Propensities to Consume and Save The percentage of income that is consumed is known as the **average propensity to consume** (APC); it is listed in column (4) of Table 1. It is calculated by dividing consumption spending by income ($C \div Y$). For example, when income is \$5,000 and consumption is \$4,750, APC is 0.95, meaning that 95% of the income is spent.

The **average propensity to save** (APS) is equal to saving divided by income ($S \div Y$); it is the percentage of income saved. Again, if income is \$5,000 and saving is \$250, APS is 0.05, or 5% is saved. The APS is shown in column (5) of Table 1.

Notice that if you add columns (4) and (5) in Table 1, the answer is always 1. That is because $Y = C + S$; therefore, all income is either spent or saved. Similar logic dictates that the two percentages spent and saved must total 100%, or that $APC + APS = 1$.

Marginal Propensities to Consume and Save *Average* propensities to consume and save represent the proportion of income that is consumed or saved. *Marginal* propensities measure what part of *additional* income will be either consumed or saved. This distinction is important because changing policies by government policymakers mean that income changes and consumers' reactions to their *changing* incomes are what we will see later drive changes in the economy.

The **marginal propensity to consume** (MPC) is equal to the change in consumption associated with a given change in income. Denoting change by the delta symbol (Δ), $MPC = \Delta C \div \Delta Y$. Thus, for example, when income grows from \$5,000 to \$5,200 (a \$200 change), and consumption rises from \$4,750 to \$4,900 (a \$150 change), MPC is equal to 0.75 ($\$150 \div \200).

Notice that this result is consistent with Keynes's fundamental psychological law quoted earlier, holding that people "are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the change in their income." In Table 1, the MPC for all changes in income is 0.75, as shown in column (6).

The **marginal propensity to save** (MPS) is equal to the change in saving associated with a given change in income; $MPS = \Delta S \div \Delta Y$. Therefore, when income grows from \$5,000 to \$5,200, and saving grows from \$250 to \$300, MPS is equal to 0.25 ($\$50 \div \200). Column (7) lists MPS.

Note once again that the sum of the MPC and the MPS will always equal 1, because the only thing that can be done with a change in income is to spend or save it. A small word of warning, however: Though $APC + APS = 1$ and $MPC + MPS = 1$, most of the time $APC + MPS \neq 1$ and $APS + MPC \neq 1$. Try adding a few different columns from Table 1 and you will see that this is true.

Figure 2 graphs the consumption and saving schedules from Table 1. The graph in panel A extends the consumption schedule back to zero income, where consumption is equal to \$1,000 and saving is equal to $-\$1,000$. (Remember that $Y = C + S$; therefore, if $Y = 0$ and $C = \$1,000$, then S must equal $-\$1,000$. With no income, people in this economy would continue to spend, either borrowing money or drawing down their accumulated savings to survive.) The 45° line in panel A is a reference line where $Y = C + S$. At the point at which the consumption schedule crosses the reference line (point a , $Y = \$4,000$), saving is zero because consumption and income are equal.

The saving schedule in panel B plots the difference between the 45° reference line ($Y = C + S$) and the consumption schedule in panel A. For example, if income is \$4,000, saving is zero (point f in panel B), and when income equals \$5,000, saving equals \$250 [line ($b - c$) in panel A, point g in panel B]. Saving is positively sloped, again reflecting Keynes's fundamental law; the more people earn, the greater percentage of income they will save (the average propensity to save rises as income rises). Make a mental note that the saving schedule shows how much people *desire* to save at various income levels.

How much people will *actually* save depends on equilibrium income, or how much income the economy is generating. We are getting a bit ahead of the story here, but planting

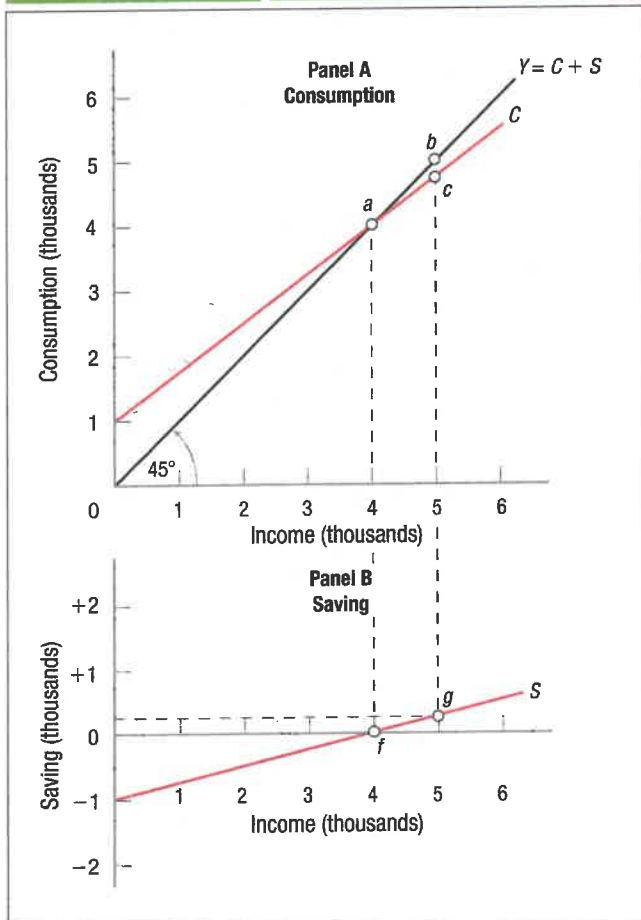


Kwiatek7/Shutterstock

Suppose you receive some birthday money from your aunt. What portion of this money would you spend and what portion would you save? These portions are your marginal propensity to consume and marginal propensity to save, respectively.

FIGURE 2

CONSUMPTION AND SAVING



The consumption and saving schedules from Table 1 are graphed here. Panel A extends the consumption schedule back to zero income, where consumption is equal to \$1,000 and saving is equal to $-\$1,000$. At the point where the consumption schedule crosses the reference line (point a , $Y = \$4,000$), saving is zero. The saving schedule in panel B simply plots the difference between the 45° reference line and the consumption schedule in panel A. Thus, when income = \$5,000, saving = \$250 [line ($b - c$) in panel A, point g in panel B].

this seed will help you when we get to the section where we determine equilibrium income in the economy.

Note finally that the consumption and saving schedules in our example are straight-line functions. This need not be the case, but it simplifies some of the relationships to graph them like this at this point. When the consumption and saving schedules are linear, the MPC is the slope of the consumption function, and the MPS is the slope of the saving schedule. In this case, $MPC = 0.75$ and $MPS = 0.25$, which tells us that every time income changes by \$1,000, consumption will change by \$750 and saving will change by \$250.

Other Determinants of Consumption and Saving Income is the principal determinant of consumption and saving, but other factors can shift the saving and consumption schedules. These factors include the wealth of a family, their expectations about the future of prices and income, family debt, and taxation.

- **Wealth** The more wealth a family has, the higher its consumption at all levels of income. Wealth affects the consumption schedule by shifting it up or down, depending on whether wealth rises or falls. When the stock market was soaring in the late 1990s, policymakers worried about the wealth effect, that as many households saw their wealth dramatically expand, rising consumption might cause the economy's inflation rate to rise. As it turned out, the stock market collapsed in 2000, and again in 2008, and the economy moved into recession. Then, economists began worrying about the negative impact of this wealth effect as trillions of dollars of wealth evaporated from the stock market before it eventually recovered.
- **Expectations** Expectations about future prices and incomes help determine how much a person will spend today. If you anticipate that prices will rise next week, you will be more likely to purchase more products today. What are sales, after all, but temporary reductions in price designed to entice customers into the store today? Similarly, if you anticipate that your income will soon rise—perhaps you are about to graduate from medical school—you will be more inclined to incur debt today to purchase something you want, as was the case with LeBron James, who drove an expensive Hummer while in high school, knowing that when he was drafted into the NBA, he would be making a fortune. Lotto winners who receive their winnings over a 20-year span often spend much of the money early on, running up debts. Few winners spend their winnings evenly over the 20 years.
- **Household Debt** Most households carry some debt, typically in the form of credit card balances, auto loans, student loans, or a home mortgage. The more debt a household has, the less able it is to spend in the current period as it makes payments toward the debt. Although the household might want to spend more money on goods now, its debt level restricts its ability to get more credit.
- **Taxes** Taxes reduce disposable income, and therefore taxes result in reduced consumption and saving. When taxes are increased, spendable income falls; therefore, consumption is reduced by the MPC times the reduction in disposable income, and saving falls by the reduction in disposable income times the MPS. Tax reductions have the opposite effect, as we will see later in this chapter.

Investment

When the town of West Point, Georgia, received the news that South Korean automaker Kia Motors was building a \$1 billion car manufacturing facility in its town, its residents couldn't have been happier. Not only was Kia creating thousands of jobs, the spending by its workers would create even more jobs throughout the region. Because Kia's manufacturing facility was new to the U.S. economy (and not simply a move from another town), it is counted as *gross private domestic investment* (the "I" in the GDP equation), an important component of the aggregate expenditures model. **Investment** can come from foreign and domestic sources, for example, when American companies expand their operations by investing in new capital such as building a new factory.

investment Spending by businesses that adds to the productive capacity of the economy. Investment depends on factors such as its rate of return, the level of technology, and business expectations about the economy.

