After studying this chapter, you will be able to:

- Describe and define the flows of funds through financial markets and the financial institutions
- Explain how investment and saving along with borrowing and lending decisions are made and how these decisions interact in the loanable funds market
- Explain how a government deficit (or surplus) influences the real interest rate, saving, and investment in the loanable funds market
- Explain how international borrowing or lending influences the real interest rate, saving, and investment in the global loanable funds market

7 FINANCE, SAVING, AND INVESTMENT

During September 2008, Wall Street put on a spectacular show. To prevent the collapse of Fannie Mae and Freddie Mac, the two largest lenders to home buyers, the U.S. government took over their risky debts. When Lehman Brothers, a venerable Wall Street investment bank, was on the verge of bankruptcy, secure phone lines and limousines worked overtime as the Federal Reserve Bank of New York, the U.S. Treasury, and senior officials of Bank of America and Barclays Bank (a British bank) tried to find ways to save the bank. The effort failed. On the same weekend, Bank of America bought Merrill Lynch, another big Wall Street investment bank. And a few days later, the U.S. government bought insurance giant AIG and tried to get Congress to provide $700 billion to buy just about every risky debt that anyone wanted to unload.

Behind such drama, Wall Street plays a crucial unseen role funneling funds from savers and lenders to investors and borrowers. This chapter explains how financial markets work and their place in the economy.

In *Reading Between the Lines* at the end of the chapter, we'll look at the effects of government budget deficits and apply what you've learned to better understand what is happening in U.S. and global financial markets today.

Financial Institutions and Financial Markets

The financial institutions and markets that we study in this chapter play a crucial role in the economy. They provide the channels through which saving flows to finance the investment in new capital that makes the economy grow.

In studying the economics of financial institutions and markets, we distinguish between:

- Finance and money
- Physical capital and financial capital

Finance and Money

In economics, we use the term *finance* to describe the activity of providing the funds that finance expenditures on capital. The study of finance looks at how households and firms obtain and use financial resources and how they cope with the risks that arise in this activity.

Money is what we use to pay for goods and services and factors of production and to make financial transactions. The study of money looks at how households and firms use it, how much of it they hold, how banks create and manage it, and how its quantity influences the economy.

In the economic lives of individuals and businesses, finance and money are closely interrelated. And some of the main financial institutions, such as banks, provide both financial services and monetary services. Nevertheless, by distinguishing between *finance* and *money* and studying them separately, we will better understand our financial and monetary markets and institutions.

For the rest of this chapter, we study finance. Money is the topic of the next chapter.

Physical Capital and Financial Capital

Economists distinguish between physical capital and financial capital. *Physical capital* is the tools, instruments, machines, buildings, and other items that have been produced in the past and that are used today to produce goods and services. Inventories of raw materials, semifinished goods, and components are part of physical capital. When economists use the term capital, they mean *physical* capital. The funds that firms use to buy physical capital are called **financial capital**.

Along the *aggregate production function* in Chapter 6 (see p. 139), the quantity of capital is fixed. An increase in the quantity of capital increases production possibilities and shifts the aggregate production function upward. You're going to see, in this chapter, how investment, saving, borrowing, and lending decisions influence the quantity of capital and make it grow, and as a consequence, make real GDP grow.

We begin by describing the links between capital and investment and between wealth and saving.

Capital and Investment

The quantity of capital changes because of investment and depreciation. *Investment* increases the quantity of capital and *depreciation* decreases it (see Chapter 4, p. 86). The total amount spent on new capital is called **gross investment**. The change in the value of capital is called **net investment**. Net investment equals gross investment minus depreciation.

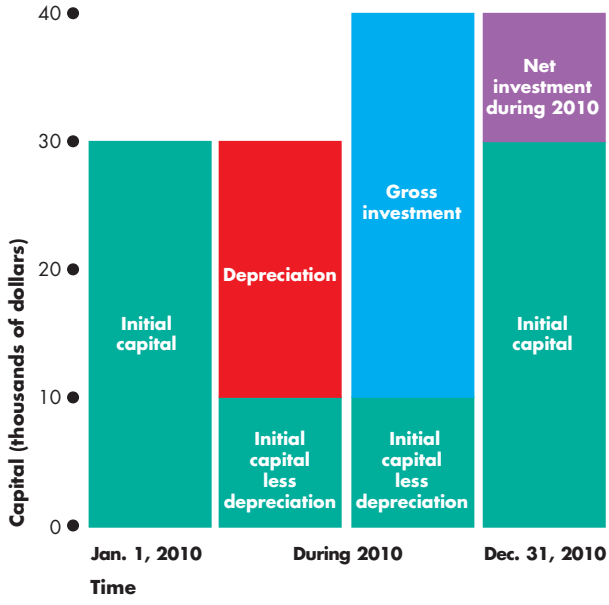
Figure 7.1 illustrates these terms. On January 1, 2010, Ace Bottling Inc. had machines worth $30,000—Ace's initial capital. During 2010, the market value of Ace's machines fell by 67 percent—$20,000. After this depreciation, Ace's machines were valued at $10,000. During 2010, Ace spent $30,000 on new machines. This amount is Ace's gross investment. By December 31, 2010, Ace Bottling had capital valued at $40,000, so its capital had increased by $10,000. This amount is Ace's net investment. Ace's net investment equals its gross investment of $30,000 minus depreciation of its initial capital of $20,000.

Wealth and Saving

Wealth is the value of all the things that people own. What people own is related to what they earn, but it is not the same thing. People earn an *income*, which is the amount they receive during a given time period from supplying the services of the resources they own. **Saving** is the amount of income that is not paid in taxes or spent on consumption goods and services. Saving increases wealth. Wealth also increases when the market value of assets rises—called *capital gains*—and decreases when the market value of assets falls—called *capital losses*.

For example, at the end of the school year you have $250 in the bank and a coin collection worth $300, so your wealth is $550. During the summer,

FIGURE 7.1 Capital and Investment



On January 1, 2010, Ace Bottling had capital worth $30,000. During the year, the value of Ace's capital fell by $20,000—depreciation—and it spent $30,000 on new capital—gross investment. Ace's net investment was $10,000 ($30,000 gross investment minus $20,000 depreciation) so that at the end of 2010, Ace had capital worth $40,000.

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you earn $5,000 (net of taxes) and spend $1,000 on consumption goods and services so your saving is $4,000. Your bank account increases to $4,250 and your wealth becomes $4,550. The $4,000 increase in wealth equals saving. If coins rise in value and your coin collection is now worth $500, you have a capital gain of $200, which is also added to your wealth.

National wealth and national saving work like this personal example. The wealth of a nation at the end of a year equals its wealth at the start of the year plus its saving during the year, which equals income minus consumption expenditure.

To make real GDP grow, saving and wealth must be transformed into investment and capital. This transformation takes place in the markets for financial capital and through the activities of financial institutions. We're now going to describe these markets and institutions.

Financial Capital Markets

Saving is the source of the funds that are used to finance investment, and these funds are supplied and demanded in three types of financial markets:

- Loan markets
- Bond markets
- Stock markets

Loan Markets Businesses often want short-term finance to buy inventories or to extend credit to their customers. Sometimes they get this finance in the form of a loan from a bank. Households often want finance to purchase big ticket items, such as automobiles or household furnishings and appliances. They get this finance as bank loans, often in the form of outstanding credit card balances.

