Consumption and Investment

Income, Consumption and Saving LO 1

Consumption and saving

- Primarily determined by DI
- Direct relationship

Consumption schedule

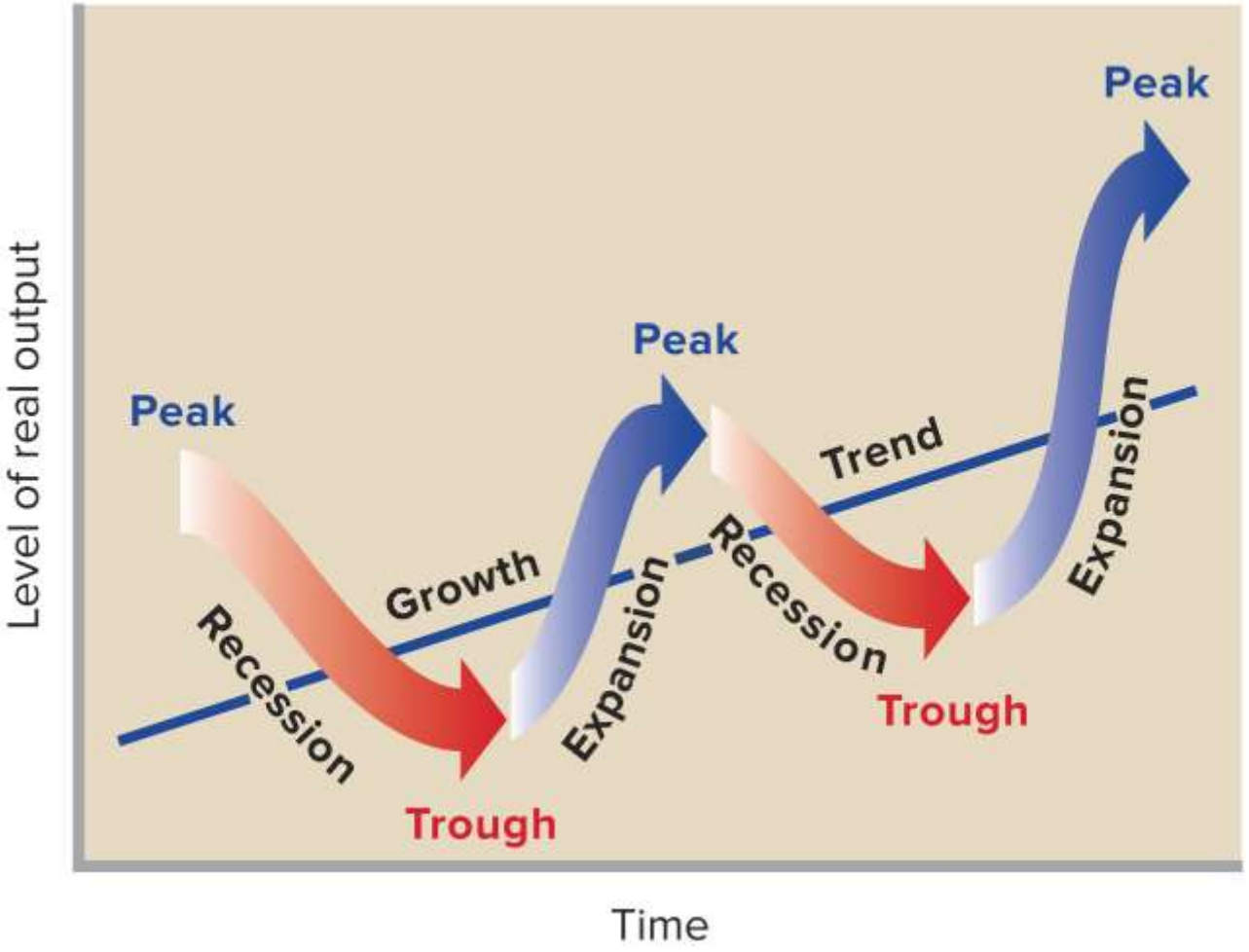
- Planned household spending (in our model)

Saving schedule

- DI minus C
- Dissaving can occur

The Business Cycle 2 of 3

LO 1



Consumption

Why are we interested in national consumption and saving trends?

Consumption behavior is crucial for understanding both short-term business cycles and long term economic growth. In the short run, consumption is a major component of aggregate spending.

When consumption changes sharply, the change is likely to affect output and employment through its impact on aggregate demand. This mechanism will be described in the chapters on Keynesian macroeconomics.

Additionally, consumption behavior is crucial because what is not consumed—that is, what is saved is available to the nation for investment in new capital goods; capital serves as a driving force behind long-term economic growth. Consumption and saving behavior are key to understanding economic growth and business cycles.

Budgetary Expenditure Patterns

No two families spend their disposable incomes in exactly the same way. Yet statistics show that there is a predictable regularity in the way people allocate their expenditures among food, clothing, and other major items.

Poor families must spend their incomes largely on the necessities of life: food and shelter.

As income increases, expenditure on many food items goes up. People eat more and eat better. There are, however, limits to the extra money people will spend on food when their incomes rise. Consequently, the proportion of total spending devoted to food declines as income increases.

TABLE 22- I . The Major Components of Consumption

Category of consumption	Value of category, 2002 ($, billion)		Percent of total
Durable goods		872	11.9
Motor vehicles and parts	376.1		
Furniture and household equipment	318.7		
Other	177.1		
Nondurable goods		2,115	29.0
Food	1,029.4		
Clothing and shoes	324.3		
Energy goods	173.5		
Other	587.8		
Services		4,317	59.1
Housing	1,071.5		
Household operation	405.2		
Transportation	275.8		
Medical care	1,148.5		
Recreation	285.1		
Other	1,130.7		
Total personal consumption expenditures		7,304	100.0

TABLE 22-1. The Major Components of Consumption

We divide consumption into three categories: durable goods, nondurable goods, and services. The service sector is growing in importance as basic needs for food are met and as health, recreation, and education claim a larger part of family budgets.

Source: U.S. Department of Commerce, available at www.bea.gov.

Cont.,

"**Engel's Laws" :** The average behavior of consumption expenditure does change fairly regularly with income.