Unlike consumer spending, which at 68% is the largest component of GDP and until recently held fairly steady from year to year, gross private domestic investment is volatile. Sure, large investment deals like Kia's new plant in West Point, Georgia, are a huge boost to the economy, but such investments tend to be sporadic. The annual percentage changes in consumption and investment spending from 1980 to 2015 are shown in Figure 3.

Notice that although consumption plodded along with annual increases between 0% and 10%, investment spending has undergone annual fluctuations ranging from -22% to +27%. Investment constitutes about 16% of GDP; therefore, its volatility often accounts for our recessions and booms.

The economic boom of the 1990s, for instance, was fueled by investments in information technology infrastructure, including massive investments in telecommunications. In the 1990s, people believed that Internet traffic would grow by 1,000% a year, doubling every three months or so. This belief led many companies to lay millions of miles of fiber optic cable. When the massive investments made in computer hardware and software over that same decade are taken into account, it is no wonder that the economy grew at a breakneck pace.

But this increase came to a halt in the early 2000s, when businesses—especially the telecoms—discovered that they had built up a massive excess capacity, and thus bandwidth prices plummeted. The resulting plunge in investment between 2000 and 2001 can be seen in Figure 3. Investment recovered by 2003, then collapsed from 2007 to 2009 as the housing and financial crises took their toll.

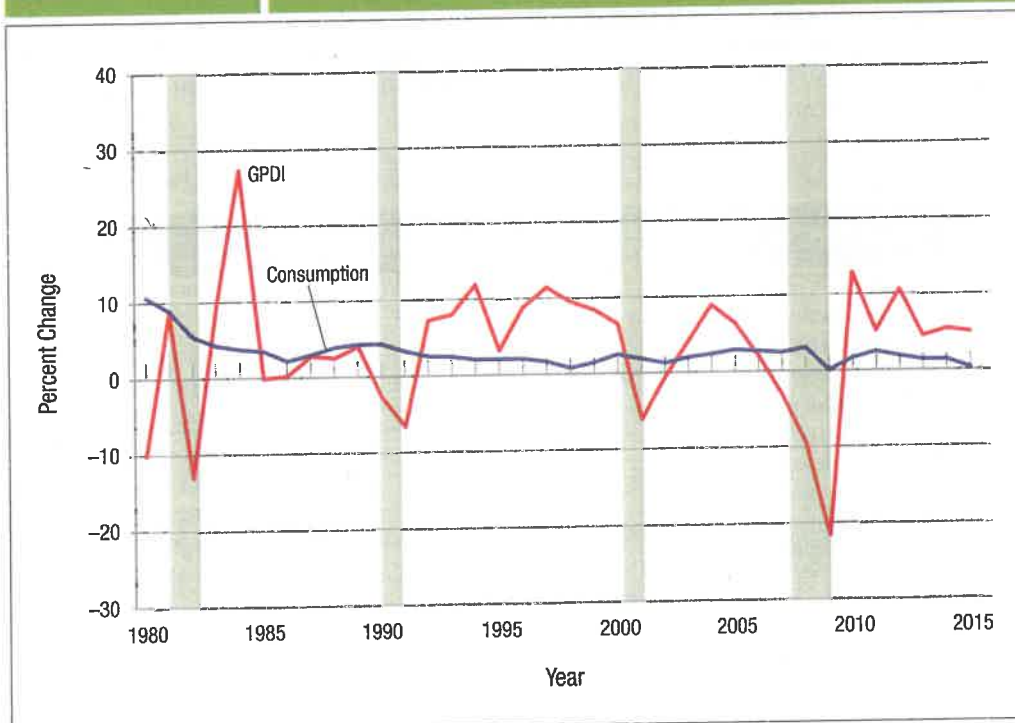
Investment Demand Investment levels depend mainly on the rate of return on capital. Investments earning a high rate of return are the investments undertaken first (assuming comparable risk), with those projects offering lower returns finding their way into the



Many residents in West Point, Georgia, were excited when South Korean auto manufacturer Kia Motors built a large factory in their town in 2008, saving the town's economy after decades of factory closings and job losses.

FIGURE 3

CHANGES IN CONSUMPTION AND GROSS PRIVATE DOMESTIC INVESTMENT



The annual percentage changes in consumption and gross private domestic investment (GPDI) are shown here. Consumption is relatively stable, but investment spending is highly volatile, with annual fluctuations ranging from -22% to +27%. The shaded bars represent recessions.

Inventories	% Higher	% Same	% Lower	Index
Feb 2016	13	64	23	45.0
Jan 2016	13	61	26	43.5
Dec 2015	14	59	27	43.5
Nov 2015	13	60	27	43.0

Each month, the Institute of Supply Management provides a forecast of investment demand by asking businesses whether their inventories are higher, the same, or lower than the previous month. Investors cheer falling inventories, because it is a sign that businesses will boost factory production and investment in new facilities. Although inventories rose slightly from November 2015 to February 2016, the overall index remains low, signaling continued economic growth.

investment stream later. Interest rate levels also are important in determining how much investment occurs, because much of business investment is financed through debt. As interest rates fall, investment rises, and vice versa.

Although the rate of return on investments is the main determinant of investment spending, other factors influence investment demand, including expectations, technological change, capital goods on hand, and operating costs.

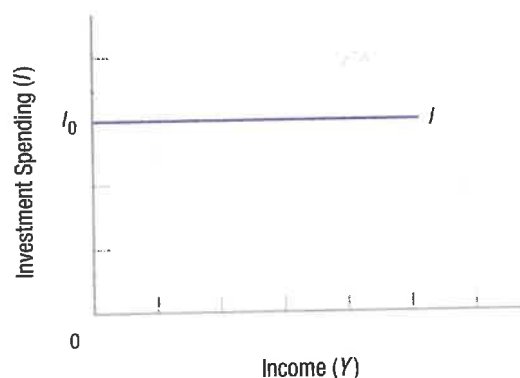
- **Expectations** Projecting the rate of return on investment is not an easy task. Returns are forecasted over the life of a new piece of equipment or factory, yet many changes in the economic environment can alter the actual return on these investments. As business expectations improve, investment demand will increase as businesses are willing to invest more at any given interest rate.
- **Technological Change** Technological innovations periodically spur investment. The introduction of electrification, automobiles, and phone service at the beginning of the 20th century and, most recently, mobile technology and the new products they have spawned, are examples. Producing brand-new products requires massive investments in plants, equipment, and research and development. These investments often take a long time before their full potential is realized.
- **Operating Costs** When the costs of operating and maintaining machinery and equipment rise, the rate of return on capital equipment declines and new investment will be postponed.
- **Capital Goods on Hand** The more capital goods a firm has on hand, including inventories of the products it sells, the less the firm will want to make new investments. Until existing capacity can be fully used, investing in more equipment and facilities will do little to help profits.

Aggregate Investment Schedule To simplify our analysis, we will assume that rates of return and interest rates fully determine investment in the short run. But once that level of investment has been determined, it remains independent of income, or *autonomous*, as economists say. Therefore, unlike consumption, which increases as income rises, we will assume that investment does not vary based on income, but instead on the rates of return that determine how potentially profitable investment will be. Figure 4 shows the resulting aggregate investment schedule that plots investment spending with respect to income.

FIGURE 4

THE INVESTMENT SCHEDULE

The aggregate investment schedule, relating investment spending to income, is shown here. Because aggregate investment is I_0 at all income levels, the curve is a horizontal straight line. This assumption simplifies the aggregate expenditures model.



Because we have assumed that aggregate investment is I_0 at all income levels, the curve is a horizontal straight line. Investment is unaffected by different levels of income. This is a simplifying assumption that we will change in later chapters when we look at its implications.

Our emphasis in this section has been on two important components of aggregate spending: consumption and investment. Consumption is about 68% and investment is about 16% of aggregate spending. Consumption is relatively stable, but investment is volatile and especially sensitive to expectations about conditions in the economy. We have seen that, on average, some income is spent (APC) and some is saved (APS). But, it is that portion of *additional* income that is spent (MPC) and saved (MPS) that is most important for where the economy settles or where it reaches equilibrium, as we will see in the next section.



CHECKPOINT

AGGREGATE EXPENDITURES

- Aggregate expenditures are equal to $C + I + G + (X - M)$, with consumption being about 68% of aggregate spending.
- Keynes argued that saving and consumption spending are related to income. As income grows, consumption will grow but not as fast.
- The marginal propensities to consume (MPC) and save (MPS) are equal to $\Delta C \div \Delta Y$ and $\Delta S \div \Delta Y$, respectively. They represent the change in consumption and saving associated with a change in income.
- Other factors affecting consumption and saving include wealth, expectations about future income and prices, the level of household debt, and taxes.
- Investment levels depend primarily on the rate of return on capital.
- Other determinants of investment demand include business expectations, technology change, operating costs, and the amount of capital goods on hand.
- Consumption is relatively stable. In contrast, investment is volatile.

QUESTION: Why is investment spending generally much more volatile than consumption spending?

Answers to the Checkpoint questions can be found at the end of this chapter.