Households also get finance to buy new homes. (Expenditure on new homes is counted as part of investment.) These funds are usually obtained as a loan that is secured by a **mortgage**—a legal contract that gives ownership of a home to the lender in the event that the borrower fails to meet the agreed loan payments (repayments and interest). Mortgage loans were at the center of the U.S. credit crisis of 2007–2008.

All of these types of financing take place in loan markets.

Bond Markets When Wal-Mart expands its business and opens new stores, it gets the finance it needs by selling bonds. Governments—federal, state, and municipal—also raise finance by issuing bonds.

A **bond** is a promise to make specified payments on specified dates. For example, you can buy a Wal-Mart bond that promises to pay $5.00 every year until 2024 and then to make a final payment of $100 in 2025.

The buyer of a bond from Wal-Mart makes a loan to the company and is entitled to the payments promised by the bond. When a person buys a newly issued bond, he or she may hold the bond until the borrower has repaid the amount borrowed or sell it to someone else. Bonds issued by firms and governments are traded in the **bond market**.

The term of a bond might be long (decades) or short (just a month or two). Firms often issue very short-term bonds as a way of getting paid for their sales before the buyer is able to pay. For example, when GM sells $100 million of railway locomotives

to Union Pacific, GM wants to be paid when the items are shipped. But Union Pacific doesn't want to pay until the locomotives are earning an income. In this situation, Union Pacific might promise to pay GM $101 million three months in the future. A bank would be willing to buy this promise for (say) $100 million. GM gets $100 million immediately and the bank gets $101 million in three months when Union Pacific honors its promise. The U.S. Treasury issues promises of this type, called Treasury bills.

Another type of bond is a **mortgage-backed security**, which entitles its holder to the income from a package of mortgages. Mortgage lenders create mortgage-backed securities. They make mortgage loans to homebuyers and then create securities that they sell to obtain more funds to make more mortgage loans. The holder of a mortgage-backed security is entitled to receive payments that derive from the payments received by the mortgage lender from the homebuyer–borrower.

Mortgage-backed securities were at the center of the storm in the financial markets in 2007–2008.

Stock Markets When Boeing wants finance to expand its airplane building business, it issues stock. A **stock** is a certificate of ownership and claim to the firm's profits. Boeing has issued about 900 million shares of its stock. So if you owned 900 Boeing shares, you would own one millionth of Boeing and be entitled to receive one millionth of its profits.

Unlike a stockholder, a bondholder does not own part of the firm that issued the bond.

A **stock market** is a financial market in which shares of stocks of corporations are traded. The New York Stock Exchange, the London Stock Exchange (in England), the Tokyo Stock Exchange (in Japan), and the Frankfurt Stock Exchange (in Germany) are all examples of stock markets.

Financial Institutions

Financial markets are highly competitive because of the role played by financial institutions in those markets. A **financial institution** is a firm that operates on both sides of the markets for financial capital. The financial institution is a borrower in one market and a lender in another.

Financial institutions also stand ready to trade so that households with funds to lend and firms or households seeking funds can always find someone on the other side of the market with whom to trade.

The key financial institutions are

- Commercial banks
- Government-sponsored mortgage lenders
- Pension funds
- Insurance companies

Commercial Banks Commercial banks are financial institutions that accept deposits, provide payment services, and make loans to firms and households. The bank that you use for your own banking services and that issues your credit card is a commercial bank. These institutions play a central role in the monetary system and we study them in detail in Chapter 8.

Government-Sponsored Mortgage Lenders Two large financial institutions, the Federal National Mortgage Association, or Fannie Mae, and the Federal Home Loan Mortgage Corporation, or Freddie Mac, are enterprises that buy mortgages from banks, package them into mortgage-backed securities, and sell them. In September 2008, Fannie and Freddie owned or guaranteed $6 trillion worth of mortgages (half of the U.S. $12 trillion of mortgages) and were taken over by the federal government.

Economics in Action

The Financial Crisis and the Fix

Bear Stearns: absorbed by JPMorgan Chase with help from the Federal Reserve. Lehman Brothers: gone. Fannie Mae and Freddie Mac: taken into government oversight. Merrill Lynch: absorbed by Bank of America. AIG: given an $85 billion lifeline by the Federal Reserve and sold off in parcels to financial institutions around the world. Wachovia: taken over by Wells Fargo. Washington Mutual: taken over by JPMorgan Chase. Morgan Stanley: 20 percent bought by Mitsubishi, a large Japanese bank. These are some of the events in the financial crisis of 2008. What was going on and how can a replay be avoided?

Between 2002 and 2005, mortgage lending exploded and home prices rocketed. Mortgage lenders bundled their loans into *mortgage-backed securities* and sold them to eager buyers around the world.

When interest rates began to rise in 2006 and asset prices fell, financial institutions took big losses. Some losses were too big to bear and big-name institutions failed.

Pension Funds Pension funds are financial institutions that use the pension contributions of firms and workers to buy bonds and stocks. The mortgage-backed securities of Fannie Mae and Freddie Mac are among the assets of pension funds. Some pension funds are very large and play an active role in the firms whose stock they hold.

Insurance Companies Insurance companies enable households and firms to cope with risks such as accident, theft, fire, ill-health, and a host of other misfortunes. They receive premiums from their customers and pay claims. Insurance companies use the funds they have received but not paid out as claims to buy bonds and stocks on which they earn interest income.

In normal times, insurance companies have a steady flow of funds coming in from premiums and interest on the financial assets they hold and a steady, but smaller, flow of funds paying claims. Their profit is the gap between the two flows. But in unusual times, when large and widespread losses are being incurred, insurance companies can run into difficulty in meeting their obligations. Such a situation arose in 2008 for one of the biggest insurers, AIG, and the firm was taken into public ownership.

Insolvency and Illiquidity

A financial institution's **net worth** is the market value of what it has lent minus the market value of what it has borrowed. If net worth is positive, the institution is *solvent*. But if net worth is negative, the institution is *insolvent* and must go out of business. The owners of an insolvent financial institution—usually its stockholders—bear the loss.

A financial institution both borrows and lends, so it is exposed to the risk that its net worth might become negative. To limit that risk, financial institutions are regulated and a minimum amount of their lending must be backed by their net worth.

Sometimes, a financial institution is solvent but illiquid. A firm is *illiquid* if it has made long-term loans with borrowed funds and is faced with a sudden demand to repay more of what it has borrowed than its available cash. In normal times, a financial institution that is illiquid can borrow from another institution. But if all the financial institutions are short of cash, the market for loans among financial institutions dries up.

Insolvency and illiquidity were at the core of the financial meltdown of 2007–2008.

In the hope of avoiding a replay, Congress has enacted the *Restoring American Financial Stability Act of 2010*. The main points of the Act are

- A Consumer Financial Protection Agency to enforce consumer-oriented regulation, ensure that the fine print on financial services contracts is clear and accurate, and maintain a toll-free hotline for consumers to report alleged deception.
- A Financial Services Oversight Council to anticipate financial market weakness.
- Authority for the Federal Deposit Insurance Corporation to seize, liquidate, and reconstruct troubled financial firms.
- Tight restrictions to stop banks gambling for their own profits and limit their risky investments.
- Mortgage reforms that require lenders to review the income and credit histories of applicants and ensure they can afford payments.
- Require firms that create mortgage-backed securities to keep at least 5 percent of them.