FIGURE 22-2. Family Budget Expenditures Show Regular Pattern

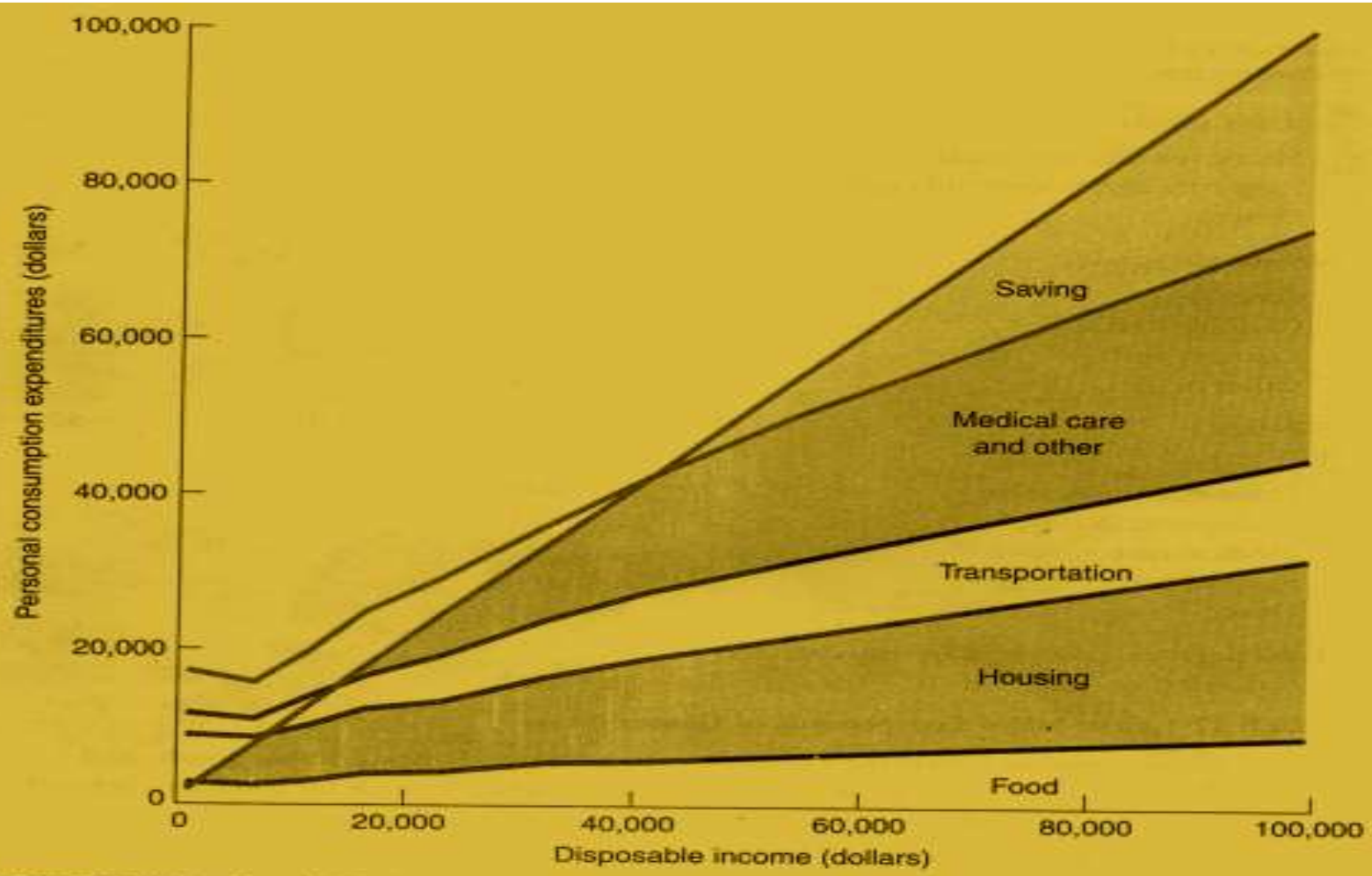


FIGURE 22-2. Family Budget Expenditures Show Regular Patterns

Surveys verify the importance of disposable income as a determinant of consumption expenditures. Notice the drop in food as a percentage of income as incomes rise. Note also that saving is negative at low incomes but rises substantially at high incomes.

Source: U.S. Department of Labor, *Consumer Expenditure Surveys, 1998*, available on the Internet at www.bls.gov/cexstnd.htm.

Consumption, Income and Saving

Income, consumption, and saving are all closely linked. More precisely, personal saving is that part of disposable income that is not consumed; saving equals income minus consumption.

Economic studies have shown that income is the primary determinant of consumption and saving. Rich people save more than poor people, both absolutely and as a percent of income. The very poor are unable to save at all. Instead, as long as they can borrow or draw down their wealth, they tend to dis save.

That is, they tend to spend more than they earn, reducing their accumulated savings or going deeper into debt.

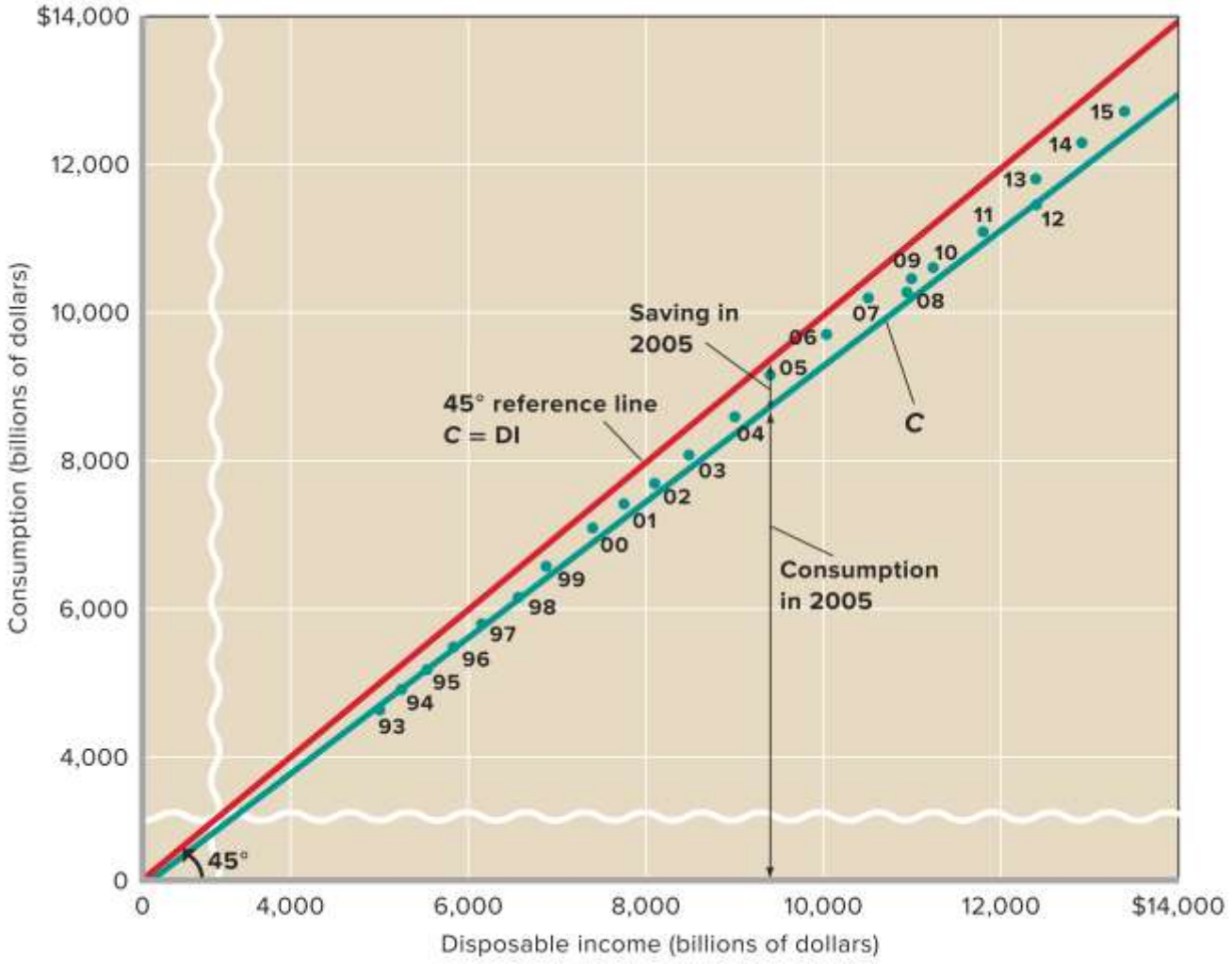
The Consumption Function

One of the most important relationships in all macroeconomics is the consumption function. The consumption function shows the relationship between the level of consumption expenditures and the level of disposable personal income.

This concept, introduced by Keynes, is based on the hypothesis that there is a stable empirical relationship between consumption and income.

Consumption and Disposable Income

LO 1



Source: Bureau of Economic Analysis, **www.bea.gov**.