THE SIMPLE AGGREGATE EXPENDITURES MODEL

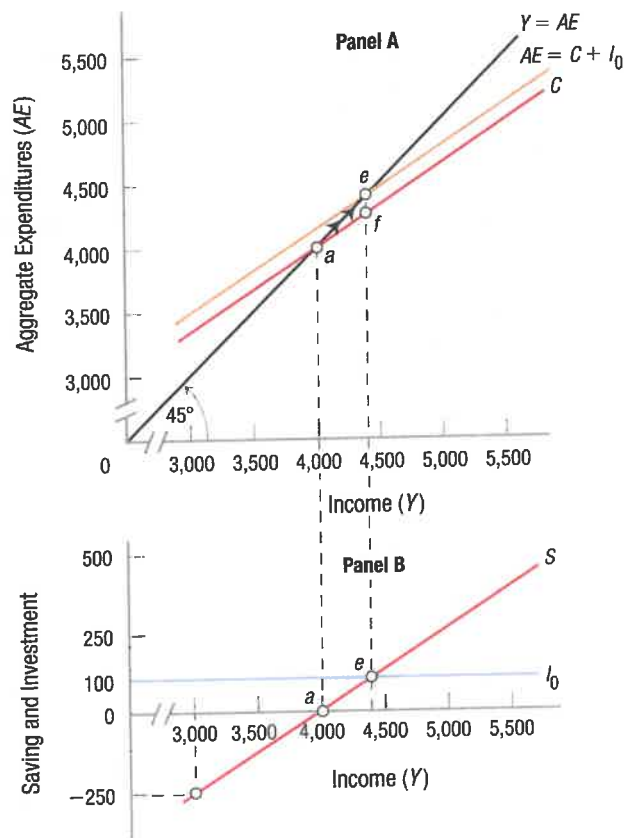
Now that we have stripped the government and foreign sectors from our analysis at this point, aggregate expenditures (AE) will consist of the sum of consumer and business investment spending ($AE = C + I$). Figure 5 shows a simple aggregate expenditures model based on consumption and investment. Aggregate expenditures based on the data in Table 1 are shown in panel A of Figure 5; panel B shows the corresponding saving and investment schedules.

Let us take a moment to remind ourselves what these graphs represent. The 45° line in panel A represents the situation when income exactly equals spending, or $Y = AE$. In other words, no savings occur at any level of income. All other lines represent situations in which income does not exactly equal spending at all levels of income. Point *a* in both panels is that level of income (\$4,000) at which saving is zero and all income is spent. Saving is therefore positive for income levels above \$4,000 and negative at incomes below. The vertical distance *ef* in panel A represents investment (I_0) of \$100; it is equal to I_0 in panel B. Note that the vertical axis of panel B has a different scale from that of panel A.

FIGURE 5

EQUILIBRIUM IN THE AGGREGATE EXPENDITURES MODEL

Ignoring government spending and net exports, aggregate expenditures (AE) consist of consumer spending and business investment ($AE = C + I$). Panel A shows AE and its relationship with income (Y); when spending equals income, the economy is on the $Y = AE$ line. Panel B shows the corresponding saving and investment schedules. Point a in both panels shows where income equals consumption and saving is zero. Therefore, saving is positive for income levels above \$4,000 and negative at incomes below \$4,000. The vertical distance ef in panel A represents investment (\$100); it is equal to I_0 in panel B. Equilibrium income and output are \$4,400 (point e), because this is the level at which businesses are producing just what other businesses and consumers want to buy.



Macroeconomic Equilibrium in the Simple Model

Keynesian macroeconomic equilibrium The state of an economy at which all injections equal all withdrawals. There are no pressures pushing the economy to a higher or lower level of output.

The important question to ask is where this economy will come to rest. Or, in the language of economists, at what income will this economy reach **Keynesian macroeconomic equilibrium**? By equilibrium, economists mean that income at which there are no net pressures pushing the economy to move to a higher or lower level of output.

To find this equilibrium point, let's begin with the economy at an income level of \$4,000. Are there pressures driving the economy to grow or decline? Looking at point a in panel A of Figure 5, we see that the economy is producing \$4,000 worth of goods and services and \$4,000 in income. At this income level, however, consumers and businesses want to spend \$4,100 (\$4,000 in consumption and \$100 in investment). Because aggregate expenditures (AE) exceed current income and output, there are more goods being demanded (\$4,100) than are being supplied at \$4,000. As a result, businesses will find it in their best interests to produce more, raising employment and income and moving the economy toward income and output level \$4,400 (point e).

Once the economy has moved to \$4,400, what consumers and businesses want to buy is exactly equal to the income and output being produced. Businesses are producing \$4,400, aggregate expenditures are equal to \$4,400, and there are no pressures on the economy to move away from point e . Income of \$4,400, or point e , is an equilibrium point for the economy.

Panel B shows this same equilibrium, again as point *e*. Is it a coincidence that saving and investment are equal at this point where income and output are at equilibrium? The answer is no. In this simple private sector model, saving and investment will always be equal when the economy is in equilibrium.

Remember that aggregate expenditures are equal to consumption plus business investment ($AE = C + I$). Recall also that at equilibrium, aggregate expenditures, income, and output are all equal; what is demanded is supplied ($AE = Y$). Finally, keep in mind that income can either be spent or saved ($Y = C + S$). By substitution, we know that, at equilibrium,

$$AE = Y = C + I$$

We also know that

$$Y = C + S$$

Substituting $C + I$ for Y yields

$$C + I = C + S$$

Canceling the C 's, we find that, at equilibrium,

$$I = S$$

Thus, the location of point *e* in panel B is not just coincidental; at equilibrium, actual saving and investment are always equal. Note that at point *a*, saving is zero, yet investment spending is \$100 at I_0 . This difference means businesses desire to invest more than people desire to save. With *desired* investment exceeding *desired* saving, this cannot be an equilibrium point, because saving and investment must be equal in order for the economy to be at equilibrium. Indeed, income will rise until these two values are equal at point *e*.

What is important to take from this discussion? First, when intended (or desired) saving and investment differ, the economy will have to grow or shrink to achieve equilibrium. When desired saving exceeds desired investment—at income levels above \$4,400 in panel B—income will decline. When intended saving is below intended investment—at income levels below \$4,400—income will rise. Notice that we are using the words “intended” and “desired” interchangeably.

Second, at equilibrium all **injections** of spending (investment in this case) into the economy must equal all **withdrawals** (saving in this simple model). Spending injections increase aggregate income, while spending withdrawals reduce it. This fact will become important as we add government and the foreign sector to the model.

Returning to Figure 5, given an initial investment of \$100 (I_0), equilibrium is at an output of \$4,400 (point *e*). Remember that at equilibrium, what people *withdraw* from the

JOHN MAYNARD KEYNES (1883–1946)



In 1935 John Maynard Keynes boasted in a letter to playwright George Bernard Shaw of a book he was writing that would revolutionize “the way the world thinks about economic problems.” This was a brash prediction to make, even to a friend, but it was not an idle boast. His *General Theory of Employment, Interest and Money* did change the way the world looked at economics.

Keynes belongs to a small class of economic earth-shakers that includes Karl Marx and Adam Smith. His one-man war on classical theory launched a new field of study known as macroeconomics. His ideas would have a profound influence on theorists and government policies for decades to come.

Keynes was once asked if there was any era comparable to the Great Depression. He replied, “It was called the Dark Ages and it lasted 400 years.” His prescription to President Franklin D. Roosevelt was to increase government spending to stimulate the economy. Sundeep Reddy reports that “during a 1934 dinner . . . after one economist carefully removed a towel from a stack to dry his hands, Mr. Keynes swept the whole pile of towels on the floor and crumpled them up, explaining that his way of using towels did more to stimulate employment among restaurant workers” (*The Wall Street Journal*, January 8, 2009, p. A10).

During the world economic depression in the early 1930s, Keynes became alarmed when unemployment in England continued to rise after the first few years of the crisis. Keynes argued that *aggregate expenditures*, the sum of consumption, investment, government spending, and net exports, determined the levels of economic output and employment. When aggregate expenditures were high, the economy would foster business expansion, higher incomes, and high levels of employment. With low aggregate spending, businesses would be unable to sell their inventories and would cut back on investment and production.

The ideas formulated by Keynes dramatically changed the way government policy is used throughout the world. Today, as many countries face a slow economic recovery, governments have taken a more proactive role in their economies in hopes of avoiding another downturn of the magnitude seen in the 1930s.

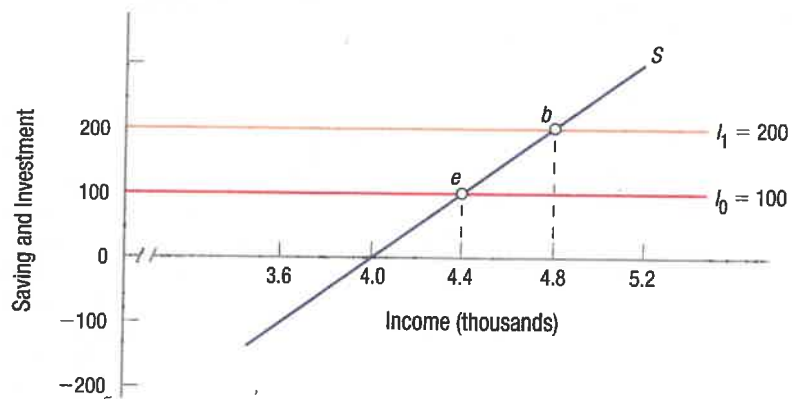
injections Increments of spending, including investment, government spending, and exports.

withdrawals Activities that remove spending from the economy, including saving, taxes, and imports.