The 2010 Act does nothing to solve the problem that Fannie and Freddie remain under government oversight. Many people believe that the measures are too timid and leave the financial system fragile.

Interest Rates and Asset Prices

Stocks, bonds, short-term securities, and loans are collectively called *financial assets*. The interest rate on a financial asset is the interest received expressed as a percentage of the price of the asset.

Because the interest rate is a percentage of the price of an asset, if the asset price rises, other things remaining the same, the interest rate falls. Conversely, if the asset price falls, other things remaining the same, the interest rate rises.

To see this inverse relationship between an asset price and the interest rate, let's look at an example. We'll consider a bond that promises to pay its holder $5 a year forever. What is the rate of return—the interest rate—on this bond? The answer depends on the price of the bond. If you could buy this bond for $50, the interest rate would be 10 percent per year:

Interest rate = ($5 ÷ $50) × 100 = 10 percent.

But if the price of this bond increased to $200, its rate of return or interest rate would be only 2.5 percent per year. That is,

Interest rate = ($5 ÷ $200) × 100 = 2.5 percent.

This relationship means that the price of an asset and the interest rate on that asset are determined simultaneously—one implies the other.

This relationship also means that if the interest rate on the asset rises, the price of the asset falls, debts become harder to pay, and the net worth of the financial institution falls. Insolvency can arise from a previously unexpected large rise in the interest rate.

In the next part of this chapter, we learn how interest rates and asset prices are determined in the financial markets.

REVIEW QUIZ

1. Distinguish between physical capital and financial capital and give two examples of each.
2. What is the distinction between gross investment and net investment?
3. What are the three main types of markets for financial capital?
4. Explain the connection between the price of a financial asset and its interest rate.

You can work these questions in Study Plan 7.1 and get instant feedback. myeconlab

The Loanable Funds Market

In macroeconomics, we group all the financial markets that we described in the previous section into a single loanable funds market. The **loanable funds market** is the aggregate of all the individual financial markets.

The circular flow model of Chapter 4 (see p. 85) can be extended to include flows in the loanable funds market that finance investment.

Funds that Finance Investment

Figure 7.2 shows the flows of funds that finance investment. They come from three sources:

1. Household saving
2. Government budget surplus
3. Borrowing from the rest of the world

Households' income, Y, is spent on consumption goods and services, C, saved, S, or paid in net taxes, T. **Net taxes** are the taxes paid to governments minus the cash transfers received from governments (such as Social Security and unemployment benefits). So income is equal to the sum of consumption expenditure, saving, and net taxes:

$$Y = C + S + T.$$

You saw in Chapter 4 (p. 86) that Y also equals the sum of the items of aggregate expenditure: consumption expenditure, C, investment, I, government expenditure, G, and exports, X, minus imports, M. That is:

$$Y = C + I + G + X - M.$$

By using these two equations, you can see that

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

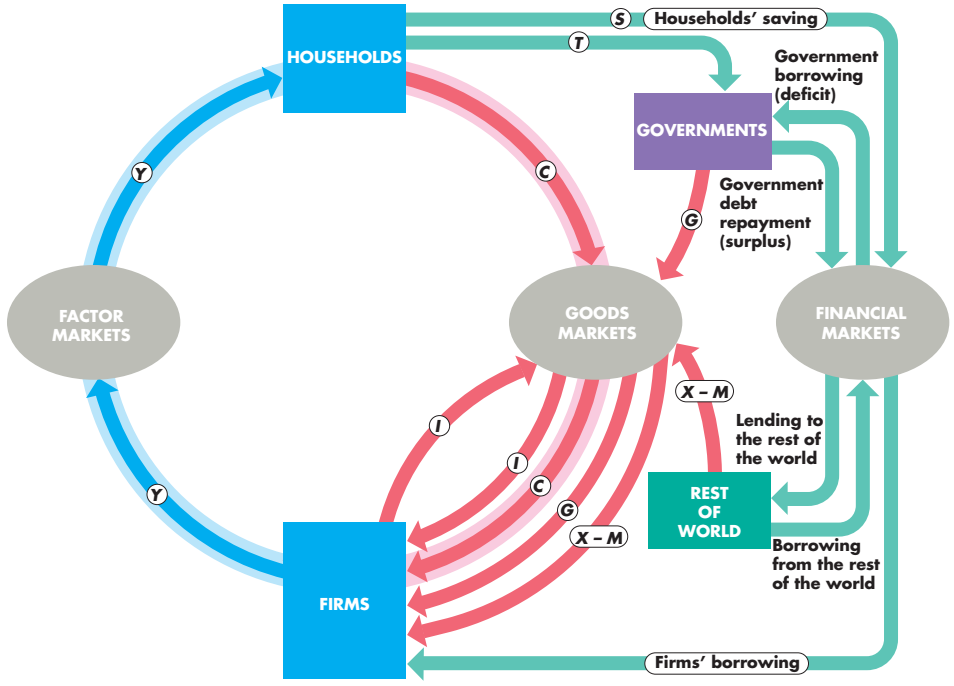
Subtract G and X from both sides of the last equation to obtain

$$I = S + (T - G) + (M - X).$$

This equation tells us that investment, I, is financed by household saving, S, the government budget surplus, $(T - G)$, and borrowing from the rest of the world, $(M - X)$.

A government budget surplus $(T > G)$ contributes funds to finance investment, but a government budget deficit $(T < G)$ competes with investment for funds.

FIGURE 7.2 Financial Flows and the Circular Flow of Expenditure and Income



Households use their income for consumption expenditure (C), saving (S), and net taxes (T). Firms borrow to finance their investment expenditure. Governments borrow to finance a budget deficit or repay debt if they have a budget surplus. The rest of the world borrows to finance its deficit or lends its surplus.

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If we export less than we import, we borrow $(M - X)$ from the rest of the world to finance some of our investment. If we export more than we import, we lend $(X - M)$ to the rest of the world and part of U.S. saving finances investment in other countries.

The sum of private saving, S, and government saving, $(T - G)$, is called **national saving**. National saving and foreign borrowing finance investment.

In 2010, U.S. investment was $1.8 trillion. Governments (federal, state, and local combined) had a deficit of $1.5 trillion. This total of $3.3 trillion was financed by private saving of $2.8 trillion and borrowing from the rest of the world (negative net exports) of $0.5 trillion.

You're going to see how investment and saving and the flows of loanable funds—all measured in constant 2005 dollars—are determined. The price in the loanable funds market that achieves equilibrium is an interest rate, which we also measure in real terms as the *real* interest rate. In the loanable funds market, there is just one interest rate, which is an average of the interest rates on all the different types of financial securities that we described earlier. Let's see what we mean by the real interest rate.

The Real Interest Rate

The **nominal interest rate** is the number of dollars that a borrower pays and a lender receives in interest in a year expressed as a percentage of the number of dollars borrowed and lent. For example, if the annual interest paid on a $500 loan is $25, the nominal interest rate is 5 percent per year: $25 ÷ $500 × 100 or 5 percent.

The **real interest rate** is the nominal interest rate adjusted to remove the effects of inflation on the buying power of money. The real interest rate is approximately equal to the nominal interest rate minus the inflation rate.