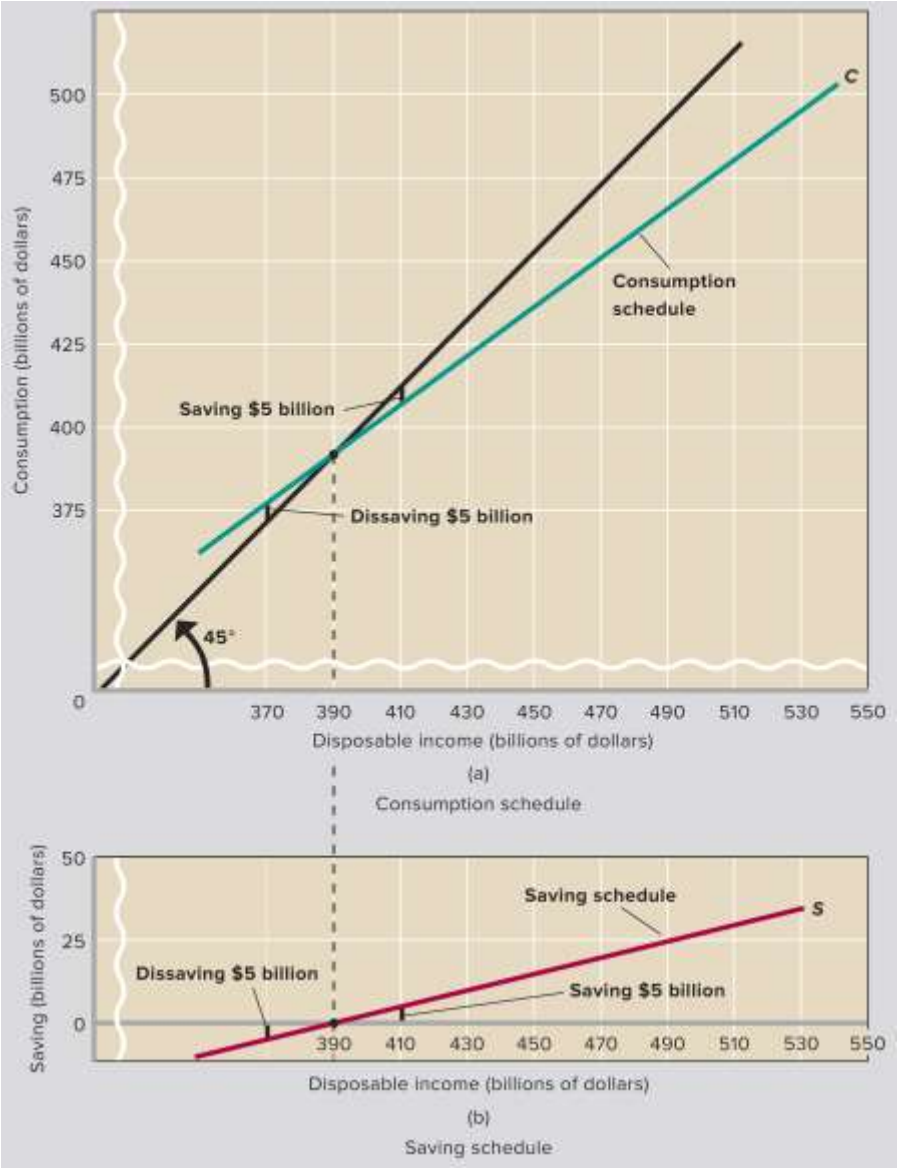
Consumption and Saving Schedules 1 of 2

LO 1

Consumption and Saving Schedules (in Billions) and Propensities to Consume and Save							
	(1) Level of Output and Income GDP = DI	(2) Consumption (C)	(3) Saving (S), (1) - (2)	(4) Average Propensity to Consume (APC), (2)/(1)	(5) Average Propensity to Save (APS), (3)/(1)	(6) Marginal Propensity to Consume (MPC), Δ(2)/Δ(1)*	(7) Marginal Propensity to Save (MPS), Δ(3)/Δ(1)*
(1)	$370	$375	$-5	1.01	-.01	.75	.25
(2)	390	390	0	1.00	.00	.75	.25
(3)	410	405	5	.99	.01	.75	.25
(4)	430	420	10	.98	.02	.75	.25
(5)	450	435	15	.97	.03	.75	.25
(6)	470	450	20	.96	.04	.75	.25
(7)	490	465	25	.95	.05	.75	.25
(8)	510	480	30	.94	.06	.75	.25
(9)	530	495	35	.93	.07	.75	.25
(10)	550	510	40	.93	.07	.75	.25

Consumption and Saving Schedules 2 of 2

LO1



The “Break-Even” Point

The "Break-Even" Point. To understand the figure, it is helpful to look at the 45° line drawn northeast from the origin. Because the vertical and horizontal axes have exactly the same scale, the 45° line has a very special property. At any point on the 45° line, the distance up from the horizontal axis (consumption) exactly equals the distance across from the vertical axis (disposable income). You can use your eyes or a ruler to verify this fact.

The 45° line tells us immediately whether consumption spending is equal to, greater than, or less than the level of disposable income. The break-even point on the consumption schedule that intersects the 45° line represents the level of disposable income at which households just break even.

Cont.,

At any point on the 45° line, consumption exactly equals income and the household has zero saving.

When the consumption function lies above the 45° line, the household is dissaving.

When the consumption function lies below the 45° line, the household has positive saving. The amount of dissaving or saving is always measured by the vertical distance between the consumption function and the 45° line.

Average Propensities LO 1

Average propensity to consume (APC)

- Fraction of total income consumed

Average propensity to save (APS)

- Fraction of total income saved

$$\text{APC} = \frac{\text{consumption}}{\text{income}} \qquad \text{APS} = \frac{\text{saving}}{\text{income}}$$

$$\text{APC} + \text{APS} = 1$$

The Marginal Propensity to Consume

The MPC is the extra amount that people consume when they receive an extra dollar of disposable income.

The word **“marginal”** is used throughout economics to mean extra or additional.

For example **“marginal Cost”** means the additional cost of producing an extra unit of output.

“Propensity to consume” designates the level of consumption.

The MPC is therefore the additional or extra consumption that result from an extra dollar disposable income.

MPC and MPS

	(1) Disposable income (after taxes) ($)	(2) Consumption expenditure ($)	(3) Marginal propensity to consume *MPC*	(4) Net saving ($) (4) = (1) − (2)	(5) Marginal propensity to save *MPS*
A	24,000	24,200		−200	
			800/1,000 = 0.80		200/1,000 = 0.20
B	25,000	25,000		0	
			800/1,000 = 0.80		200/1,000 = 0.20
C	26,000	25,800		200	
			800/1,000 = 0.80		200/1,000 = 0.20
D	27,000	26,600		400	
			800/1,000 = 0.80		200/1,000 = 0.20
E	28,000	27,400		600	
			800/1,000 = 0.80		200/1,000 = 0.20
F	29,000	28,200		800	
			800/1,000 = 0.80		200/1,000 = 0.20
G	30,000	29,000		1,000	

Each dollar of disposable income not consumed is saved. Each extra dollar of disposable income goes either into extra consumption or into extra saving. Combining these facts allows us to calculate the marginal propensity to consume (*MPC*) and the marginal propensity to save (*MPS*).

