CHAPTER 7

Financial Swaps

Opening Case 7: Why have Gillette and GE Chosen a Higher Cost of Funding?

Gillette did a strange thing in January 1999. To finance its European operations, it raised money through a Eurobond deal denominated in euros, even though it would have been cheaper to issue in US dollars and then swap the proceeds to euros. Gillette's decision not to execute the currency swap on the 5-year deal cost the company about 10 basis points or €300,000 per year. In fact, Gillette was not the only US borrower to forfeit a lower cost of funding. General Electric issued €250 million in Eurobonds rather than offering bonds in dollars and then swapping for euros. Lynn Seymour, Gillette's controller, explains that currency swaps have formed an integral part of the company's borrowing strategy in the past. "We have borrowed in US dollars, swapped to floating, foreign-denominated debt, like deutsche marks, because it was cheaper," she said. However, under the new accounting rules, this procedure becomes more troublesome.

Gillette's action exemplifies the fact that companies will frequently choose a costlier option to avoid government regulations. When the Financial Accounting Standards Board (FASB) issued its FASB 133 in 1998, some US companies, such as Gillette Corp., decided to undertake the costlier transaction rather than face problems under FASB 133. The FASB 133 standard requires companies to report the fair market value of their derivatives in their balance sheets and to include derivatives gains and losses in their income statements. Business executives argue that such accounting treatments of derivatives will distort their company earnings.

According to Ira Kawaller of Kawaller & Associates, a New York management consulting firm, currency swaps and interest rate swaps must be marked to market as the

present value of cash flows and recorded in current income, subjecting the company to earnings volatility. "This is going to be a big problem for multinational companies," he noted. Bob Sullivan, managing partner of PricewaterhouseCoopers, agreed: "For the top Fortune 100 companies, this is a major issue," adding that, as far as debt markets are concerned, this is the "biggest topic" raised by FASB 133. Although it is too early to tell exactly how the FASB will interpret the new rules, it is already clear that FASB 133 is a major headache for American issuers in international debt markets. Thus some companies, such as Gillette and General Electric, would rather pay greater funding costs than face balance-sheet and income volatilities.

In developing the standard, the FASB reached six decisions that became the cornerstones of FASB 133. First, derivative instruments represent rights or obligations that meet the definitions of assets or liabilities. Second, fair value is the only relevant measure for derivative instruments. Third, only items that are assets or liabilities should be reported as such on the balance sheet. Fourth, therefore, all derivatives are reported at fair value on the balance sheet. Fifth, special hedge accounting is appropriate for derivatives designed and effective in offsetting changes in fair values or cash flows for the risk being hedged. Six, changes in fair value for derivatives not designated and qualifying as hedges are currently recorded in earnings. FASB 133 permits an entity to use the fair-value accounting model and the cash flow hedge accounting model. Under these two accounting models, the entity must recognize gains or losses on derivative hedging instruments as earnings.

Sources: Simon Boughey, "US Issuers in Euromarket are Snakebit by FAS 133," *Investment Dealers Digest*, Feb. 22, 1999, p. 13; and Arjen Ronner and Mark Blok, "Hedging Foreign Currency Exposure: Consequences of FAS 133," *Journal of Applied Finance*, Vol. 11, No. 1, 2001, pp. 25–34.

A **swap** is an agreement between two parties, called **counterparties**, that exchange sets of cash flows over a period of time in the future. When exchange rates and interest rates fluctuate, risks of forward market and money market positions are so great that the forward market and the money market may not function properly. Currency futures and options are inflexible and available only for selected currencies. In such cases, multinational companies (MNCs) and governments may use swap arrangements to protect the value of export sales, import orders, and outstanding loans denominated in foreign currencies.

Financial swaps are now used by MNCs, commercial banks, world organizations, and sovereign governments to minimize currency and interest rate risks. These swaps compete with other exchange risk management tools, such as currency forwards, futures, and options, but they also complement these other instruments.