You can see why if you suppose that you have put $500 in a savings account that earns 5 percent a year. At the end of a year, you have $525 in your savings account. Suppose that the inflation rate is 2 percent per year—during the year, all prices increased by 2 percent. Now, at the end of the year, it costs $510 to buy what $500 would have bought one year ago. Your money in the bank has really only increased by $15, from $510 to $525. That $15 is equivalent to a real interest rate of 3 percent a year on your original

$500. So the real interest rate is the 5 percent nominal interest rate minus the 2 percent inflation rate[1].

The real interest rate is the opportunity cost of loanable funds. The real interest *paid* on borrowed funds is the opportunity cost of borrowing. And the real interest rate *forgone* when funds are used either to buy consumption goods and services or to invest in new capital goods is the opportunity cost of not saving or not lending those funds.

We're now going to see how the loanable funds market determines the real interest rate, the quantity of funds loaned, saving, and investment. In the rest of this section, we will ignore the government and the rest of the world and focus on households and firms in the loanable funds market. We will study

- The demand for loanable funds
- The supply of loanable funds
- Equilibrium in the loanable funds market

The Demand for Loanable Funds

The *quantity of loanable funds demanded* is the total quantity of funds demanded to finance investment, the government budget deficit, and international investment or lending during a given period. Our focus here is on investment. We'll bring the other two items into the picture in later sections of this chapter.

What determines investment and the demand for loanable funds to finance it? Many details influence this decision, but we can summarize them in two factors:

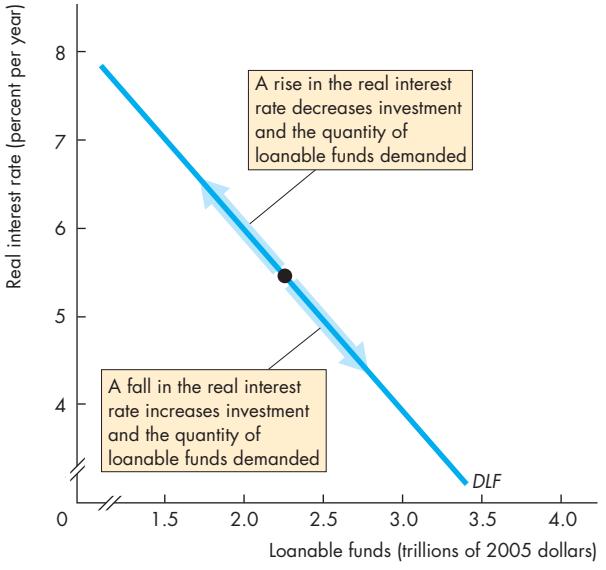
1. The real interest rate
2. Expected profit

Firms invest in capital only if they expect to earn a profit and fewer projects are profitable at a high real interest rate than at a low real interest rate, so

> Other things remaining the same, the higher the real interest rate, the smaller is the quantity of loanable funds demanded; and the lower the real interest rate, the greater the quantity of loanable funds demanded.

[1]The *exact* real interest rate formula, which allows for the change in the purchasing power of both the interest and the loan is: Real interest rate = (Nominal interest rate – Inflation rate) ÷ (1 + Inflation rate/100). If the nominal interest rate is 5 percent a year and the inflation rate is 2 percent a year, the real interest rate is (5 – 2) ÷ (1 + 0.02) = 2.94 percent a year.

FIGURE 7.3 The Demand for Loanable Funds



A change in the real interest rate changes the quantity of loanable funds demanded and brings a movement along the demand for loanable funds curve.

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Demand for Loanable Funds Curve The **demand for loanable funds** is the relationship between the quantity of loanable funds demanded and the real interest rate, when all other influences on borrowing plans remain the same. The demand curve *DLF* in Fig. 7.3 is a demand for loanable funds curve.

To understand the demand for loanable funds, think about Amazon.com's decision to borrow $100 million to build some new warehouses. If Amazon expects to get a return of $5 million a year from this investment before paying interest costs and the interest rate is less than 5 percent a year, Amazon would make a profit, so it builds the warehouses. But if the interest rate is more than 5 percent a year, Amazon would incur a loss, so it doesn't build the warehouses. The quantity of loanable funds demanded is greater the lower is the real interest rate.

Changes in the Demand for Loanable Funds When the expected profit changes, the demand for loanable funds changes. Other things remaining the same, the greater the expected profit from new capital, the greater is the amount of investment and the greater the demand for loanable funds.

Expected profit rises during a business cycle expansion and falls during a recession; rises when technological change creates profitable new products; rises as a growing population brings increased demand for goods and services; and fluctuates with contagious swings of optimism and pessimism, called "animal spirits" by Keynes and "irrational exuberance" by Alan Greenspan.

When expected profit changes, the demand for loanable funds curve shifts.

The Supply of Loanable Funds

The *quantity of loanable funds supplied* is the total funds available from private saving, the government budget surplus, and international borrowing during a given period. Our focus here is on saving. We'll bring the other two items into the picture later.

How do you decide how much of your income to save and supply in the loanable funds market? Your decision is influenced by many factors, but chief among them are

1. The real interest rate
2. Disposable income
3. Expected future income
4. Wealth
5. Default risk

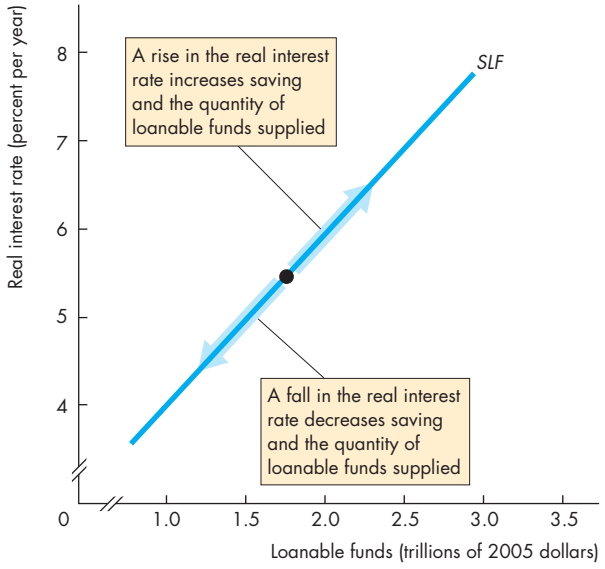
We begin by focusing on the real interest rate.

Other things remaining the same, the higher the real interest rate, the greater is the quantity of loanable funds supplied; and the lower the real interest rate, the smaller is the quantity of loanable funds supplied.

The Supply of Loanable Funds Curve The **supply of loanable funds** is the relationship between the quantity of loanable funds supplied and the real interest rate when all other influences on lending plans remain the same. The curve *SLF* in Fig. 7.4 is a supply of loanable funds curve.

Think about a student's decision to save some of what she earns from her summer job. With a real interest rate of 2 percent a year, she decides that it is not worth saving much—better to spend the income and take a student loan if funds run out during the semester. But if the real interest rate jumped to 10 percent a year, the payoff from saving would be high enough to encourage her to cut back on spending and increase the amount she saves.

FIGURE 7.4 The Supply of Loanable Funds



A change in the real interest rate changes the quantity of loanable funds supplied and brings a movement along the supply of loanable funds curve.

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Changes in the Supply of Loanable Funds A change in disposable income, expected future income, wealth, or default risk changes the supply of loanable funds.

Disposable Income A household's *disposable income* is the income earned minus net taxes. When disposable income increases, other things remaining the same, consumption expenditure increases but by less than the increase in income. Some of the increase in income is saved. So the greater a household's disposable income, other things remaining the same, the greater is its saving.