FIGURE 6

SAVING AND INVESTMENT

When investment is \$100, equilibrium employment occurs at an output of \$4,400 (point *e*). When investment rises to \$200 (I_1), equilibrium output climbs to \$4,800 (point *b*). Thus, \$100 of added investment spending causes income to grow by \$400. This is the multiplier at work.



economy (saving) is equal to what others are willing to *inject* into the spending system (investment). In this case, both values equal \$100. Point *e* is an equilibrium point because there are no pressures in the system to increase or decrease output; the spending desires of consumers and businesses are satisfied.

The Multiplier

Injections and withdrawals in an economy produce an effect that is greater than the initial value of the injection or withdrawal. The following example illustrates why. Assume that *full employment* occurs at output \$4,800. How much would investment have to increase to move the economy out to full employment? As Figure 6 shows, investment must rise to \$200 (I_1), an increase of \$100. With this new investment, equilibrium output moves from point *e* to point *b*, and income rises from \$4,400 to \$4,800.

What is remarkable here is that a mere \$100 of added spending (investment in this case) caused income to grow by \$400. This phenomenon is known as the **multiplier** effect. Recognizing it was one of Keynes's major insights. How does it work?

multiplier Spending changes alter equilibrium income by the spending change times the multiplier. One person's spending becomes another's income, and that second person spends some (the MPC), which becomes income for another person, and so on, until income has changed by $1/(1 - MPC) = 1/MPS$. The multiplier operates in both directions.

In this example, we have assumed the marginal propensity to consume is 0.75. Therefore, for each added dollar received by consumers, \$0.75 is spent and \$0.25 is saved. Thus, when businesses invest an additional \$100, the firms providing the machinery will spend \$75 of this new income on more raw materials, while saving the remaining \$25. The firms supplying the new raw materials have \$75 of new income. These firms will spend \$56.25 of this ($0.75 \times \75.00), while saving \$18.75 ($\$56.25 + \$18.75 = \75.00). This effect continues on until the added spending has been exhausted. As a result, income will increase by $\$100 + \$75 + \$56.25 \dots$. In the end, income rises by \$400. Figure 7 outlines this multiplier process.

The general formula for the spending multiplier (k) is

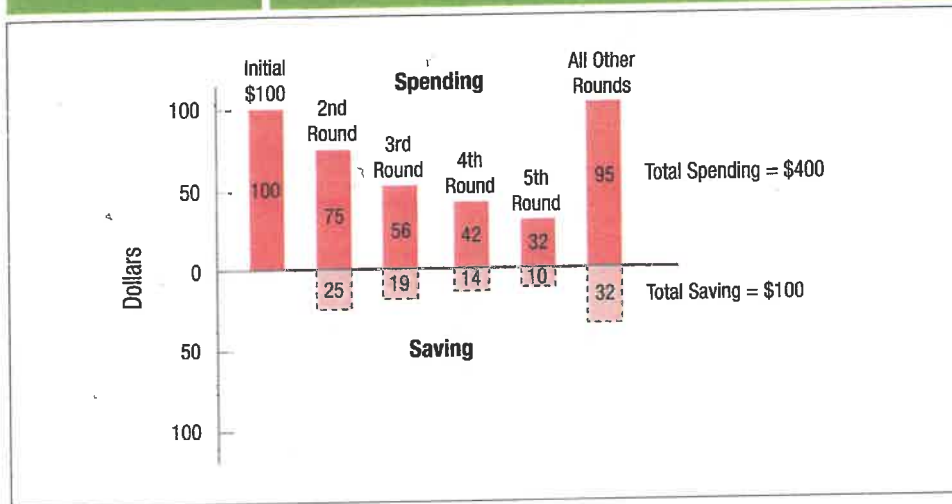
$$k = 1/(1 - MPC)$$

Alternatively, because $MPC + MPS = 1$, the $MPS = 1 - MPC$; therefore,

$$k = 1/MPS$$

FIGURE 7

THE MULTIPLIER PROCESS



An initial \$100 of spending generates more spending because of the multiplier process shown in this figure. With an $MPC = 0.75$ in the second round, \$75 is spent and \$25 is saved. In the third round, \$56.25 of the previous \$75 is spent and \$18.75 is saved, and so on. Total spending is \$400, and total saving is \$100 when all rounds are completed.

Thus, in our simple model, the multiplier is

$$1/(1 - 0.75) = 1/0.25 = 4$$

As a result of the multiplier effect, new spending will raise equilibrium by 4 times the amount of new spending. Note that any change in spending (consumption, investment—and as we will see in the next section—government spending or changes in net exports) will also have this effect. Spending is spending. Note also—and this is important—the multiplier works in both directions.

The Multiplier Works in Both Directions

If spending increases raise equilibrium income by the increase times the multiplier, a spending decrease will reduce income in corresponding fashion. In our simple economy, for instance, a \$100 decline in investment or consumer spending will reduce income by \$400.

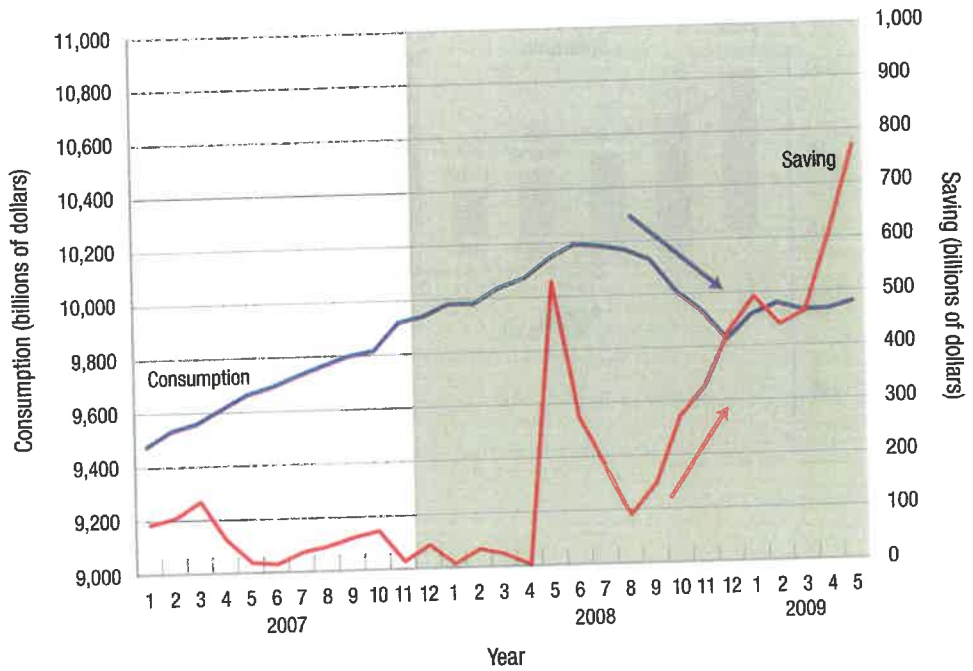
This is one reason why recession watchers are always concerned about consumer confidence. During a recession, income declines, or at least the rate of income growth falls. If consumers decide to increase their saving to guard against the possibility of job loss, they may inadvertently make the recession worse. As they pull more of their money out of the spending stream, *withdrawals* increase, and income is reduced by a multiplied amount as other agents in the economy feel the effects of this reduced spending. The result can be a more severe or longer-lasting recession.

This was the case when consumer spending peaked in the summer of 2008. After that, auto sales plummeted and housing prices and sales fell. As the recession that started in December 2007 progressed and jobs were lost, consumers reduced their spending. As their confidence in the economy deteriorated, households began to save more, consumer spending declined further, and the economy sank into a deeper recession. Figure 8 shows how consumer spending (downward arrow) fell and saving rose (upward arrow) after September 2008. Leading up to the recession, saving was less than 1% of personal income, but by mid-2009 it had grown to 7%. Before the recession, aggregate household debt had soared, and part of what we are seeing in Figure 8 may reflect households spending less in order to pay off debt and return to more sustainable levels of debt.

FIGURE 8

CONSUMPTION AND SAVING, 2007-2009

Consumption declined as the recession developed, and consumer worries about job losses and the decline in housing prices resulted in households saving more. The shaded area on the right represents the recession.



paradox of thrift When investment is positively related to income and households *intend* to save more, they reduce consumption. Consequently, income and output decrease, reducing investment such that savings actually end up decreasing.

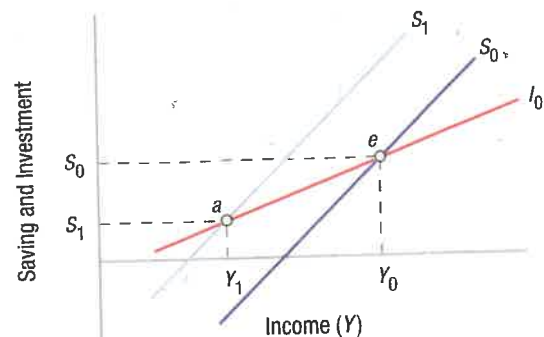
Paradox of Thrift The implication of Keynesian analysis for actual aggregate household saving and household intentions regarding saving is called the **paradox of thrift**. As we saw in Figure 8, if households *intend* (or desire) to save more, they will reduce consumption, thereby reducing income and output, resulting in job losses and further reductions in income, consumption, business investment, and so on. The end result is an aggregate equilibrium with lower output, income, investment, and in the final analysis, lower *actual* aggregate saving.