This chapter consists of three major sections. The first section describes the emergence of the swap market. The second section discusses two major types of financial swap – interest rate swaps and currency swaps. The third section evaluates motivations for swaps.

7.1 The Emergence of the Swap Market

The origins of the swap market can be traced back to the late 1970s, when currency traders developed currency swaps to evade British controls on the movement of foreign currency. The market has grown rapidly since then. In this section, we consider the origins of the swap market, drawbacks of parallel and back-to-back loans, and the growth of the swap market.

7.1.1 The origins of the swap market

Financial swaps are usually regarded as an outgrowth of parallel and back-to-back loans. These work similarly except in one respect; parallel loans involve four firms, while back-to-back loans involve only two firms. These two instruments attained prominence in the 1970s, when the British government imposed taxes on foreign-currency transactions to prevent capital outflows. The parallel loan became a widely accepted vehicle by which these taxes could be avoided. The back-to-back loan was a simple modification of the parallel loan, and the currency swap was a natural extension of the back-to-back loan.

PARALLEL LOANS A loan that involves an exchange of currencies between four parties, with a promise to re-exchange the currencies at a predetermined exchange rate on a specified future date, is referred to as a **parallel loan**. Typically, though not always, the parties consist of two pairs of affiliated companies. Parallel loans are commonly arranged by two multinational parent companies in two different countries.

The structure of a typical parallel loan is illustrated in figure 7.1. Assume that: (1) a parent corporation (IBM) in the United States with a subsidiary in Australia wants to obtain a 1-year Australian dollar loan and (2) a parent corporation (WMC: Western Mining Company) in Australia with a subsidiary in the USA wishes to obtain a 1-year US dollar loan. In other words, each parent wants to lend to its subsidiary in the subsidiary's currency. These loans can be arranged without using the foreign-exchange market. IBM lends the agreed amount in US dollars

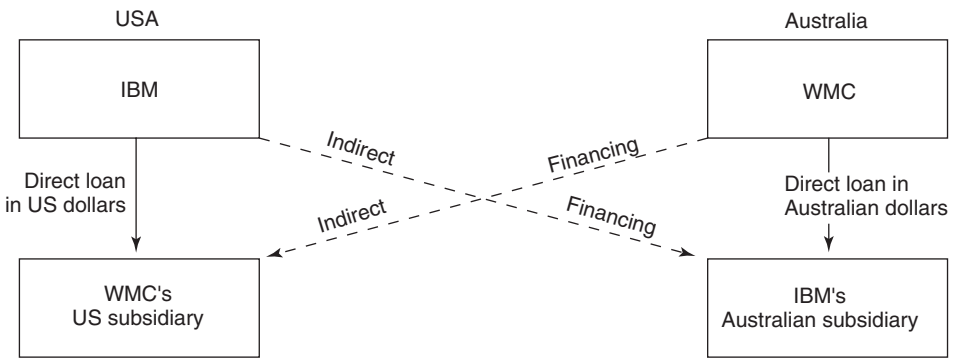

Figure 7.1 The structure of a parallel loan

to the American subsidiary of WMC. In return for this loan, WMC lends the same amount of money in Australian dollars to the Australian subsidiary of IBM. Parallel loan agreements involve the same loan amount and the same loan maturity. Of course, each loan is repaid in the subsidiary's currency. The parallel loan arrangement avoids foreign-exchange risk because each loan is made and repaid in one currency.

BACK-TO-BACK LOANS A loan that involves an exchange of currencies between two parties, with a promise to re-exchange the currencies at a specified exchange rate on a specified future date, is referred to as a **back-to-back loan** and it involves two companies domiciled in two different countries. For example, AT&T agrees to borrow funds in the USA and then to lend those borrowed funds to Toyota in Japan, which, in return, borrows funds in Japan and then lends those funds to AT&T in the USA. By this simple arrangement, each firm has access to the capital markets in the foreign country without any actual cross-border flows of capital. Consequently, both companies avoid exchange rate risk in a back-to-back loan.