Expected Future Income The higher a household's expected future income, other things remaining the same, the smaller is its saving today.

Wealth The higher a household's wealth, other things remaining the same, the smaller is its saving. If a person's wealth increases because of a capital gain, the person sees less need to save. For example, from 2002 through 2006, when house prices were rising rapidly, wealth increased despite the fact that personal saving dropped close to zero.

Default Risk Default risk is the risk that a loan will not be repaid. The greater that risk, the higher is the interest rate needed to induce a person to lend and the smaller is the supply of loanable funds.

Shifts of the Supply of Loanable Funds Curve When any of the four influences on the supply of loanable funds changes, the supply of loanable funds changes and the supply curve shifts. An increase in disposable income, a decrease in expected future income, a decrease in wealth, or a fall in default risk increases saving and increases the supply of loanable funds.

Equilibrium in the Loanable Funds Market

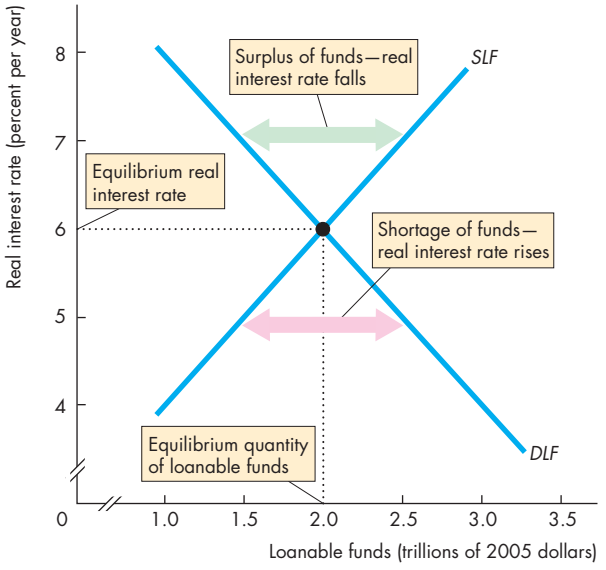
You've seen that other things remaining the same, the higher the real interest rate, the greater is the quantity of loanable funds supplied and the smaller is the quantity of loanable funds demanded. There is one real interest rate at which the quantities of loanable funds demanded and supplied are equal, and that interest rate is the equilibrium real interest rate.

Figure 7.5 shows how the demand for and supply of loanable funds determine the real interest rate. The *DLF* curve is the demand curve and the *SLF* curve is the supply curve. If the real interest rate exceeds 6 percent a year, the quantity of loanable funds supplied exceeds the quantity demanded—a surplus of funds. Borrowers find it easy to get funds, but lenders are unable to lend all the funds they have available. The real interest rate falls and continues to fall until the quantity of funds supplied equals the quantity of funds demanded.

If the real interest rate is less than 6 percent a year, the quantity of loanable funds supplied is less than the quantity demanded—a shortage of funds. Borrowers can't get the funds they want, but lenders are able to lend all the funds they have. So the real interest rate rises and continues to rise until the quantity of funds supplied equals the quantity demanded.

Regardless of whether there is a surplus or a shortage of loanable funds, the real interest rate changes and is pulled toward an equilibrium level. In Fig. 7.5, the equilibrium real interest rate is 6 percent a year. At this interest rate, there is neither a surplus nor a shortage of loanable funds. Borrowers can get the funds they want, and lenders can lend all the funds they have available. The investment plans of borrowers and the saving plans of lenders are consistent with each other.

FIGURE 7.5 Equilibrium in the Loanable Funds Market



A surplus of funds lowers the real interest rate and a shortage of funds raises it. At an interest rate of 6 percent a year, the quantity of funds demanded equals the quantity supplied and the market is in equilibrium.

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Changes in Demand and Supply

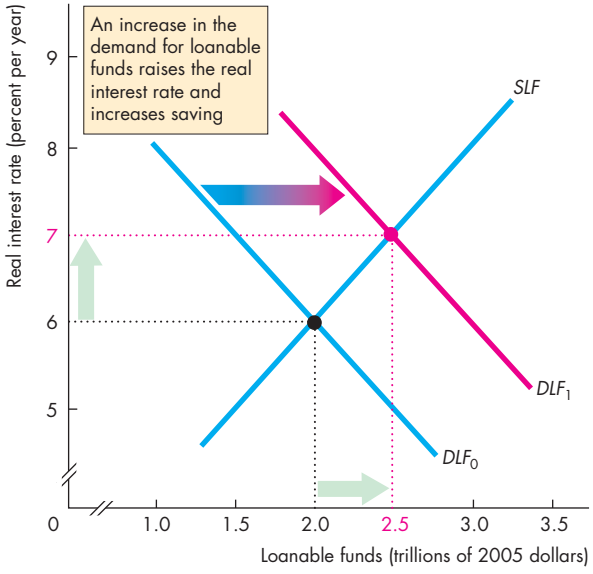
Financial markets are highly volatile in the short run but remarkably stable in the long run. Volatility in the market comes from fluctuations in either the demand for loanable funds or the supply of loanable funds. These fluctuations bring fluctuations in the real interest rate and in the equilibrium quantity of funds lent and borrowed. They also bring fluctuations in asset prices.

Here we'll illustrate the effects of *increases* in demand and supply in the loanable funds market.

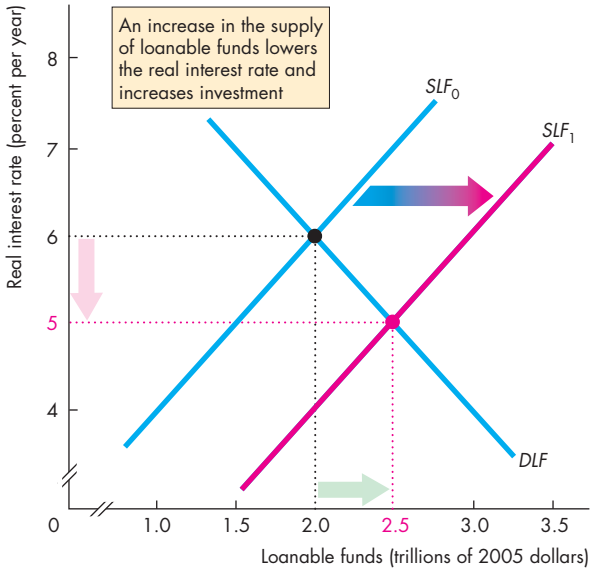
An Increase in Demand If the profits that firms expect to earn increase, they increase their planned investment and increase their demand for loanable funds to finance that investment. With an increase in the demand for loanable funds, but no change in the supply of loanable funds, there is a shortage of funds. As borrowers compete for funds, the interest rate rises and lenders increase the quantity of funds supplied.

Figure 7.6(a) illustrates these changes. An increase in the demand for loanable funds shifts the demand curve rightward from DLF_0 to DLF_1. With no

FIGURE 7.6 Changes in Demand and Supply



(a) An increase in demand



(b) An increase in supply

In part (a), the demand for loanable funds increases and supply doesn't change. The real interest rate rises (financial asset prices fall) and the quantity of funds increases. In part (b), the supply of loanable funds increases and demand doesn't change. The real interest rate falls (financial asset prices rise) and the quantity of funds increases.

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change in the supply of loanable funds, there is a shortage of funds at a real interest rate of 6 percent a year. The real interest rate rises until it is 7 percent a year. Equilibrium is restored and the equilibrium quantity of funds has increased.