Notice that we have modified our assumption about investment—it now varies with economic conditions and is positively related to income. When the economy improves and income (or output) rises, investment expands as well, and vice versa when the economy sours. This is shown in our simple aggregate expenditures framework in Figure 9.

FIGURE 9

PARADOX OF THRIFT

When consumers intend to save more and consume less (the saving schedule shifts from S_0 to S_1), and if investment is a rising function of income, the end result is that at equilibrium, households actually end up saving less (point *a*).



ISSUE

Do High Savings Rates Increase the Risk of a Long Recession?

Everyone has a frugal friend or relative who saves every penny possible, or a shopaholic friend who can't seem to save any money at all. These differences in savings rates often are influenced by economic and demographic factors.

People with higher incomes tend to save a larger portion of their incomes than those with lower incomes. Older people tend to save more than younger people. And those living in rural areas tend to save more than those in urban areas. Yet, although these factors explain savings rates *within* a country, they do not fully explain the savings rate across countries. In other words, cultural differences play an important role as well.

The following bar graph shows the average household saving rate in a sample of twelve countries in 2016. China and India rank at the top of this list, despite having a lower income per capita than any other country on the list. The United States, which has the highest income per capita among the countries shown, has a savings rate toward the bottom. And some countries have seen dramatic changes in their savings rate, such as Japan, which had one of the highest savings rates 30

years ago, but today has the lowest savings rate among the countries shown.

The savings rate plays an important role in an economy. A high savings rate, such as that in China, India, and France, gives a country's banking system a vote of confidence; people trust putting their money into financial institutions and expect the money will be available when desired. Also, savings provide opportunities for others to borrow, providing inexpensive access to loans for investment.

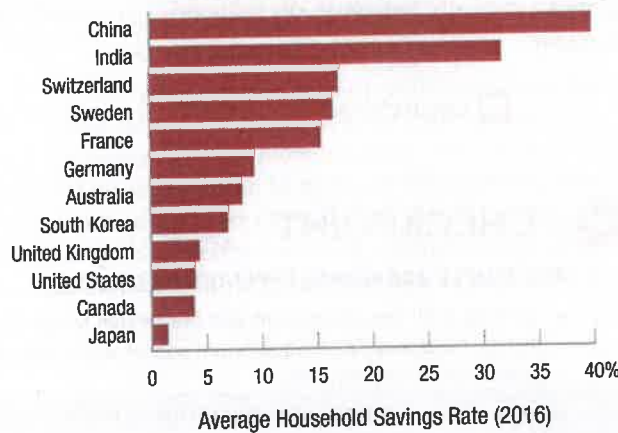
However, a high savings rate can also make a country vulnerable in times of recession. The adverse effects of a high savings rate are seen in China today, which has seen its growth rate fall in recent years. The natural reaction by Chinese citizens is to save even more, which may further slow economic



Xeye/Dreamstime.com

growth and eventually lead to a recession. In the 1990s, Japan faced a decade-long recession due to the government's inability to boost consumption and investment using incentives, largely because its citizens and businesses were too worried to consume and invest, and instead chose to save.

The ability of governments to minimize the effects of economic downturns depends on the marginal propensity to consume, which determines the multiplier. The higher the multiplier, the greater the effect government efforts to increase spending will have. Because China and India have very high savings rates, government incentives to boost consumption and investment may not be very effective, which doesn't bode well should either country enter into a recession.



Initially, the economy is in equilibrium at point *e* with saving equal to S_0 . If households *desire* to save more because they feel insecure about their jobs, the savings curve will shift upward and to the left to S_1 . Now at all levels of income households *intend* to save more. This sets up the chain reaction described previously, leading to a new equilibrium at point *a*, where equilibrium income has fallen to Y_1 and *actual* saving has declined to S_1 . The paradox is that if everyone tries to save more (even for good reasons), in the end they may end up saving less.



Brazil's Beco Do Batman: How Graffiti Revived a Neighborhood

How did the Beco Do Batman neighborhood in São Paulo turn graffiti into an economic growth engine?

In cities around the world, graffiti artists exhibit their talents on the sides of buildings, trains, and bridges, turning otherwise pristine areas into unsightly views. Graffiti is also a common tool used by gangs, which increases the perception of neighborhoods with graffiti as unsafe, leading to a reduction in their desirability as a place to live or visit. As a result, neighborhoods and cities have an incentive to clean up graffiti. But because cleanup costs can be expensive and graffiti artists often return, winning the war against graffiti becomes difficult.

In one neighborhood in São Paulo, Brazil, instead of pumping more money



Eric Chiang

into a never-ending battle on graffiti, residents decided on a markedly different strategy. What did the residents of Beco Do Batman ("Batman Alley" in Portuguese) choose to do?


Instead of cleaning up the graffiti, residents *encouraged* graffiti artists to come to the area. Since the 1980s, artists from around Brazil and other countries journeyed to Beco Do Batman to paint giant murals in its alleyways. Because the lack of unpainted walls means that new artists must paint over a previous artist's work, a constantly changing art gallery is created for visitors to enjoy.

How did this strategy of welcoming graffiti affect the neighborhood?

First, overall crime *declined*. Because graffiti in Beco Do Batman was no longer a sign of gang power, criminal graffiti artists went elsewhere. This attracted wealthier residents and investors to build homes in the area, raising the property values of all homeowners and businesses.

Second, as Beco Do Batman became a unique tourist attraction, money was spent by tourists who visited the shops and restaurants in the area. The economic activity spurred by visitors created jobs and higher wages for its residents, who then had more money to spend. The cycle of increased economic activity generated a multiplier effect that allowed Beco Do Batman and its surrounding neighborhoods to thrive, pulling many of its residents out of poverty.

The graffiti art of Beco Do Batman is a unique example of how aggregate expenditures and the multiplier effect can lead to higher economic growth.

GO TO  **LaunchPad** TO PRACTICE THE ECONOMIC CONCEPTS IN THIS STORY



CHECKPOINT

THE SIMPLE AGGREGATE EXPENDITURES MODEL

- Ignoring both the government and the foreign sector in a simple aggregate expenditures model, macroeconomic equilibrium occurs when aggregate expenditures are just equal to what is being produced.
- At equilibrium, aggregate saving equals aggregate investment.
- The multiplier process amplifies new spending because some of the new spending is saved and some becomes additional spending. And some of that spending is saved and some is spent, and so on.
- The multiplier is equal to $1/(1 - MPC) = 1/MPS$.
- The multiplier works in both directions. Changes in spending are amplified, changing income by more than the initial change in spending.
- The paradox of thrift results when households *intend* to save more, but at equilibrium they end up saving less.

QUESTION: Business journalists, pundits, economists, and policymakers all pay attention to the results of the Conference Board's monthly survey of 5,000 households, called the Consumer Confidence Index. When the index is rising, this is good news for the economy, and when it is falling, concerns are often heard that it portends a recession. Why is this survey important as a tool in forecasting where the economy is headed in the near future?

Answers to the Checkpoint questions can be found at the end of this chapter.

THE FULL AGGREGATE EXPENDITURES MODEL

With the simple aggregate expenditures model of the domestic private sector (individual consumption and private business investment), we concluded that at equilibrium, saving would equal investment, and that changes in spending lead to a larger change in income. This multiplier effect was an important insight by Keynes. To build the full aggregate expenditures model, we now turn our attention to adding government spending and taxes and the impact of the foreign sector.

Adding Government Spending and Taxes

Although government spending and tax policy can get complex, for our purposes it involves simple changes in government spending (G) or taxes (T). As we have seen in the previous section, any change in aggregate spending causes income and output to rise or fall by the spending change times the multiplier.

Figure 10 illustrates a change in government spending. Initially, investment is \$100; therefore, equilibrium income is \$4,400 (point e), just as in Figure 6 earlier. Rather than investment rising by \$100, let's assume that the government decides to spend another \$100. As Figure 10 shows, the new equilibrium is \$4,800 (point b). This result is similar to the one in Figure 6, confirming that spending is spending; the economy does not care where it comes from.

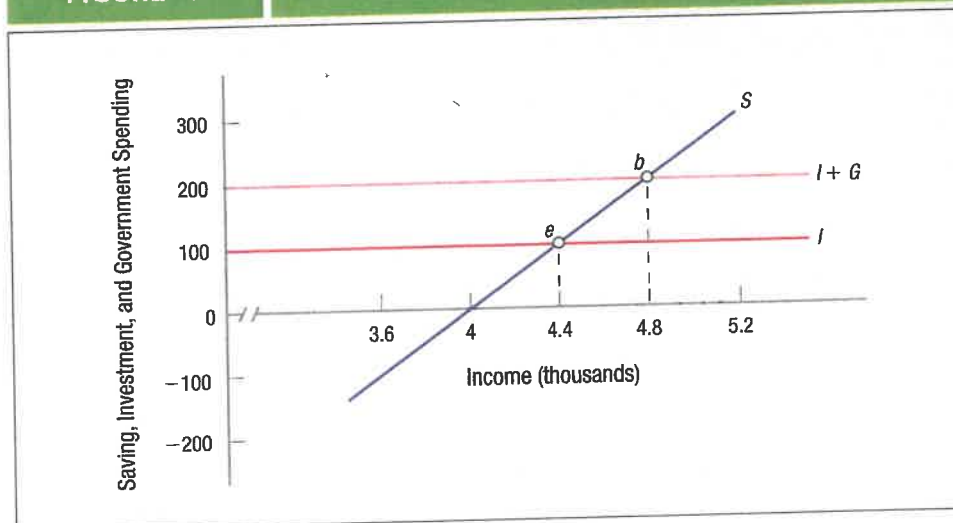
A quick summary is now in order. Equilibrium income is reached when *injections* (here, $I + G = \$200$) equal *withdrawals* (in this case, $S = \$200$). It did not matter whether these injections came from investment alone or from investment and government spending together. The key is spending.