7.1.2 Drawbacks of parallel and back-to-back loans

While parallel and back-to-back loans offer definite benefits to participating companies, three problems limit their usefulness as financing tools. First, it is difficult to find counterparties with matching needs. Second, one party is still obligated to comply with such an agreement even if another party fails to do so. Third, such loans customarily show up on the books of the participating parties.

Currency swaps can overcome these problems fully or partly, and this explains their rapid growth. First, a company in one country with a use for this type of financing must find another company in another country with matching needs; that is, mirror-image financing requirements. These requirements include currencies, principals, types of interest payments, the frequency of interest payments, and the length of the loan period. Search costs for finding such a company may be considerable, if it is possible. Currency swaps largely resolve the problem of matching needs because they are arranged by specialized swap dealers and brokers who recruit prospective counterparties.

Second, parallel and back-to-back loans are actually two loans with two separate agreements, which exist independently of each other. If the first company defaults on its obligations to the second company, the second company is not legally relieved of its obligations to the first company. To avoid this problem, a separate agreement, defining the right of offset, must be drafted. If this agreement is not registered, the situation and outcome described above may still arise. On the other hand, registration itself may cause problems. With currency swaps, however, the right of offset is usually embodied in the agreement.

Third, parallel and back-to-back loans are carried on the books of the participating parties. In other words, the exchange of principals under these two instruments involves net increases in both assets and liabilities; these amounts are customarily recorded in full on the counterparties' books. With currency swaps, however, the principal amounts usually do not show up on the participants' books. Many commercial banks prefer currency swaps to parallel and back-to-back loans to keep the transactions off their books. These off-book transactions of currency swaps and other derivatives may enable banks to avoid increases in their capital requirements under applicable regulations. However, such off-book transactions may be disallowed in the near future, as

accounting-standard setters in the USA and other countries require MNCs to include derivatives transactions in their financial statements (see Opening Case 7, Global Finance in Action 7.1, and Case Problem 7).

Global Finance in Action 7.1

Off-Balance-Sheet Operations and New Regulations

American corporate scandals, one after another, have recently rocked investors. The problems with Enron, Arthur Andersen, WorldCom, Global Grossing, and other companies have been blamed on off-balance-sheet transactions. Consider a simple example of the use of an off-balance-sheet, offshore partnership that Enron used to prop itself up financially. According to the US Senate investigation, Enron convinced Merrill Lynch to buy three barges located in Nigeria for $28 million. Enron assured Merrill Lynch that it would repurchase the barges in 6 months at a higher price. Enron recorded the sale and captured a $12 million profit in order to meet its earnings expectations. However, the sale of an asset with an agreement to repurchase it is not really a sale. It is simply a loan, with the asset as collateral for the loan. Enron did not want a loan. In fact, it already had too much debt on its books. It wanted the money and the recorded profit without creating more debt.

In 2003, the Financial Accounting Standard Board (FASB) and the Securities and Exchange Commission (SEC) issued two sets of new rules to bring more transactions onto companies' financial statements, as well as to improve disclosure of those that remain off. They were issued in response to outrage over energy trader Enron's abuse of off-balance-sheet partnerships to hide debt. These new rules require companies to add transactions to their balance sheets when they stand to absorb a majority of the expected benefits or losses from the bulk of expected returns. For activity that remains off balance sheets, companies are required to tell investors about the nature and purpose of that activity, how they benefit from it, and the potential risk to which it exposes them.

The impact of the new rules could be sizable. Companies in Standard & Poor's 500-stock index could add to balance sheets about $379 billion of assets and $377 billion of liabilities, estimates Credit Suisse First Boston (CSFB) in a recent report. Almost two-thirds of those assets and liabilities are expected to be concentrated within 10 companies, mostly banks. For example, Citigroup may see an additional $55 billion of assets on its balance sheet, while the magnitude of the liabilities to be added to Citigroup's balance sheet will likely be roughly equal to that of its assets. The CSFB report estimates that the new rules could affect as many as 234 of the S&P 500 companies.