An Increase in Supply If one of the influences on saving plans changes and increases saving, the supply of loanable funds increases. With no change in the demand for loanable funds, the market is flush with loanable funds. Borrowers find bargains and lenders find themselves accepting a lower interest rate. At the lower interest rate, borrowers find additional investment projects profitable and increase the quantity of loanable funds that they borrow.

Figure 7.6(b) illustrates these changes. An increase in supply shifts the supply curve rightward from SLF_0 to SLF_1. With no change in demand, there is a surplus of funds at a real interest rate of 6 percent a year. The real interest rate falls until it is 5 percent a year. Equilibrium is restored and the equilibrium quantity of funds has increased.

Long-Run Growth of Demand and Supply Over time, both demand and supply in the loanable funds market fluctuate and the real interest rate rises and falls. Both the supply of loanable funds and the demand for loanable funds tend to increase over time. On the average, they increase at a similar pace, so although demand and supply trend upward, the real interest rate has no trend. It fluctuates around a constant average level.

REVIEW QUIZ

1. What is the loanable funds market?
2. Why is the real interest rate the opportunity cost of loanable funds?
3. How do firms make investment decisions?
4. What determines the demand for loanable funds and what makes it change?
5. How do households make saving decisions?
6. What determines the supply of loanable funds and what makes it change?
7. How do changes in the demand for and supply of loanable funds change the real interest rate and quantity of loanable funds?

You can work these questions in Study Plan 7.2 and get instant feedback. myeconlab

Economics in Actions

Loanable Funds Fuel Home Price Bubble

The financial crisis that gripped the U.S. and global economies in 2007 and cascaded through the financial markets in 2008 had its origins much earlier in events taking place in the loanable funds market.

Between 2001 and 2005, a massive injection of loanable funds occurred. Some funds came from the rest of the world, but that source of supply has been stable. The Federal Reserve provided funds to keep interest rates low and that was a major source of the increase in the supply of funds. (The next chapter explains how the Fed does this.)

Figure 1 illustrates the loanable funds market starting in 2001. In that year, the demand for loanable funds was DLF_{01} and the supply of loanable funds was SLF_{01}. The equilibrium real interest rate was 4 percent a year and the equilibrium quantity of loanable funds was $29 trillion (in 2005 dollars).

During the ensuing four years, a massive increase in the supply of loanable funds shifted the supply curve rightward to SLF_{05}. A smaller increase in demand shifted the demand for loanable funds curve to DLF_{05}. The real interest rate fell to 1 percent a year and the quantity of loanable funds increased to $36 trillion—a 24 percent increase in just four years.

With this large increase in available funds, much of it in the form of mortgage loans to home buyers, the demand for homes increased by more than the increase in the supply of homes. Home prices rose and the expectation of further increases fueled the demand for loanable funds.

By 2006, the expectation of continued rapidly rising home prices brought a very large increase in the demand for loanable funds. At the same time, the Federal Reserve began to tighten credit. (Again, you'll learn how this is done in the next chapter). The result of the Fed's tighter credit policy was a slowdown in the pace of increase in the supply of loanable funds.

Figure 2 illustrates these events. In 2006, the demand for loanable funds increased from DLF_{05} to DLF_{06} and the supply of loanable funds increased by a smaller amount from SLF_{05} to SLF_{06}. The real interest rate increased to 3 percent a year.

The rise in the real interest rate (and a much higher rise in the nominal interest rate) put many homeowners in financial difficulty. Mortgage payments increased and some borrowers stopped repaying their loans.

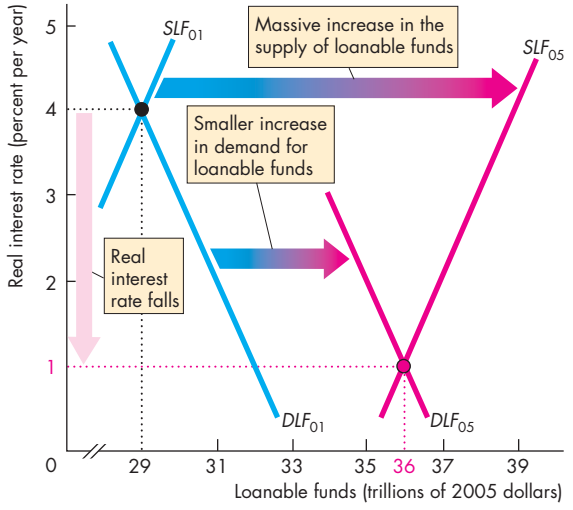


Figure 1 The Foundation of the Crisis: 2001–2005

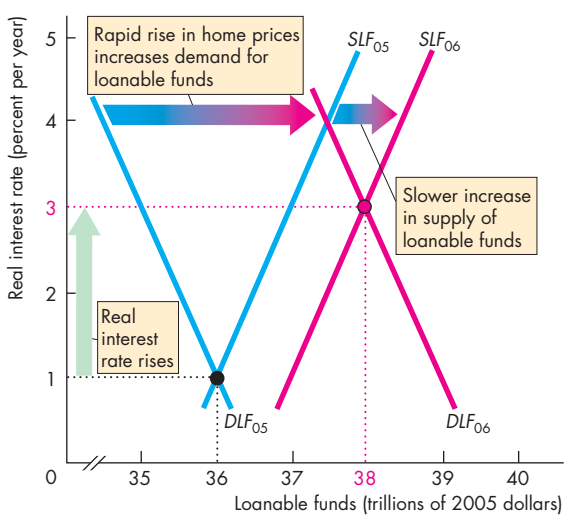


Figure 2 The Start of the Crisis: 2005–2006

By August 2007, the damage from mortgage default and foreclosure was so large that the credit market began to dry up. A large decrease in both demand and supply kept interest rates roughly constant but decreased the quantity of new business.

The total quantity of loanable funds didn't decrease, but the rate of increase slowed to a snail's pace and financial institutions most exposed to the bad mortgage debts and the securities that they backed (described on p. 162) began to fail.

These events illustrate the crucial role played by the loanable funds market in our economy.

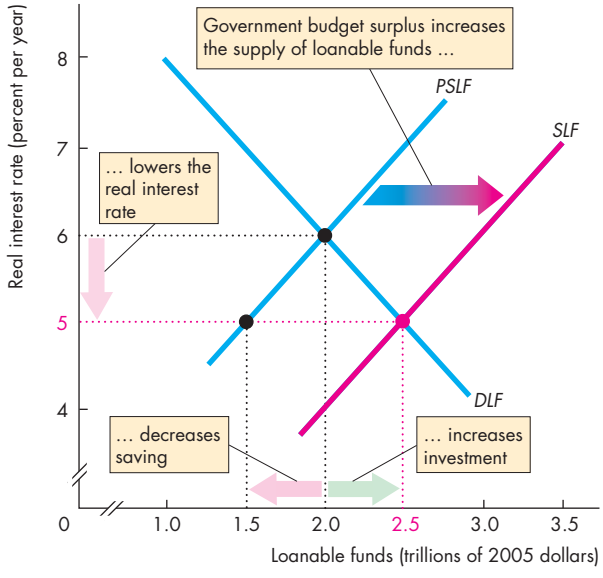
Government in the Loanable Funds Market

Government enters the loanable funds market when it has a budget surplus or budget deficit. A government budget surplus increases the supply of loanable funds and contributes to financing investment; a government budget deficit increases the demand for loanable funds and competes with businesses for funds. Let's study the effects of government on the loanable funds market.