FIGURE 22-5. The Slope of the Consumption Function Is Its MPC

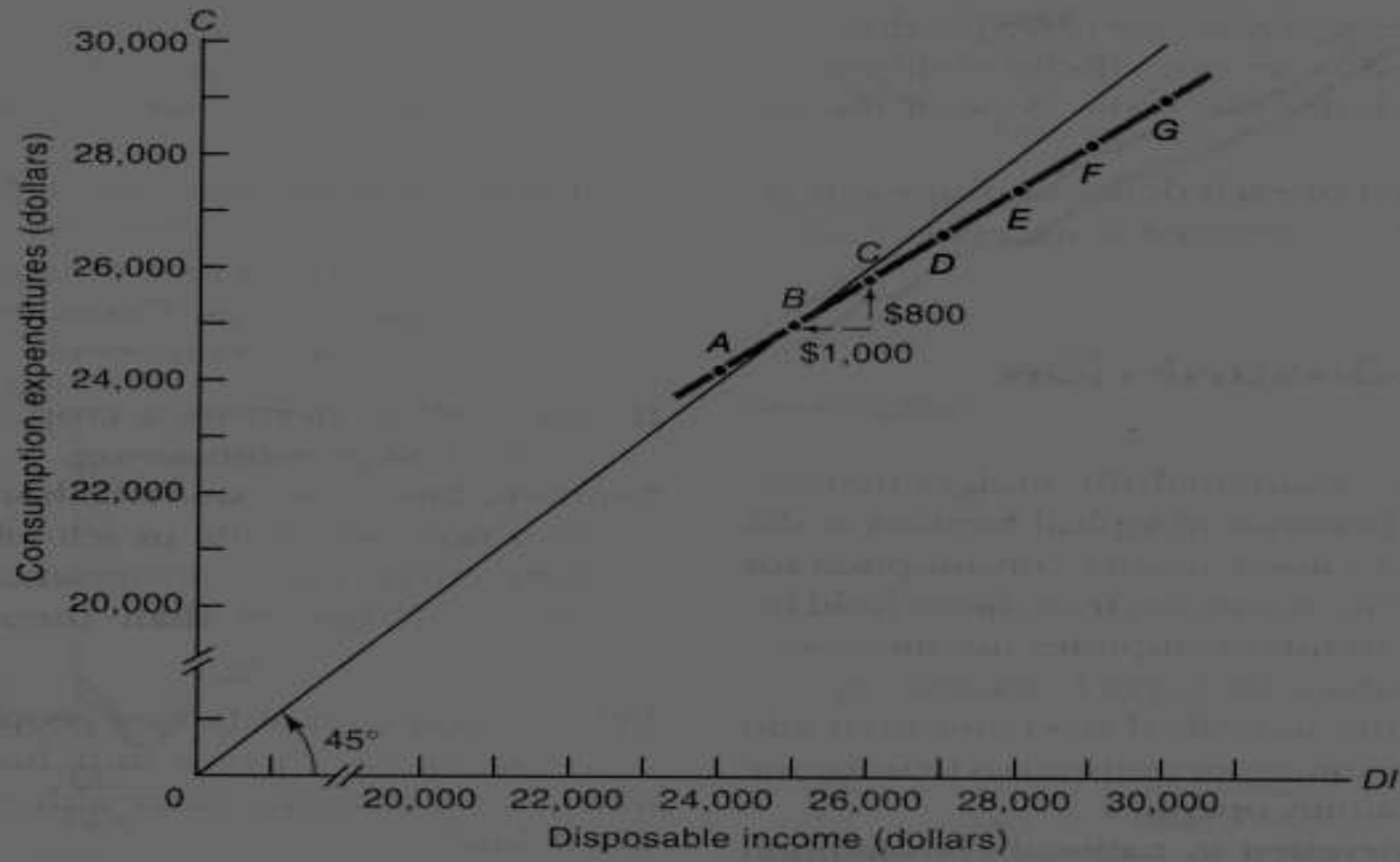


FIGURE 22-5. The Slope of the Consumption Function Is Its *MPC*

To calculate the marginal propensity to consume (*MPC*), we measure the slope of the consumption function by forming a right triangle and relating height to base. From point *B* to point *C*, the increase in consumption is $800 while the change in disposable income is $1000. The slope, equal to the change in *C* divided by the change in *DI*, gives the *MPC*. If the consumption function is everywhere upward-sloping, what does this imply about the *MPC*? If the line is a straight line, with a constant slope, what does this imply about the *MPC*?

The Marginal Propensity to SAVE

The Slope of the Consumption Function is its MPC.

The marginal propensity to save is defined as the fraction of an extra dollar of disposable income that goes to extra saving.

Recall that disposable income equals consumption plus saving. This implies that each extra dollar of disposable income must be divided between extra consumption and extra saving. Thus if MPC is 0.80, then MPS must be 0.20. (What would MPS be if MPC were O.6? Or O.99?) Comparing columns (3) and (5) of of last table confirms that at any income level, MPC and MPS must always add up to exactly 1, no more and no less. MPS + MPC = 1, always and everywhere.

Brief Review of Definitions:

1. The consumption functions relates the level of consumption to the level of disposable income.
2. The saving function relates saving to disposable income. Because what is saved equals what is not consumed, saving and consumption schedules are mirror images.
3. The MPC is the amount of extra consumption generated by an extra dollar of disposable income. Graphically, it is given by the slope of the consumption function.
4. The ‘MPS is the extra saving generated by an extra dollar of disposable income. Graphically, this is the slope of the saving schedule.
5. Because the part of each dollar disposable income that in not. Consumed is necessarily saved. MPS = 1 - MPC

NATIONAL CONSUMPTION BEHAVIOR

Up to now we have examined the budget patterns and consumption behavior of typical families at different incomes, Let's now consider consumption for the entire nation. This transition from household behavior to national trends exemplifies the methodology of macroeconomics. We begin by examining economic activity on the individual level and then add up or aggregate the totality of individuals to study the way the overall economy operates.

Permanent Income and the Life-Cycle Model of Consumption.

Studies show that consumers generally choose their consumption levels with an eye to both current income and long-run income prospects.

In order to understand how consumption depends on long—term income trends, economists have developed the permanent-income theory and the life- cycle hypothesis.

Permanent Income:

Permanent income is the trend level of income that is, income after removing temporary or transient influences due to the weather or windfall gains or losses.

If a change in income appears permanent (such as being promoted to a secure and high-paying job), people are likely to consume a large fraction of the increase in income.

On the other hand, if the income change is clearly transitory (for example, if it arises from a one-time bonus or a good harvest), a significant fraction of the additional income may be saved.

Life cycle Hypothesis

The life-cycle hypothesis assumes that people save in order to smooth their consumption over their lifetime. One important objective is to have an adequate retirement income.

One implication of the life-cycle hypothesis is that a program like social security, which provides a generous income supplement for retirement, will reduce saving by middle—aged workers since they no longer need to save as much for retirement.

Wealth and Other Influence

One important historical case was the stock market crash after 1929, when fortunes collapsed and paper—rich capitalists became paupers overnight. Economic historians believe that the sharp decline in wealth after the 1929 stock market crash reduced consumption pending and contributed to the depth of the Great Depression.

Alternative Measures of Saving

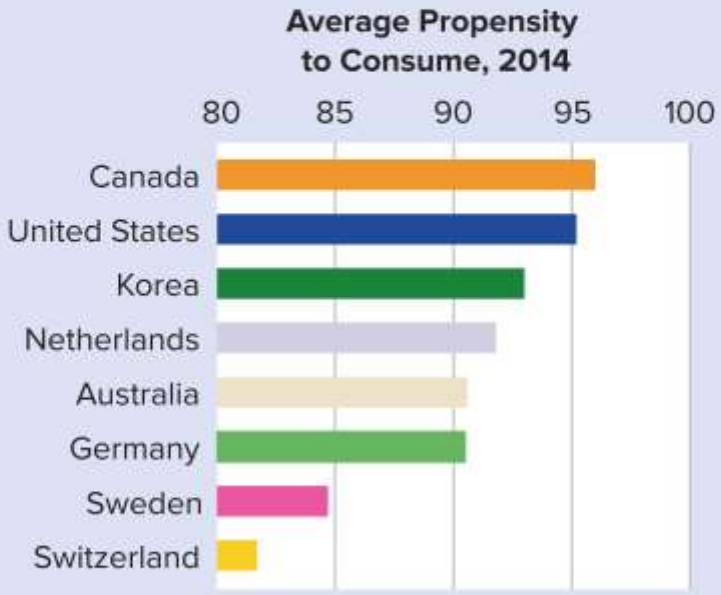
Saving looks different to the household than to the nation as a whole. This is so because saving as measured in the national income and product accounts is not the same as that measured by accountants or in balance sheets**. The national-accounts measure of saving is the difference between disposable income (excluding capital gains) and consumption.**

The balance sheet measure of saving calculates the change in real net worth (that is, assets less liabilities, corrected for inflation) from one year to the next; this measure includes real capital gains.

Global Perspective 1 LO 1

Average Propensities to Consume, Selected Nations

There are surprisingly large differences in average propensities to consume (APCs) among nations. In 2014, Canada, the United States, Korea, and the Netherlands in particular had substantially higher APCs, and thus lower APSs, than several other advanced economies.



Source: Organization for Economic Cooperation and Development, OECD, **www.oecd.org**. Derived from OECD household saving rates as percentages of disposable income. *Econ Outlook 98*, Annex Table 23, extracted April 2016.

Marginal Propensities 1 of 2

LO 1

Marginal propensity to consume (MPC)

- Proportion of a change in income consumed

Marginal propensity to save (MPS)