Changes in spending modify income by an amount equal to the change in spending times the multiplier. How, then, do changes in taxes affect the economy? The answers are not as simple in that case.

Tax Changes and Equilibrium When taxes are increased, money is withdrawn from the economy's spending stream. When taxes are reduced, money is injected into the economy's spending stream because consumers and businesses have more to spend. Thus, taxes form a wedge between income and that part of income that can be spent, or disposable income. Disposable income (Y_d) is equal to income minus taxes ($Y_d = Y - T$). For simplicity, we will assume that all taxes are paid in a lump sum, thereby removing a certain fixed sum of money from the economy. This assumption does away with the need to worry now about the incentive effects of higher or lower tax rates.

FIGURE 10

SAVING, INVESTMENT, AND GOVERNMENT SPENDING



A change in government spending (G) causes income and output to rise or fall by the spending change times the multiplier.

Income or Output (Y), in \$	Taxes (T), in \$	Disposable Income (Y_d), in \$	Consumption (C)	Saving (S)	Investment (I)	Government Spending (G)
4,000	100	3,900	3,925	-25	100	100
4,100	100	4,000	4,000	0	100	100
4,200	100	4,100	4,075	25	100	100
4,300	100	4,200	4,150	50	100	100
4,400	100	4,300	4,225	75	100	100
4,500	100	4,400	4,300	100	100	100
4,600	100	4,500	4,375	125	100	100
4,700	100	4,600	4,450	150	100	100
4,800	100	4,700	4,525	175	100	100
4,900	100	4,800	4,600	200	100	100
5,000	100	4,900	4,675	225	100	100

Returning to the model of the economy we have been developing, consumer spending now relates to disposable income ($Y - T$), rather than just income. Table 2 reflects this change, using disposable income to determine consumption. With government spending and taxes (fiscal policy) in the model, spending *injections* into the economy include government spending plus business investment ($G + I$). *Withdrawals* from the system include saving and taxes ($S + T$).

Again, equilibrium requires that *injections* equal *withdrawals*, or in this case,

$$G + I = S + T$$

In our example, Table 2 shows that $G + I = S + T$ at income level \$4,500 (the shaded row in the table). If no tax had been imposed, equilibrium would have been at the point at which $S = G + I$, and thus at an income of \$4,800 (point *b* in Figure 10, not shown in Table 2). Therefore, imposing the tax reduces equilibrium income by \$300. Because taxes represent a withdrawal of spending from the economy, we would expect equilibrium income to fall when a tax is imposed. Yet, why does equilibrium income fall by only \$300, and not by the tax multiplied by the multiplier, which would be \$400?

The answer is that consumers pay for this tax, in part, by *reducing* their saving. Specifically, with the MPC at 0.75, the \$100 tax payment is split between consumption, reduced by \$75, and saving, reduced by \$25. When this \$75 decrease in consumption is multiplied by the multiplier, this yields a decline in income of \$300 ($\75×4). The *reduction* in saving of \$25 *dampens* the impact of the tax on equilibrium income because those funds were previously withdrawn from the spending stream. Changing the withdrawal category from saving to taxes does not affect income: Both are withdrawals.

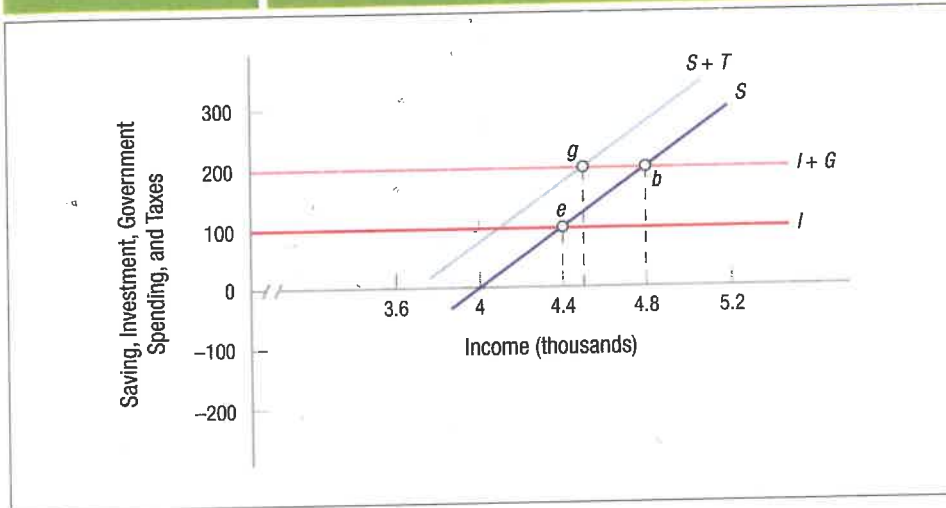
Equilibrium is shown at point *g* in Figure 11. At point *g*, $I + G = S + T$, with equilibrium income equal to \$4,500 and taxes and saving equal to \$100 each.

The result is that a tax increase (or decrease, for that matter) will have less of a direct impact on income, employment, and output than will an equivalent change in government spending. For this reason, economists typically describe the “tax” multiplier (calculated as $MPC/(1 - MPC)$) as being smaller than the “spending” multiplier ($1/(1 - MPC)$).

The Balanced Budget Multiplier By now you have probably noticed a curious thing. Our original equilibrium income was \$4,400, with investment and saving equal to \$100. When the government was introduced with a balanced budget ($G = T = \$100$),

FIGURE 11

SAVING, INVESTMENT, GOVERNMENT SPENDING, AND TAXES



Tax increases or decreases have less of a direct impact on income, employment, and output than an equivalent change in government spending. Some of a tax increase will come from saving and some of a tax decrease will go into saving, thereby reducing the effect of these tax changes.

income rose by \$100 to \$4,500, while equilibrium saving and investment remained constant at \$100.

This has led to what economists call the **balanced budget multiplier**. Equal changes in government spending and taxation (a balanced budget) lead to an equal change in income. Equivalently, the balanced budget multiplier is equal to 1. If spending and taxes are increased by the same amount, income grows by this amount, hence a balanced budget multiplier equal to 1. Note that the balanced budget multiplier is 1 no matter what the values of MPC and MPS.

Adding Net Exports

Thus far we have essentially assumed a closed economy by avoiding adding foreign transactions: exports and imports. We now add the foreign sector to complete the aggregate expenditures model.

The impact of the foreign sector in the aggregate expenditures model is through net exports: exports minus imports ($X - M$). Exports are *injections* of spending into the domestic economy, and imports are *withdrawals*. When Africans purchase grain from American farmers, they are injecting new spending on grain into our economy. Conversely, when we purchase French wine, we are withdrawing spending (as saving does) and injecting these funds into the French economy.

Figure 12 adds net exports to Figure 10 with investment and government spending. By adding \$100 of net exports to the previous equilibrium at point *b*, equilibrium moves to \$5,200 (point *c*). Again, we see the multiplier at work as the \$100 in net exports leads to a \$400 increase in income.

With the foreign sector included, all injections into the economy must equal all withdrawals; therefore at equilibrium,

$$I + G + X = S + T + M$$

Thus, if we import more and all other spending remains the same, equilibrium income will fall. This is one reason why many economists focus on the trade deficit or net exports ($X - M$) figures each month.

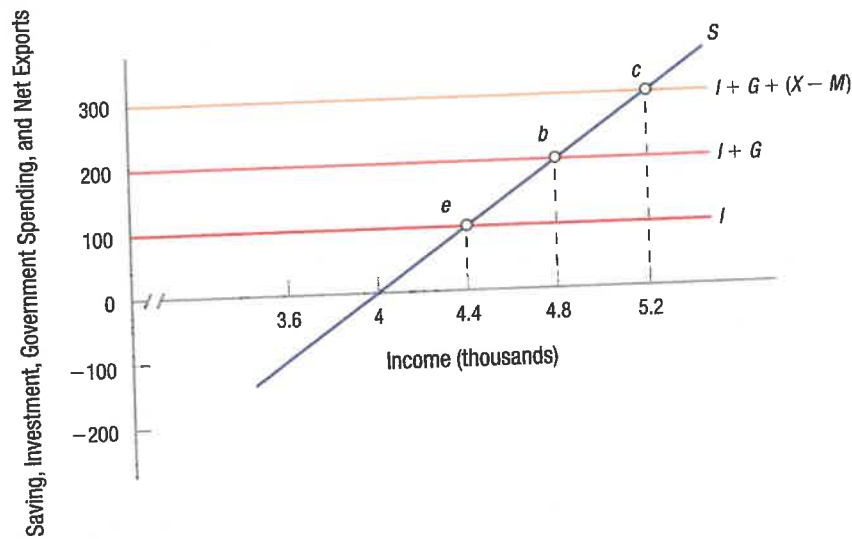
The aggregate expenditures model illustrates the importance of spending in an economy. Investment, government spending, and exports all increase income, whereas saving, taxes, and imports reduce it. Further, the fact that consumers spend and save some of the changes in income (MPC and MPS) gives rise to a spending multiplier that magnifies the impact of changes in spending on the economy.

balanced budget multiplier
Equal changes in government spending and taxation (a balanced budget) lead to an equal change in income (the balanced budget multiplier is equal to 1).