A Government Budget Surplus

A government budget surplus increases the supply of loanable funds. The real interest rate falls, which decreases household saving and decreases the quantity of private funds supplied. The lower real interest rate increases the quantity of loanable funds demanded, and increases investment.

FIGURE 7.7 A Government Budget Surplus



A government budget surplus of $1 trillion is added to private saving and the private supply of loanable funds (*PSLF*) to determine the supply of loanable funds, *SLF*. The real interest rate falls to 5 percent a year, private saving decreases, but investment increases to $2.5 trillion.

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Figure 7.7 shows these effects of a government budget surplus. The private supply of loanable funds curve is *PSLF*. The supply of loanable funds curve, *SLF*, shows the sum of private supply and the government budget surplus. Here, the government budget surplus is $1 trillion, so at each real interest rate the *SLF* curve lies $1 trillion to the right of the *PSLF* curve. That is, the horizontal distance between the *PSLF* curve and the *SLF* curve equals the government budget surplus.

With no government surplus, the real interest rate is 6 percent a year, the quantity of loanable funds is $2 trillion a year, and investment is $2 trillion a year. But with the government surplus of $1 trillion a year, the equilibrium real interest rate falls to 5 percent a year and the equilibrium quantity of loanable funds increases to $2.5 trillion a year.

The fall in the interest rate decreases private saving to $1.5 trillion, but investment increases to $2.5 trillion, which is financed by private saving plus the government budget surplus (government saving).

A Government Budget Deficit

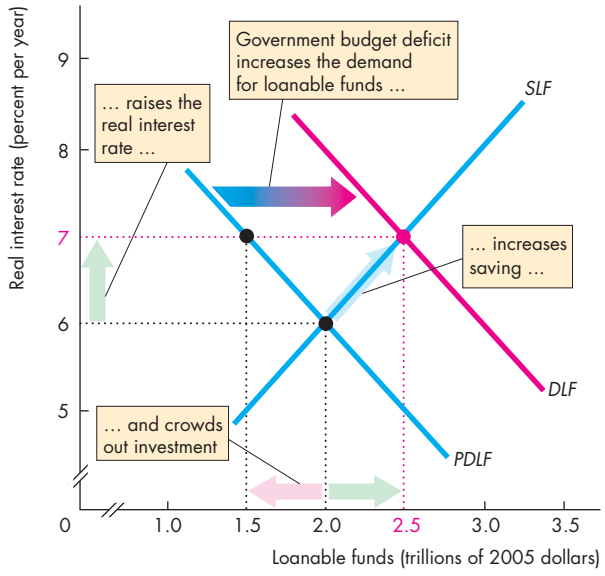
A government budget deficit increases the demand for loanable funds. The real interest rate rises, which increases household saving and increases the quantity of private funds supplied. But the higher real interest rate decreases investment and the quantity of loanable funds demanded by firms to finance investment.

Figure 7.8 shows these effects of a government budget deficit. The private demand for loanable funds curve is *PDLF*. The demand for loanable funds curve, *DLF*, shows the sum of private demand and the government budget deficit. Here, the government budget deficit is $1 trillion, so at each real interest rate the *DLF* curve lies $1 trillion to the right of the *PDLF* curve. That is, the horizontal distance between the *PDLF* curve and the *DLF* curve equals the government budget deficit.

With no government deficit, the real interest rate is 6 percent a year, the quantity of loanable funds is $2 trillion a year and investment is $2 trillion a year. But with the government budget deficit of $1 trillion a year, the equilibrium real interest rate rises to 7 percent a year and the equilibrium quantity of loanable funds increases to $2.5 trillion a year.

The rise in the real interest rate increases private saving to $2.5 trillion, but investment decreases to $1.5 trillion because $1 trillion of private saving must finance the government budget deficit.

FIGURE 7.8 A Government Budget Deficit



A government budget deficit adds to the private demand for loanable funds curve (*PDLF*) to determine the demand for loanable funds curve, *DLF*. The real interest rate rises, saving increases, but investment decreases—a crowding-out effect.

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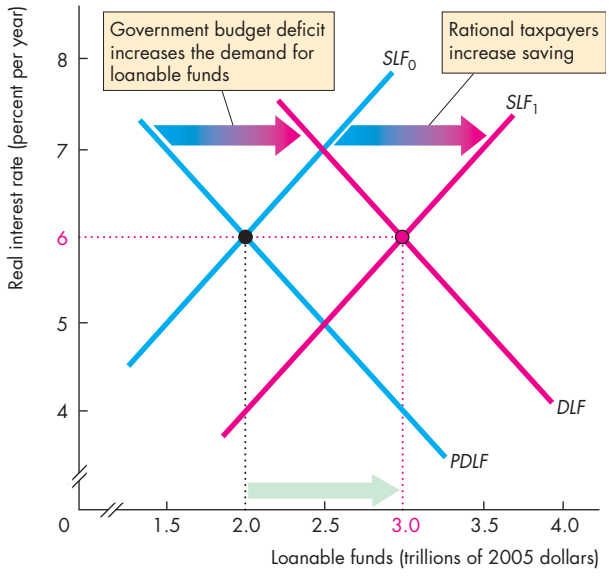
FIGURE 7.9 The Ricardo-Barro Effect



A budget deficit increases the demand for loanable funds. Rational taxpayers increase saving, which increases the supply of loanable funds curve from SLF_0 to SLF_1. Crowding out is avoided: Increased saving finances the budget deficit.

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The Crowding-Out Effect The tendency for a government budget deficit to raise the real interest rate and decrease investment is called the **crowding-out effect**. The budget deficit crowds out investment by competing with businesses for scarce financial capital.

The crowding-out effect does not decrease investment by the full amount of the government budget deficit because the higher real interest rate induces an increase in private saving that partly contributes toward financing the deficit.

The Ricardo-Barro Effect First suggested by the English economist David Ricardo in the eighteenth century and refined by Robert J. Barro of Harvard University, the Ricardo-Barro effect holds that both of the effects we've just shown are wrong and the government budget, whether in surplus or deficit, has no effect on either the real interest rate or investment.

Barro says that taxpayers are rational. They can see that a budget deficit today means that future taxes will be higher and future disposable incomes will be smaller. With smaller expected future disposable incomes, saving increases today. Private saving and the private supply of loanable funds increase to match the quantity of loanable funds demanded by the government. So the budget deficit has no effect on either the real interest rate or investment. Figure 7.9 shows this outcome.

Most economists regard the Ricardo-Barro view as extreme. But there might be some change in private saving that goes in the direction suggested by the Ricardo-Barro effect that lessens the crowding-out effect.

REVIEW QUIZ

1. How does a government budget surplus or deficit influence the loanable funds market?
2. What is the crowding-out effect and how does it work?
3. What is the Ricardo-Barro effect and how does it modify the crowding-out effect?

You can work these questions in Study Plan 7.3 and get instant feedback.

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The Global Loanable Funds Market

The loanable funds market is global, not national. Lenders on the supply side of the market want to earn the highest possible real interest rate and they will seek it by looking everywhere in the world. Borrowers on the demand side of the market want to pay the lowest possible real interest rate and they will seek it by looking everywhere in the world. Financial capital is mobile: It moves to the best advantage of lenders and borrowers.