- Proportion of a change in income saved

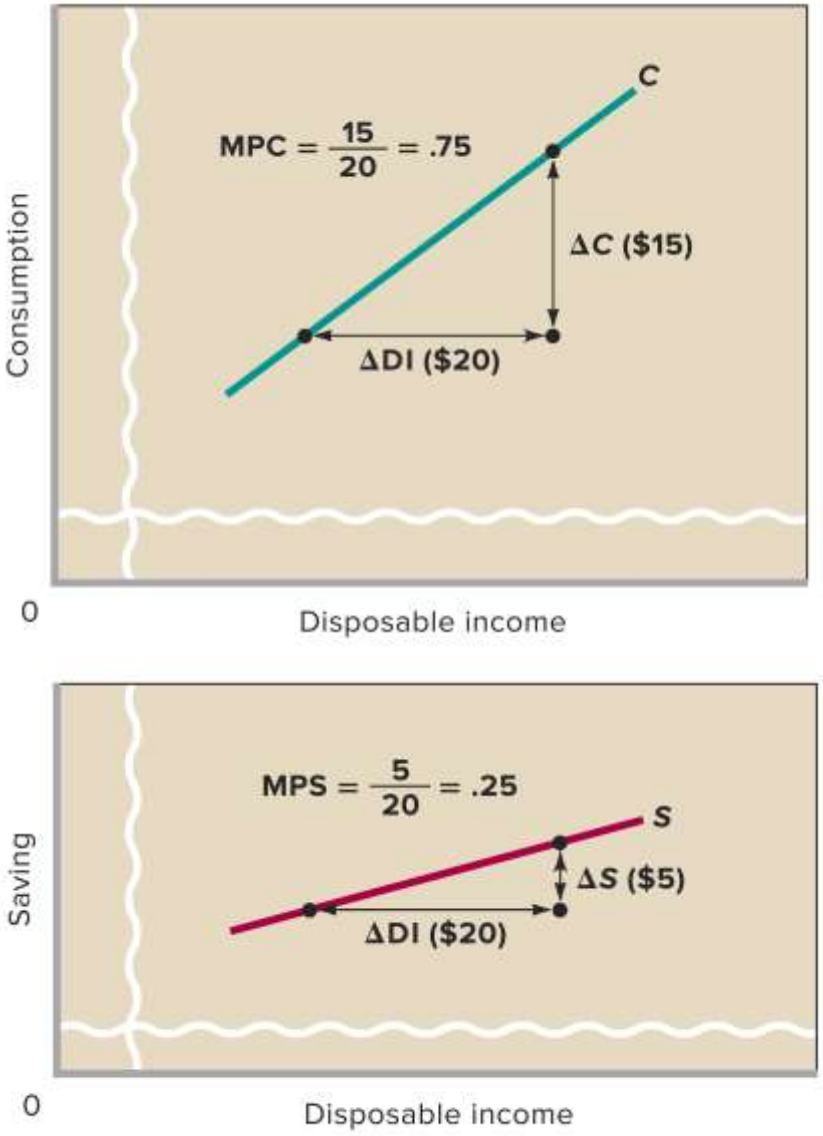
$$\text{MPC} = \frac{\text{change in consumption}}{\text{change in income}}$$

$$\text{MPS} = \frac{\text{change in saving}}{\text{change in income}}$$

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

Marginal Propensities 2 of 2

LO 1



Nonincome Determinants LO 2

Amount of disposable income is the main determinant

Other determinants

- Wealth
- Borrowing
- Expectations
- Real interest rates

Nonincome Determinants

Wealth: A household's wealth is the dollar amount of all the assets that it owns minus the dollar amount of its liabilities (all the debt that it owes). Households build wealth by saving money out of current income. wealth effect shifts the consumption schedule upward and the saving schedule downward.

Borrowings: Household borrowing also affects consumption. When a household borrows, it can increase current consumption .By allowing households to spend more, borrowing shifts the current consumption schedule upward.

Stated a bit differently, increased borrowing increases debt (liabilities), which in turn reduces household wealth (since wealth = assets − liabilities). This reduction in wealth reduces future consumption possibilities in much the same way that a decline in asset values would.

Expectations: Household expectations about future prices and income may affect current spending and saving. For example, the expectation of higher prices tomorrow may cause households to buy more today while prices are still low. Thus, the current consumption schedule shifts up and the current saving schedule shifts down.

Or expectations of a recession and thus lower income in the future may lead households to reduce consumption and save more today.

Real interest rates: When real interest rates (those adjusted for inflation) fall, households tend to borrow more, consume more, and save less. A lower interest rate, for example, decreases monthly loan payments and induces consumers to purchase automobiles and other goods bought on credit. A lower interest rate also diminishes the incentive to save because of the reduced interest "payment" to the saver. At best, lower interest rates shift the consumption schedule slightly upward and the saving schedule slightly downward. Higher interest rates do the opposite.

Other Important Considerations

LO 2

Switching to real GDP

Changes along schedules

Simultaneous shifts

Taxation

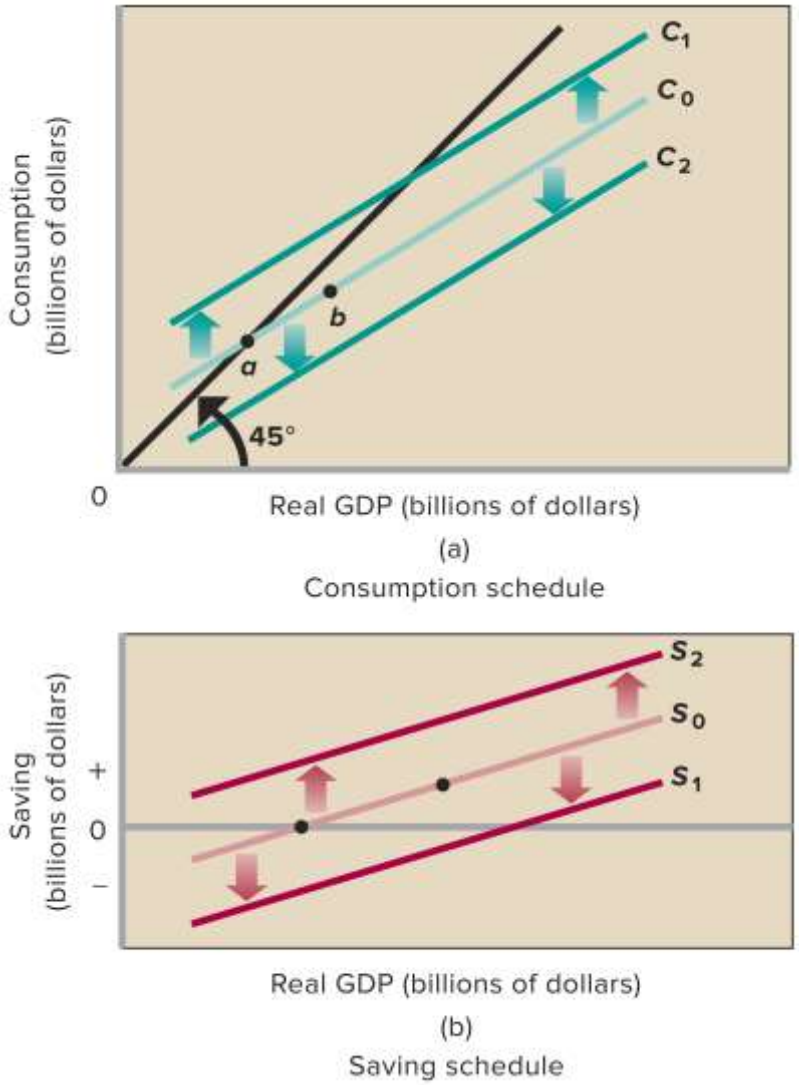
Stability

Switching to real GDP

When developing macroeconomic models, economists change their focus from the relationship between consumption (and saving) and disposable income to the relationship between consumption (and saving) and real domestic output (real GDP).

Changes along schedules The movement from one point to another on a consumption schedule (for example, from a to b on C0 in Figure 10.4a) is a change in the amount consumed and is solely caused by a change in real GDP. On the other hand, an upward or downward shift of the entire schedule, for example, a shift from C0 to C1 or C2 in Figure 10.4a, is a shift of the consumption schedule and is caused by changes in any one or more of the non income determinants of consumption just discussed.

Shifts of Consumption and Saving Schedules LO 2



Investment

Investment consists of spending on new plants, capital equipment, machinery, inventories, construction, etc

The investment decision weighs marginal benefits and marginal costs. The expected rate of return is the marginal benefit and the interest rate (the cost of borrowing funds) represents the marginal cost.

Interest-Rate-Investment Relationship LO 3

Expected rate of return

The expected rate of return is found by finding the expected economic profit (total revenue minus total cost) as a percentage of the cost of investment.

example: gives $100 expected profit on a $1000 investment, for a 10% expected rate of return. Thus, the business would not want to pay more than a 10% interest rate on the investment.