Sources: C. Bryan-Low, "Off-Balance-Sheet Operations are Focus of New Regulations," *The Wall Street Journal*, July 15, 2003, p. C5; and J. Nofsinger and K. Kim, *Infectious Greed*, Upper Saddle River, NJ: Prentice Hall, 2003.

Table 7.1 The value of outstanding swaps (billions of US dollars)

Year	*Interest rate swaps*	*Currency swaps*	*Total swaps*
1987	683	183	866
1988	1,010	317	1,327
1989	1,539	435	1,974
1990	2,311	578	2,889
1991	3,065	807	3,872
1992	3,851	860	4,711
1993	6,178	900	7,078
1994	8,816	915	9,731
1995	12,811	1,197	14,008
1996	19,170	1,600	20,770
1997	22,291	1,823	24,114
1998	36,262	2,253	38,515
1999	38,372	2,444	40,816
2000	47,995	2,605	50,600
2001	57,220	4,302	61,522
2002	68,274	4,560	72,834

Source: The International Monetary Fund, *International Financial Markets*, various issues.

7.1.3 The growth of the swap market

Salomon Brothers arranged the first currency swap in August 1981, with the World Bank and IBM as counterparties. The World Bank wanted to obtain Swiss francs and German marks to finance its operations in Switzerland and West Germany without having to tap the capital markets of these two countries directly. On the other hand, IBM, which had previously acquired fixed-rate obligations in francs and marks, obtained an unrealized capital gain in terms of dollars when the dollar appreciated. Because IBM's management believed that the dollar's appreciation would not continue, it wanted to realize the capital gain and remove itself from its mark–franc exposure.

It was a short step from currency swaps to interest rate swaps. If swaps could be used to convert one type of currency obligation to another at the applicable interest rate on each currency, a similar type of contract could be used to convert one type of borrowing (fixed rate) to another (floating rate). The first interest rate swap was put together in London in 1981, and their use spread to the USA the next year. The swap concept was extended in 1986 when the Chase Manhattan Bank introduced the commodity swap. In 1989, Bankers Trust introduced the first reported equity swap.

Equity swaps are the newest type of swap and are a subset of a new class of instruments known as synthetic equity. Equity swaps generally function as an asset swap that converts the interest flows on a bond portfolio into cash flows linked to a stock index. The stock indexes that have been used include the Standard & Poor's (S&P) 500, the Tokyo Stock Price Index and Nikkei 225 (Japan), The Chambre des Agents de Change 240 (France), the Financial Times Stock Exchange 100 (United Kingdom), and the Toronto Stock Exchange 300 (Canada).

Table 7.1 shows the amount of outstanding swaps at year-end from 1987 to 2002. By the end of 2002, the total swap market had reached approximately $73 trillion, with about 93 percent

of the swaps being interest rate swaps and the remaining 7 percent being currency swaps. US dollars account for about 30 percent of these swaps, while the Japanese yen, the euro, the British pound, and the Swiss franc account for most of the remaining 70 percent. The value of outstanding swaps increased over 84 times between 1987 and 2002.

7.2 Plain Vanilla Swaps

The basic form of a swap – the simplest kind – is called a **plain vanilla swap**. Although many variants of the plain vanilla swap exist, all swaps have the same basic structure. Two counterparties agree to make payments to each other on the basis of some quantity of underlying assets. These payments include interest payments, commissions, and other service payments. The swap agreement contains a specification of the assets to be exchanged, the rate of interest applicable to each, the timetable by which the payments are to be made, and other provisions. The two parties may or may not exchange the underlying assets, which are called notional principals, in order to distinguish them from physical exchanges in the cash markets. In the sections that follow, we discuss the two forms of a plain vanilla swap: interest rate swaps and currency swaps.

7.2.1 Swap banks

It is difficult and time-consuming for two end users to arrange a swap directly. A more efficient structure for them is to obtain a financial intermediary that serves as counterparty to both end users. This counterparty is called a swap bank. A **swap bank** is a generic term used to describe a financial institution that assists in the completion of a swap. The swap bank profits from the bid–ask spread it imposes on the swap coupon.