International Capital Mobility

If a U.S. supplier of loanable funds can earn a higher interest rate in Tokyo than in New York, funds supplied in Japan will increase and funds supplied in the United States will decrease—funds will flow from the United States to Japan.

If a U.S. demander of loanable funds can pay a lower interest rate in Paris than in New York, the demand for funds in France will increase and the demand for funds in the United States will decrease—funds will flow from France to the United States.

Because lenders are free to seek the highest real interest rate and borrowers are free to seek the lowest real interest rate, the loanable funds market is a single, integrated, global market. Funds flow into the country in which the interest rate is highest and out of the country in which the interest rate is lowest.

When funds leave the country with the lowest interest rate, a shortage of funds raises the real interest rate. When funds move into the country with the highest interest rate, a surplus of funds lowers the real interest rate. The free international mobility of financial capital pulls real interest rates around the world toward equality.

Only when the real interest rates in New York, Tokyo, and Paris are equal does the incentive to move funds from one country to another stop.

Equality of real interest rates does not mean that if you calculate the average real interest rate in New York, Tokyo, and Paris, you'll get the same number. To compare real interest rates, we must compare financial assets of equal risk.

Lending is risky. A loan might not be repaid. Or the price of a stock or bond might fall. Interest rates include a risk premium—the riskier the loan, other things remaining the same, the higher is the interest rate. The interest rate on a risky loan minus that on a safe loan is called the *risk premium*.

International capital mobility brings *real* interest rates in all parts of the world to equality except for differences that reflect differences in risk—differences in the risk premium.

International Borrowing and Lending

A country's loanable funds market connects with the global market through net exports. If a country's net exports are negative ($X < M$), the rest of the world supplies funds to that country and the quantity of loanable funds in that country is greater than national saving. If a country's net exports are positive ($X > M$), the country is a net supplier of funds to the rest of the world and the quantity of loanable funds in that country is less than national saving.

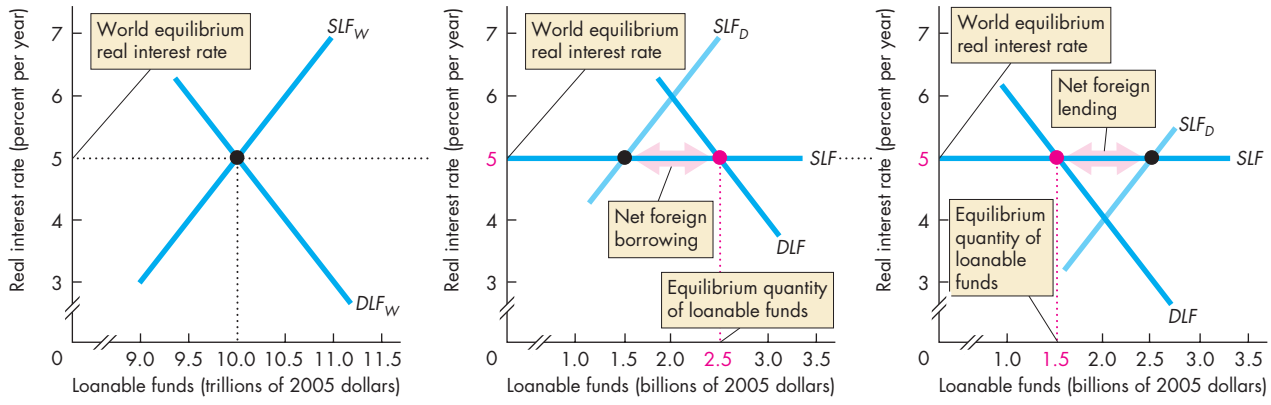
Demand and Supply in the Global and National Markets

The demand for and supply of funds in the global loanable funds market determines the world equilibrium real interest rate. This interest rate makes the quantity of loanable funds demanded equal the quantity supplied in the world economy. But it does not make the quantity of funds demanded and supplied equal in each national economy. The demand for and supply of funds in a national economy determine whether the country is a lender to or a borrower from the rest of the world.

The Global Loanable Funds Market Figure 7.10(a) illustrates the global market. The demand for loanable funds, DLF_W is the sum of the demands in all countries. Similarly, the supply of loanable funds, SLF_W is the sum of the supplies in all countries. The world equilibrium real interest rate makes the quantity of funds supplied in the world as a whole equal to the quantity demanded. In this example, the equilibrium real interest rate is 5 percent a year and the quantity of funds is $10 trillion.

An International Borrower Figure 7.10(b) shows the loanable funds market in a country that borrows from the rest of the world. The country's demand for loanable funds, *DLF*, is part of the world demand in Fig. 7.10(a). The country's supply of loanable funds, SLF_D, is part of the world supply.

FIGURE 7.10 Borrowing and Lending in the Global Loanable Funds Market



(a) The global market **(b) An international borrower** **(c) An international lender**

In the global loanable funds market in part (a), the demand for loanable funds, DLF_W, and the supply of funds, SLF_W, determine the world real interest rate. Each country can get funds at the world real interest rate and faces the (horizontal) supply curve *SLF* in parts (b) and (c).

At the world real interest rate, borrowers in part (b) want more funds than the quantity supplied by domestic lenders (SLF_D). The shortage is made up by international borrowing.

Domestic suppliers of funds in part (c) want to lend more than domestic borrowers demand. The excess quantity supplied goes to foreign borrowers.

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If this country were isolated from the global market, the real interest rate would be 6 percent a year (where the *DLF* and SLF_D curves intersect). But if the country is integrated into the global economy, with an interest rate of 6 percent a year, funds would *flood into* it. With a real interest rate of 5 percent a year in the rest of the world, suppliers of loanable funds would seek the higher return in this country. In effect, the country faces the supply of loanable funds curve *SLF*, which is horizontal at the world equilibrium real interest rate.

The country's demand for loanable funds and the world interest rate determine the equilibrium quantity of loanable funds—$2.5 billion in Fig. 7.10(b).

An International Lender Figure 7.10(c) shows the situation in a country that lends to the rest of the world. As before, the country's demand for loanable funds, *DLF*, is part of the world demand and the country's supply of loanable funds, SLF_D, is part of the world supply in Fig. 7.10(a).

If this country were isolated from the global economy, the real interest rate would be 4 percent a year (where the *DLF* and SLF_D curves intersect). But if this country is integrated into the global economy, with an interest rate of 4 percent a year, funds would quickly *flow out* of it. With a real interest rate of 5 percent a year in the rest of the world, domestic suppliers of loanable funds would seek the higher return in other countries. Again, the country faces the supply of loanable funds curve *SLF*, which is horizontal at the world equilibrium real interest rate.

The country's demand for loanable funds and the world interest rate determine the equilibrium quantity of loanable funds—$1.5 billion in Fig. 7.10(c).

Changes in Demand and Supply A change in the demand or supply in the global loanable funds market changes the real interest rate in the way shown in Fig. 7.6 (see p. 169). The effect of a change in demand or supply in a national market depends on the size of the country. A change in demand or supply in a small country has no significant effect on global demand or supply, so it leaves the world real interest rate unchanged and changes only the country's net exports and international borrowing or lending. A change in demand or supply in a large country has a significant effect on global demand or supply, so it changes the world real interest rate as well as the country's net exports and international borrowing or lending. Every country feels some of the effect of a large country's change in demand or supply.