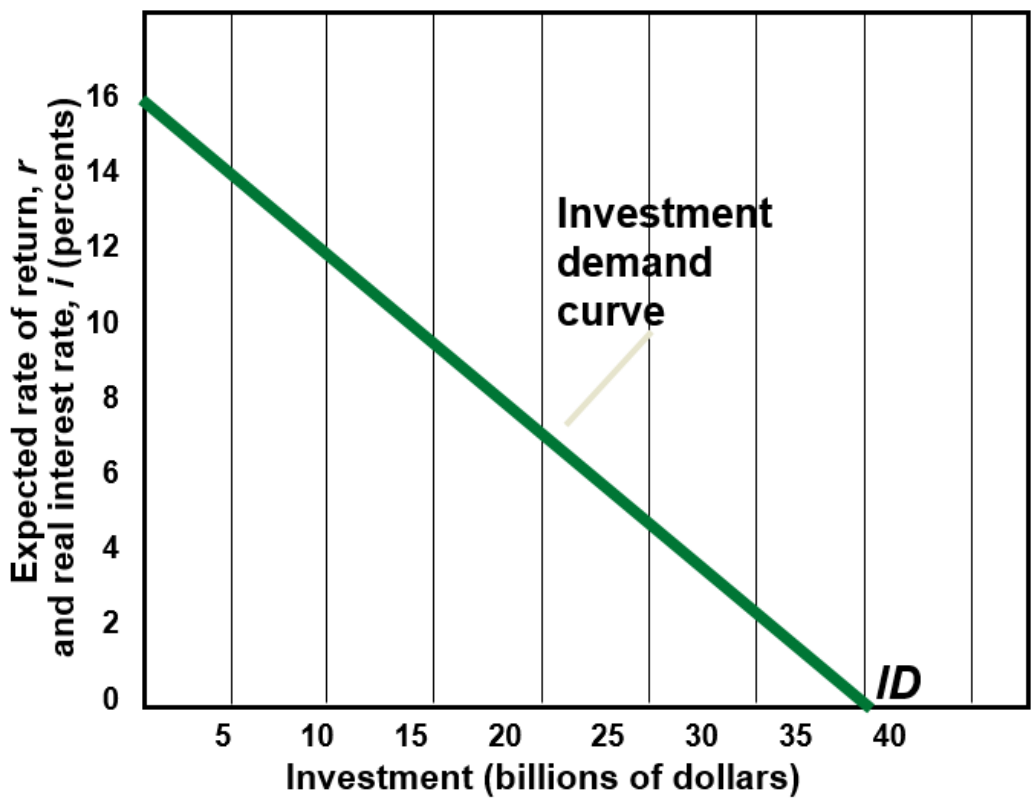
Remember that the expected rate of return is not a guaranteed rate of return. Investment carries risk.

The real interest rate, i (nominal rate corrected for expected inflation), determines the cost of investment.

The interest rate represents either the cost of borrowed funds or the opportunity cost of investing your own funds, which is income forgone. If the real interest rate (MC) exceeds the expected rate of return, the investment should not be made.

Investment Demand Curve LO 3

(r) and (i)	Cumulative Amount at this ROR (billions of dollars)
16%	$ 0
14	5
12	10
10	15
8	20
6	25
4	30
2	35
0	40



Shifts of Investment Demand LO 4

Acquisition, maintenance, and operating costs

Business taxes

Technological change

Stock of capital goods on hand

Planned inventory changes

Expectations

Shifts of Investment Demand

Acquisition, maintenance, and operating costs

The initial costs of capital goods, and the estimated costs of operating and maintaining those goods, affect the expected rate of return on investment. When these costs rise, the expected rate of return from prospective investment projects falls and the investment demand curve shifts to the left.

Example: Higher electricity costs associated with operating tools and machinery shifts the investment demand curve to the left. Lower costs, in contrast, shift it to the right.

Business taxes

When government is considered, firms look to expected returns after taxes in making their investment decisions. An increase in business taxes lowers the expected profitability of investments and shifts the investment demand curve to the left; a reduction of business taxes shifts it to the right.

Technological change

Technological progress—the development of new products, improvements in existing products, and the creation of new machinery and production processes—stimulates investment.

A rapid rate of technological progress shifts the investment demand curve to the right.

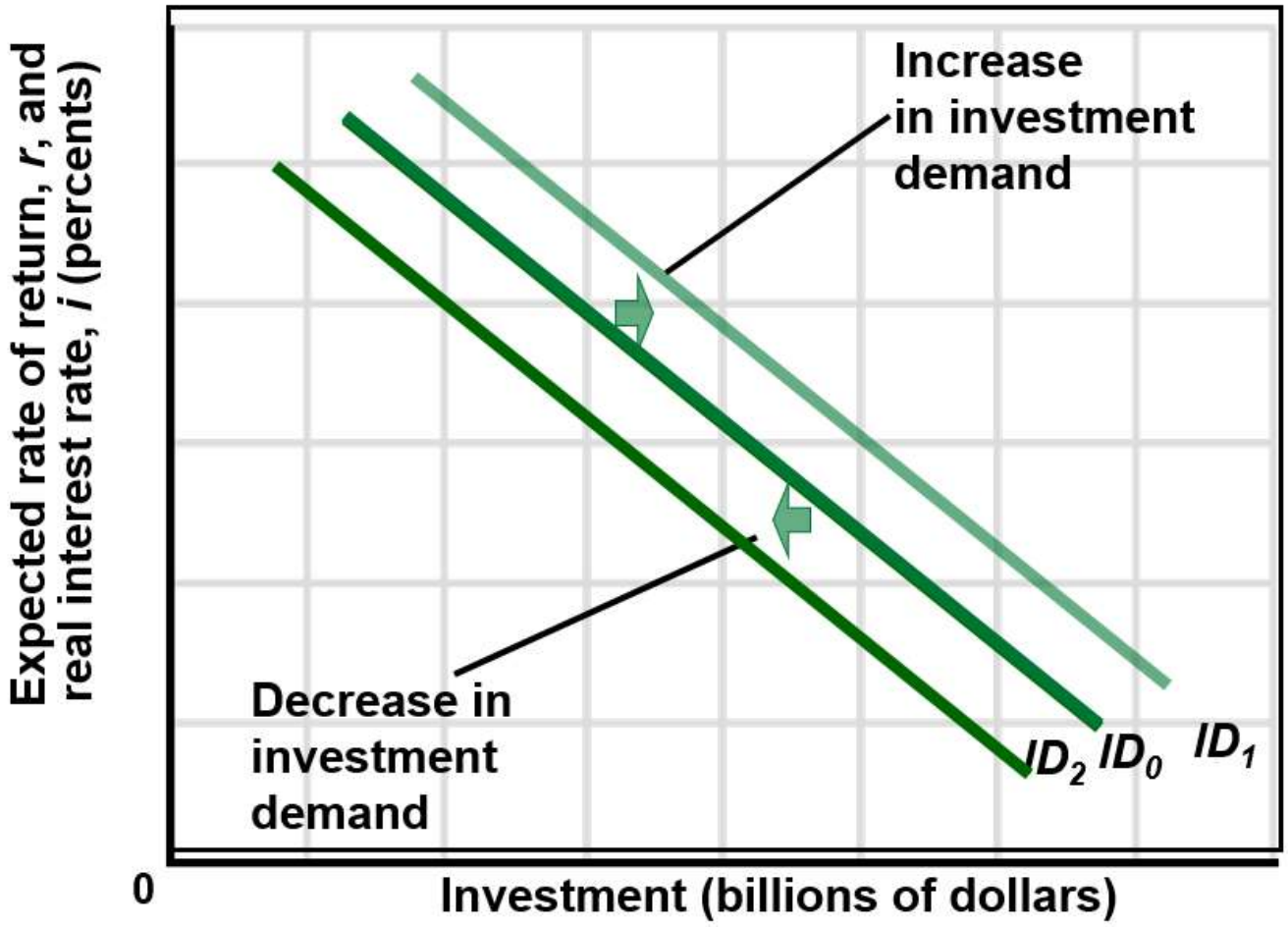
Stock of capital goods on hand

The stock of capital goods on hand, relative to output and sales, influences investment decisions by firms. When the economy is overstocked with production facilities and when firms have excessive inventories of finished goods, the expected rate of return on new investment declines.

Expectations

We noted that business investment is based on expected returns (expected additions to profit). Most capital goods are durable, with a life expectancy of 10 or 20 years. Thus, the expected rate of return on capital investment depends on the firm's expectations of future sales, future operating costs, and future profitability of the product that the capital helps produce.