FIGURE 12

SAVING, INVESTMENT, GOVERNMENT SPENDING, AND NET EXPORTS

Adding investment (I), government spending (G), and net exports ($X - M$) causes income and output to rise or fall by the spending change times the multiplier. In this figure, we have added net exports ($X - M$) of \$100 to the investment and government spending in Figure 10 to get $I + G + (X - M)$. Thus, an increase in investment spending, government spending, and net exports has the same effect on income and output.



Recessionary and Inflationary Gaps

Keynesian analysis illustrated what was needed to get the economy out of the Great Depression: an increase in aggregate spending. Without an increase in spending, an economy can be stuck at a point below full employment for an extended period of time. Therefore, Keynes argued that if consumers, businesses, and foreigners were unwilling to spend (their economic expectations were clearly dismal), government should. This was also the basic rationale for the extraordinary spending measures implemented by Congress and signed by President Obama during the 2007–2009 recession. This leads to the question of just how much additional spending is needed to return the economy to full employment.

recessionary gap The increase in aggregate spending needed (when expanded by the multiplier) to bring a depressed economy back to full employment.

Recessionary Gap The **recessionary gap** is the increase in aggregate spending needed to bring a depressed economy back to full employment. Note that it is not the difference between real GDP at full employment and current real GDP, which is called the GDP gap. If full employment income is \$4,400 and our current equilibrium income is \$4,000, the recessionary gap is the added spending (\$100) that when boosted by the multiplier (4 in this case) will close a GDP gap (\$400).

inflationary gap The spending reduction necessary (when expanded by the multiplier) to bring an overheated economy back to full employment.

Inflationary Gap If aggregate spending generates income above full employment levels, the economy will eventually heat up, creating inflationary pressures. Essentially, the economy is trying to produce more output and income than it can sustain for very long. Thus, the excess aggregate spending exceeding that necessary to result in full employment is the **inflationary gap**. Using our previous example, if full employment is an income of \$4,400 and our current equilibrium is \$4,800, a reduction in spending is needed to close the \$400 GDP gap and to prevent inflation from building. In this case, a reduction in aggregate expenditures of \$100 with a multiplier of 4 would bring the economy back to full employment at \$4,400. In sum, changes in aggregate expenditures expanded by the multiplier can help bring an economy facing either recessionary or inflationary pressures back into equilibrium sooner.

This Keynesian approach to analyzing aggregate spending revolutionized the way economists looked at the economy and led to the development of modern macroeconomics. In the next chapter, we extend our analysis to the aggregate demand and supply model, a modern extension of this aggregate expenditures model to account for varying price levels and the supply side of the macroeconomy.

ISSUE

Was Keynes Right About the Great Depression?

There is little disagreement that the Great Depression was one of the most important events in the United States in modern history. Good aggregate data were not yet available, but President Roosevelt and congressional leaders knew something was very wrong.

Within a couple of years, 10,000 banks collapsed, farms and businesses were lost, the stock market lost 85% of its value from the beginning of the decade, and soup kitchens fed a growing horde as unemployment soared to nearly 25%, up from 3.2% in 1929. Worse, the Great Depression persisted: It did not look to be temporary; there was no end in sight.

The aggregate expenditures model we have just studied provides some insight into the Great Depression. The figure plots hypothetical saving and investment curves over the actual data for 1929 and 1933. Both government and the foreign sector were tiny at this time; therefore, the simple aggregate expenditures model effectively illustrates why the Great Depression did not show signs of much improvement; by 1939 the unemployment rate was still over 17%.

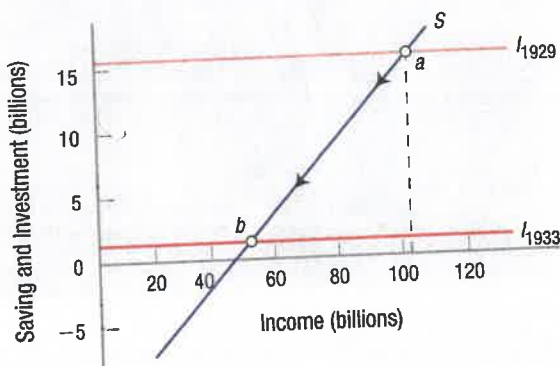
Saving and investment were over \$16 billion in 1929, or roughly a healthy 15% of GDP (point *a*). By 1933 investment collapsed to just over \$1 billion (a 91% decline), and the economy was in equilibrium at an income of roughly half of that in 1929 (point *b*). Government spending remained at roughly the same levels while net exports, a small fraction of aggregate



Archive Photos/Getty Images

expenditures, fell by more than half of their previous levels.

Keynes had it right: Unless something happened to increase investment or exports (not likely given that the rest of the world was suffering economically as well), the economy would remain mired in the Great Depression (point *b*). He suggested that government spending was needed. Ten years later (1943), the United States was in the middle of World War II, and aggregate expenditures swelled as government spending rose by a factor of 10. The Great Depression was history.



CHECKPOINT

THE FULL AGGREGATE EXPENDITURES MODEL

- Government spending affects the economy in the same way as other spending.
- Tax increases withdraw money from the spending stream but do not affect the economy as much as spending reductions, because these tax increases are partly offset by decreases in saving.
- Tax decreases inject money into the economy but do not affect the economy as much as spending increases, because tax reductions are partly offset by increases in saving.
- Equal changes in government spending and taxes (a balanced budget) result in an equal change in income (a balanced budget multiplier of 1).
- A recessionary gap is the new spending required that, when expanded by the multiplier, moves the economy to full employment.
- An inflationary gap is the spending reduction necessary (again when expanded by the multiplier) to bring the economy back to full employment.

QUESTIONS: If the government is considering reducing taxes to stimulate the economy, does it matter if the MPS is 0.25 or 0.33? What if the government reduces government spending by an equal amount to fund the tax cut?

Answers to the Checkpoint questions can be found at the end of this chapter.

chapter summary

Section 1 Aggregate Expenditures

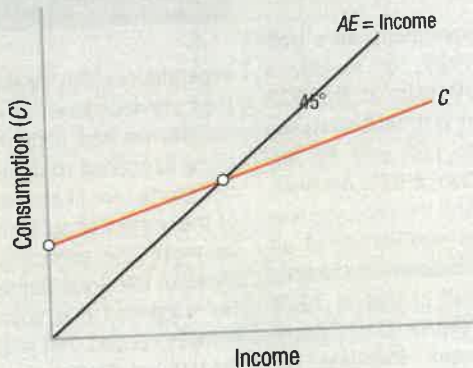
8.1

Gross domestic product (GDP) is measured by spending or income. Using the spending approach, GDP is equal to aggregate expenditures (AE). Therefore,

$$GDP = AE = C + I + G + (X - M)$$

8.2

45° and Consumption Lines



The 45° line shows where total spending (AE) equals income. No borrowing or saving exists.

The consumption line (C) starts above the origin on the vertical axis (even with no income, one still consumes by borrowing). As income increases, consumption rises, but not as fast as income (the slope of C depends on the MPC).

When C crosses AE, spending equals income (on the 45° line). When C is below the AE line, saving is positive.



Investment spending fluctuates much more than consumption year to year.

Disposable income, Y_d , is income after all taxes have been paid. Disposable income can either be spent (C) or saved (S). Thus, $Y_d = C + S$.

The portion that is consumed or saved is an important concept in the aggregate expenditures model:

8.3

Marginal propensity to consume (MPC) = $\Delta C \div \Delta Y_d$
 Marginal propensity to save (MPS) = $\Delta S \div \Delta Y_d$

$MPC + MPS = 1$ (all money is either spent or saved)



Corbis

Even with little to no income, college students still consume goods and services, often by borrowing against future income.

8.4

Determinants of Consumption and Saving

The aggregate expenditures model states that income is the main determinant of consumption and saving. But other factors also can shift the consumption schedule, such as:

- Wealth
- Expectations
- Household debt
- Taxes

Determinants of Investment Demand

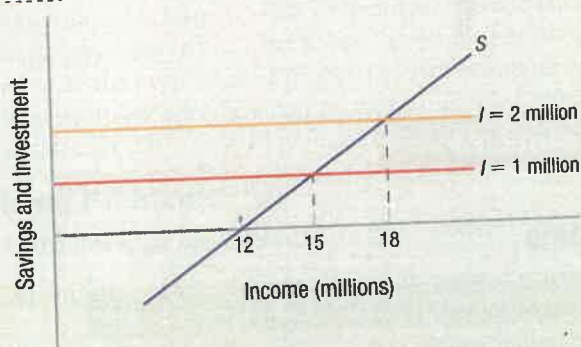
Investment demand is assumed to be independent of income, but certain factors can shift investment demand, such as:

- Expectations
- Technological change
- Operating costs
- Capital goods on hand

Section 2 The Simple Aggregate Expenditures Model

Ignoring government spending and net exports, aggregate expenditures (AE) are the sum of consumer and business investment: $AE = C + I$. Because AE also equals $C + S$ at equilibrium, this means that saving equals investment.