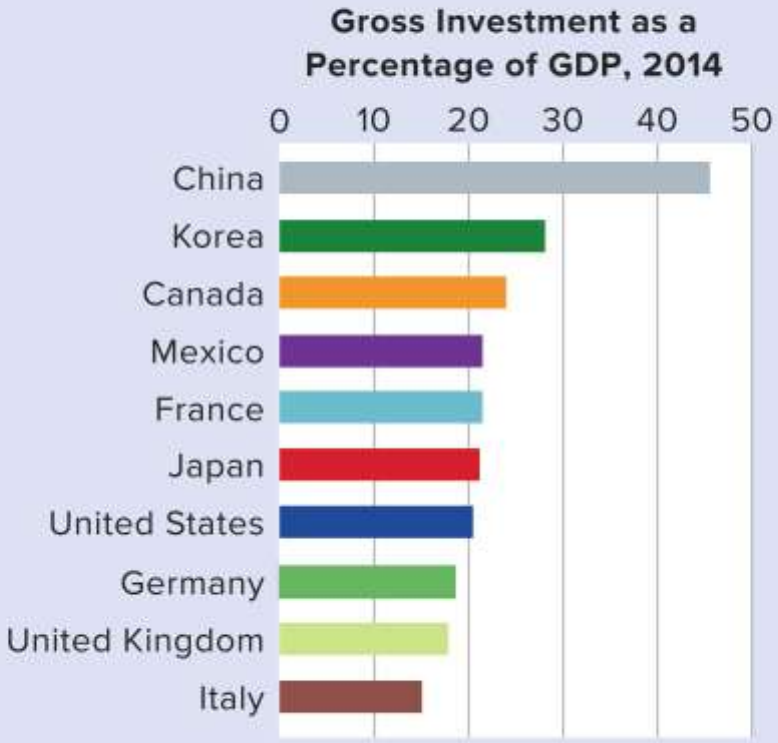
Shifts of Investment Demand Curve LO 4



Global Perspective 2 LO 4

Gross Investment Expenditures as a Percentage of GDP, Selected Nations

As a percentage of GDP, investment varies widely by nation. These differences, of course, can change from year to year.

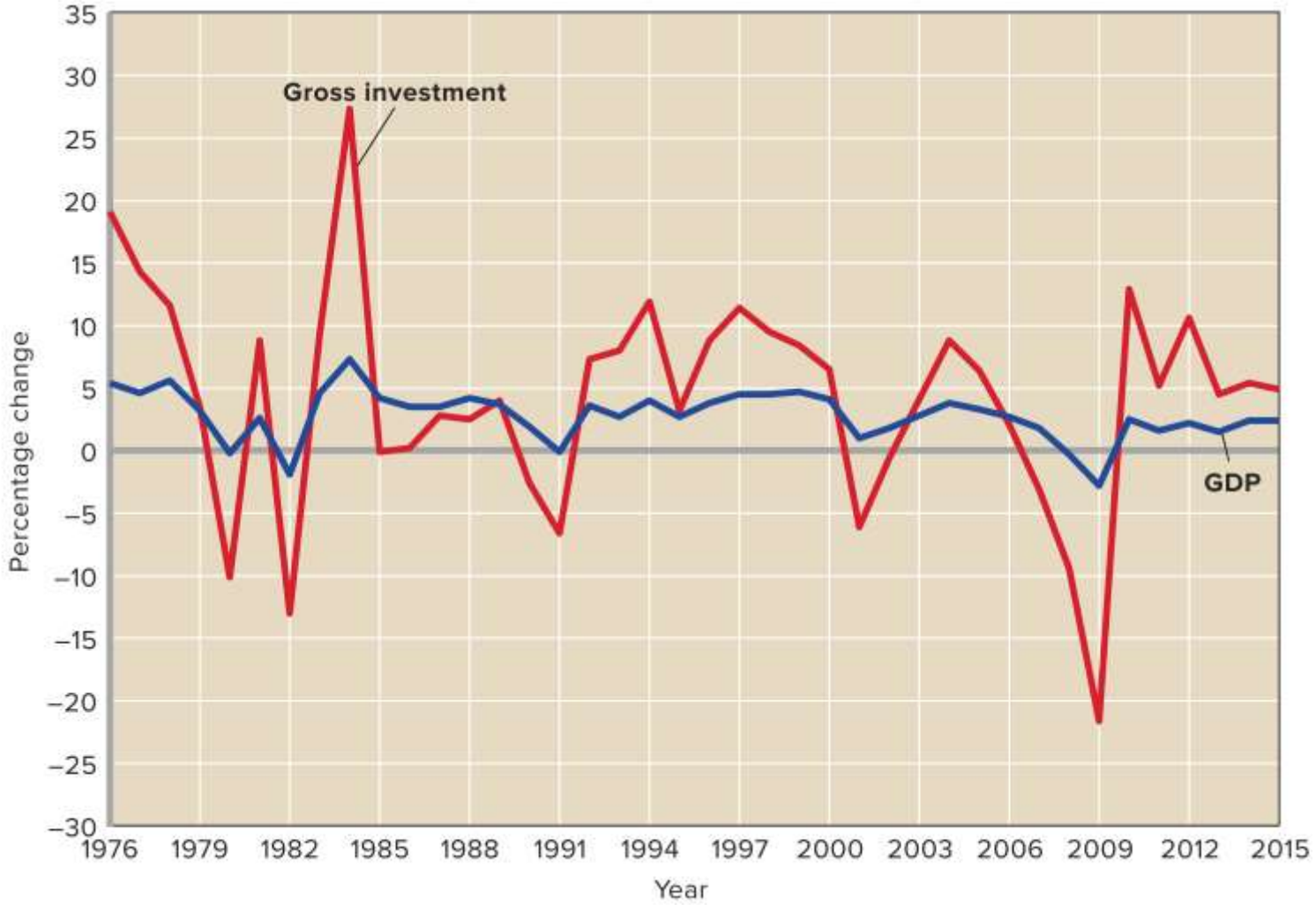


Source: Gross fixed capital formation data from International Financial Statistics, International Monetary Fund, **www.imf.org**.

Instability of Investment

In contrast to consumption, investment is unstable; it rises and falls quite often. Investment, in fact, is the most volatile component of total spending—so much so that most of the fluctuations in output and employment that happen over the course of the business cycle can be attributed to demand shocks relating to unexpected increases and decreases in investment.