8.5



With no investment, Income = \$12 million. With \$1 million in investment, income rises to \$15 million, an increase of \$3 million. The multiplier in this example is 3.

8.6

The **multiplier effect** occurs when a dollar of spending generates many more dollars of spending in the economy.

The **multiplier** is equal to $1/(1 - MPC)$ or $1/MPS$



Section 3 The Full Aggregate Expenditures Model

8.7

Government spending affects the economy just like any other spending, and so does spending by foreign consumers (exports). In the full aggregate expenditures model, all forms of spending are analyzed, including C , I , G , and $(X - M)$.

If the multiplier for an economy is 5, a \$1 million increase in investment increases income by \$5 million. The same effect occurs with a \$1 million increase in government spending or \$1 million increase in net exports. Essentially, spending is spending, no matter where it comes from.

8.8

A general way to analyze policies that increase or decrease aggregate output is to categorize activities as either an **injection** or a **withdrawal**:

- Injections increase spending in an economy, and include investment (I), government spending (G), and exports (X).
- Withdrawals decrease spending in an economy, and include savings (S), taxes (T), and imports (M).

In equilibrium, all injections must equal all withdrawals:

$$I + G + X = S + T + M$$

8.9

Whenever the economy moves away from its full employment equilibrium, one of two gaps is created:

- **Recessionary gap:** The increase in aggregate spending (that is then multiplied) to bring a depressed economy to full employment.
- **Inflationary gap:** The reduction in aggregate spending (again expanded by the multiplier) needed to reduce income to full employment levels.



Mark Hryciw/Dreamstime.com

Purchasing an American-made car injects spending into the economy, and the economic benefits are enhanced by the multiplier.



Hupeng/Dreamstime.com

Purchasing a foreign-made car, however, results in a withdrawal because money leaves the country, and this effect is compounded by the multiplier.

KEY CONCEPTS

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QUESTIONS AND PROBLEMS

Check Your Understanding

1. Describe the important difference between the average propensity to consume (APC) and the marginal propensity to consume (MPC).
2. List the factors that influence an individual's marginal propensity to consume.
3. Explain why we wouldn't expect investment to grow sufficiently to pull the economy out of a depression.
4. Define the multiplier effect. Describe why a multiplier exists.
5. Explain why a \$100 reduction in taxes does not have the same impact on output and employment as a \$100 increase in government spending.
6. How do injections and withdrawals into an economy affect its income and output?

Apply the Concepts

7. Assume a simple Keynesian depression economy with a multiplier of 4 and an initial equilibrium income of \$3,000. Saving and investment equal \$400, and assume full employment income is \$4,000.
 - a. What is the MPC equal to? The MPS?
 - b. How much would government spending have to rise to move the economy to full employment?
 - c. Assume that the government plans to finance any spending by raising taxes to cover the increase in spending (it intends to run a balanced budget). How much will government spending and taxes have to rise to move the economy to full employment?
 - d. From the initial equilibrium, if investment grows by \$100, what will be the new equilibrium level of income and savings?
8. Other than reductions in interest rates that increase the level of investment by businesses, what factors would result in higher investment?
9. The simple aggregate expenditures model argues that one form of spending is just as good as any other; increases in all types of spending lead to equal increases in income. Is there any reason to suspect that private investment might be better for the economy than government spending?
10. Assume that the economy is in equilibrium at \$5,700, and full employment is \$4,800. If the MPC is 0.67, how big is the inflationary gap?
11. How does the economy today differ from that of the Great Depression, the economy Keynes used as the basis for the macroeconomic model discussed in this chapter?
12. In modern politics, the word "Keynesian" often is synonymous with "big government" spending. Does this characterization accurately reflect the role of government in spurring economic activity? How would a tax cut be characterized today versus in Keynes's time?

In the News

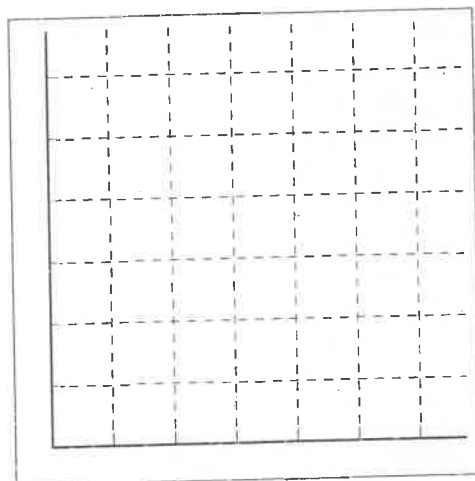
13. In recent years banks have encouraged their customers to save by giving incentives to join programs that automatically transfer money from checking accounts to savings accounts. For example, a bank might offer to round debit transactions to the nearest dollar, transferring the change to one's savings account, and then boost this amount with a match up to a certain amount. Although these programs were intended to encourage customers to save, some economists are not very enthusiastic about these programs. What reasons, both practical and theoretical, might cause some to be concerned?
14. The Affordable Care Act (a.k.a. Obamacare) is one of the largest government programs to be implemented in recent years, and involves the use of government subsidies to increase the percentage of Americans with health insurance. Explain how the increase in government spending may lead to a multiplier effect. How might this multiplier be affected if taxes are raised to finance the increased government spending?

Solving Problems

15. Using this aggregate expenditures table, answer the questions that follow.

Income (Y), in \$	Consumption (C), in \$	Saving (S), in \$
2,200	2,320	-120
2,300	2,380	-80
2,400	2,440	-40
2,500	2,500	0
2,600	2,560	40
2,700	2,620	80
2,800	2,680	120
2,900	2,740	160
3,000	2,800	200

- Compute the APC when income equals \$2,300 and the APS when income equals \$2,800.
- Compute the MPC and MPS.
- What does the multiplier equal?
- If investment spending is equal to \$120, what will be equilibrium income?
- Using the following graph, show saving, investment, and equilibrium income.

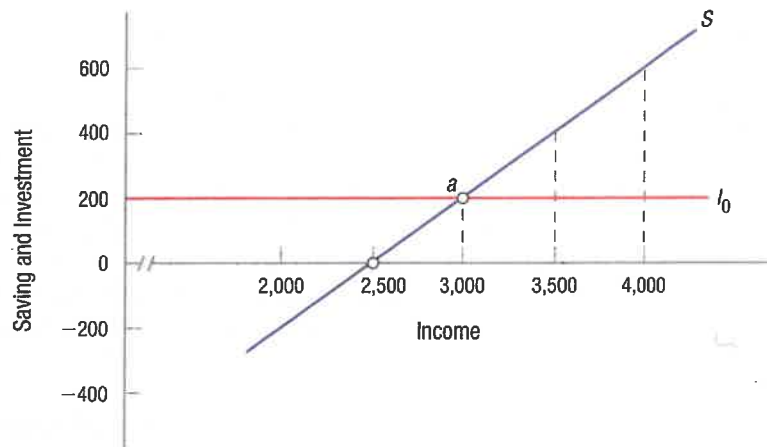


WORK IT OUT

LaunchPad | interactive activity

16. Use the figure to answer the following questions.

- What are the MPC, the MPS, and the multiplier?
- If the economy is currently in equilibrium at point *a*, and full employment income is \$4,000, how much in *additional* expenditures is needed to move this economy to full employment? What is this level of spending called?
- Assume that the economy is currently in equilibrium at point *a* and full employment income is \$4,000. How much of a tax decrease would be required to move the economy to full employment?



USING THE NUMBERS

- According to By the Numbers, in the year 2015, by how much did total food and grocery consumption exceed total gasoline and energy consumption? Based on your knowledge of how food and gas prices have changed since 2015, how would this difference in spending change?
- According to By the Numbers, the U.S. government spends less per person than any other developed country on the list. Does this mean that the overall size of the U.S. government is smaller than that of the other developed countries? Why or why not?

ANSWERS TO QUESTIONS IN CHECKPOINTS

Checkpoint: Aggregate Expenditures 193

Consumer spending, while 5 times larger in absolute size than investment spending, involves many small expenditures by households that do not vary much from month to month, such as rent (or mortgage payment), food, and utilities. Consumers change habits, but slowly. Business investment expenditures are typically on big-ticket items such as new factories and equipment, but such investments occur only when businesses have favorable expectations about the economy. When expectations sour, investment by all firms in an industry typically falls.

Checkpoint: The Simple Aggregate Expenditures Model 200

When consumer confidence is declining, this may suggest that consumers are going to spend less and save more. Because consumer spending is about 68% of aggregate spending, a small decline represents a significant reduction in aggregate spending and may well mean that a recession is on the horizon. Relatively small changes in consumer spending coupled with the multiplier can mean relatively large changes in income, and therefore forecasters and policy-makers should keep a close eye on consumer confidence.

Checkpoint: The Full Aggregate Expenditures Model 205

Yes, it does matter. If the tax reduction is going to be \$100, for example, and the MPS is 0.25, the multiplier is 4, and the income increase will be $\$75 \times 4 = \300 . Keep in mind that in this case, one-fourth of the tax reduction will go into saving and will not be amplified by the multiplier. However, with a MPS of 0.33, the multiplier will be 3, and one-third will not be multiplied (will go into saving); therefore, the increase in income will be $\$66.6 \times 3 = \200 . If government spending is reduced by an amount equal to the tax cut, income in the economy will fall by exactly the value of the reduction in government spending. The balanced budget multiplier is equal to 1, regardless of the value of MPS.