Volatility of Investment LO 4



Source: Bureau of Economic Analysis, **www.bea.gov.**

Instability of Investment LO 4

Variability of expectations

Durability

Irregularity of innovation

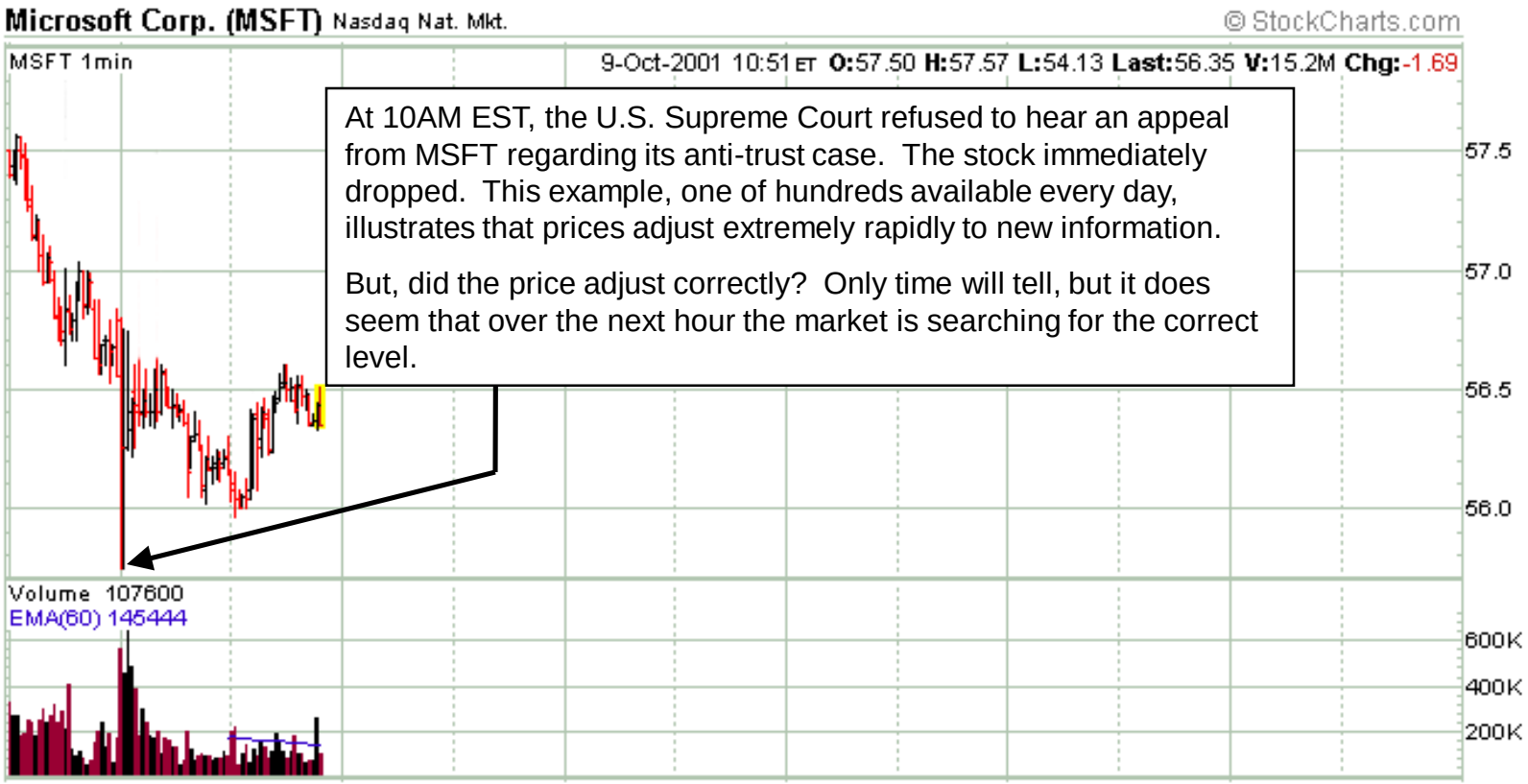
Variability of profits

Variability of expectations

Variability of expectations

Business expectations can change quickly when some event suggests a significant possible change in future business conditions. Changes in exchange rates, trade barriers, legislative actions, stock market prices, government economic policies, the outlook for war or peace, court decisions in key labor or antitrust cases, and a host of similar considerations may cause substantial shifts in business expectations.

Price Adjustment with New Information



Notes: Each bar represents high, low, and close for one-minute. Each solid gridline represents the top of an hour, and each dotted gridline represents a half-hour.

Durability

Optimism about the future may prompt firms to replace their older facilities and such modernizing will call for a high level of investment. A less optimistic view, however, may lead to smaller amounts of investment as firms repair older facilities and keep them in use.

Irregularity of innovation

New products and processes stimulate investment. Major innovations such as railroads, electricity, airplanes, automobiles, computers, the Internet, and cell phones induce vast upsurges or “waves” of investment spending that in time recede. But such innovations occur quite irregularly, adding to the volatility of investment.

Variability of profits

High current profits often generate optimism about the future profitability of new investments, whereas low current profits or losses spawn considerable doubt about the wisdom of new investments.

Additionally, firms often save a portion of current profits as retained earnings and use these funds (as well as borrowed funds) to finance new investments.

The Multiplier Effect 1 of 2

LO 5

A change in Investment changes real GDP more than the initial change in spending

$$\text{Multiplier} = \frac{\text{change in real GDP}}{\text{initial change in } \textit{Investment}}$$

Change in GDP
= multiplier × initial change in Investment

So if investment in an economy rises by $30 billion and GDP increases by $90 billion as a result, we then know from our first equation that the multiplier is 3 (= $90/$30)

The Multiplier Effect 2 of 2

LO 5

	(1) Change in Income	(2) Change in Consumption (MPC = .75)	(3) Change in Saving (MPS = .25)
Increase in investment of **$5.00**	$5.00	$3.75	$1.25
Second round	3.75	2.81	.94
Third round	2.81	2.11	.70
Fourth round	2.11	1.58	.53
Fifth round	1.58	1.19	.39
All other rounds	4.75	3.56	1.19
Total	**$20.00**	$15.00	$5.00

Multiplier and Marginal Propensities 1 of 2

LO 5

Multiplier and MPC directly related

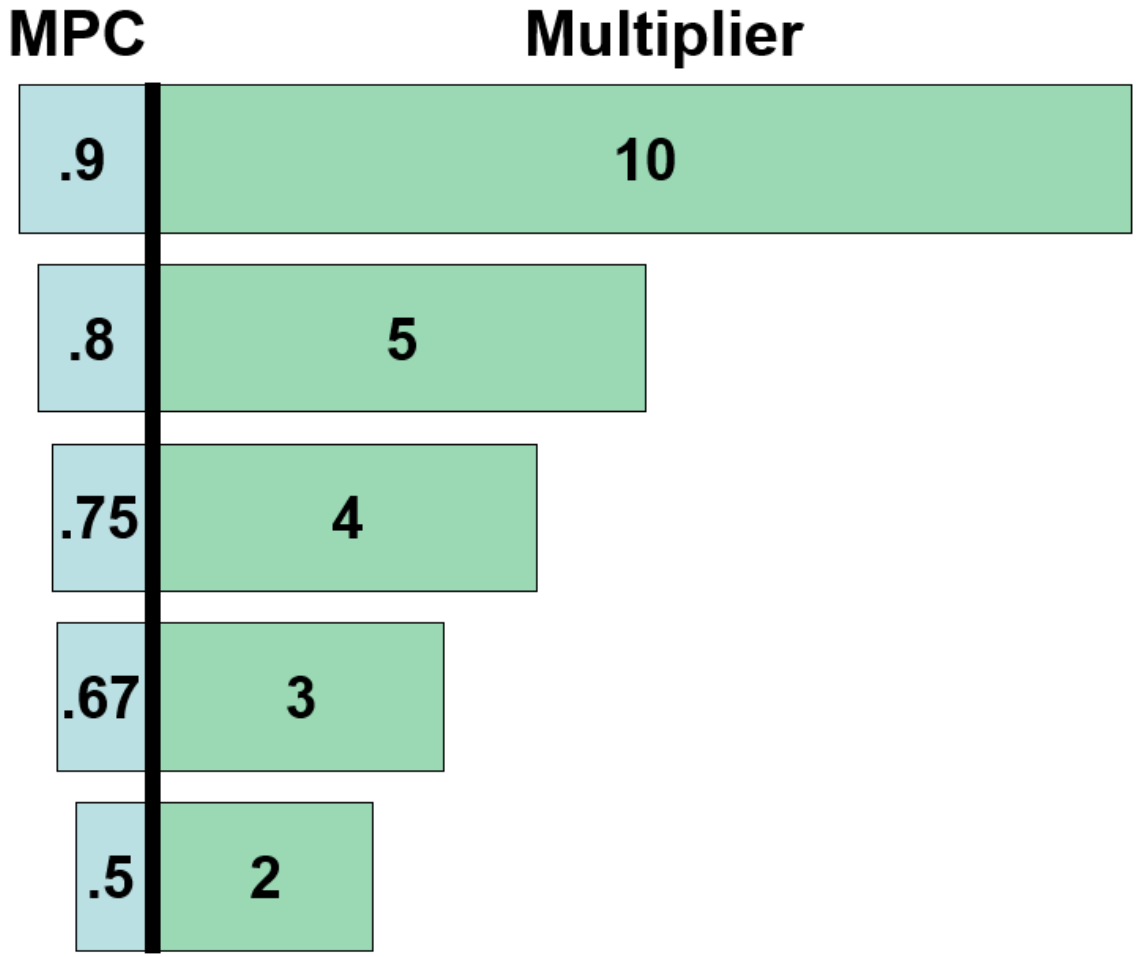
- Large MPC results in larger increases in spending

Multiplier and MPS inversely related

- Large MPS results in smaller increases in spending

$$\text{Multiplier} = \frac{1}{1-\text{MPC}} \qquad \text{Multiplier} = \frac{1}{\text{MPS}}$$

Multiplier and Marginal Propensities 2 of 2 LO 5



Multiplier Effects

A decline in spending begins a chain of declines, or, in other words, the initial decrease in spending is multiplied in terms of the final effect of this single decision.

This occurs because of the observation that any change in income causes a change in spending that is directly proportional to it.

The multiplier effect helps us understand why there is a business cycle as opposed to a stable level of output growth from year to year.

The multiplier is based on two facts:

1. The economy has continuous flows of expenditures and income — a ripple effect — in which income received by one comes from money spent by another, and so forth.

2. Any change in income will cause both consumption and saving to vary in the same direction as the initial change in income.

Squaring the Economic Circle

Humorous small town example of the multiplier

One person in town decides not to buy a product

Creates a ripple effect of people not spending, following the first decision

Ultimately the entire town experiences an economic downturn