The swap bank serves as either a broker or a dealer. A **swap broker** is a swap bank that acts strictly as an agent without taking any financial position in the swap transaction. In other words, the swap broker matches counterparties but does not assume any risk of the swap. The broker receives a commission for this service. A **swap dealer** is a swap bank that actually transacts for its own account to help complete the swap. In this capacity, the swap dealer assumes a position in the swap and thus assumes certain risks.

7.2.2 Interest rate swaps

An **interest rate swap** is a swap in which counterparties exchange cash flows of a floating rate for cash flows of a fixed rate, or exchange cash flows of a fixed rate for cash flows of a floating rate. No **notional principal** changes hands, but it is a reference amount against which the interest is calculated. Maturities range from under 1 year to over 15 years, but most transactions fall within a 2-year to 10-year period. While swaps are inherently international in nature, interest rate swaps can be purely domestic. However, when they are arranged in the Eurocurrency market, interest rate swaps have counterparties from different countries or foreign arranging banks.

In a typical interest rate swap, one company has an initial position in a fixed-rate debt instrument, while another company has an initial position in a floating-rate obligation. In this initial position, the company with the floating-rate obligation is exposed to changes in interest rates. By swapping this floating-rate obligation with the fixed-rate obligation, this company eliminates exposure to changing interest rates.

Borrowers may want to arrange an interest rate swap for a number of reasons. First, changes in financial markets may cause interest rates to change. Second, borrowers may have different credit ratings in different countries. Third, some borrowers have different preferences for debt service payment schedule. Because market imperfections exist in different international financial markets with diversified borrowers and lenders, the objectives of interest rate swaps can be achieved easily and readily. Interest rate swaps are normally arranged by an international bank that serves as a swap broker or a swap dealer. Through interest rate swaps, borrowers obtain a lower cost of debt service payments and lenders obtain profit guarantees.

Example 7.1

Assume that a swap agreement covers a 5-year period and involves annual interest payments on a $10 million principal amount. Party A agrees to pay a fixed rate of 7 percent to party B. In return, party B agrees to pay a floating rate of LIBOR + 3 percent to party A. LIBOR stands for the London Interbank Offered Rate.

Figure 7.2 shows the basic features of this transaction. Party A pays 7 percent interest on $10 million or $700,000 each year to party B. Party B makes an interest payment on $10 million each year to party A in return, but the actual amount of the interest payments depends on the prevailing LIBOR.

If the LIBOR is 5 percent at the time of the first payment, party B will have to pay $800,000 to party A. Party A still owes $700,000 to party B, because its interest is fixed at 7 percent on a $10 million loan. If these mutual interest obligations offset each other, party B owes only $100,000 to party A. Typically, only payment of the net amount, the difference between the two interest obligations, actually takes place. This practice avoids unnecessary payments.

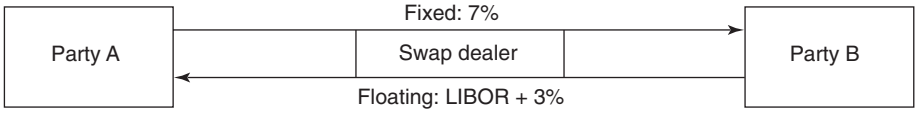

Figure 7.2 An interest rate swap

7.2.3 Currency swaps

A **currency swap** is a swap in which one party provides a certain principal in one currency to its counterparty in exchange for an equivalent amount in a different currency. For example, a British company may be anxious to swap British pounds for US dollars. Similarly, a US company may be willing to exchange US dollars for British pounds. Given these needs, the two companies may engage in a currency swap.

Currency swaps achieve an economic purpose similar to that of parallel loans. However, currency swaps have effectively displaced parallel loans, because companies seeking parallel loans have difficulty matching needs, have no right of offset, and must place such loans on the counterparties' books.

A typical currency swap involves three sets of cash flows. First, at the initiation of the swap, the two parties actually exchange the currencies in which the principals are denominated. This differs from the interest rate swap, in which both parties may deal in the same currency and can pay the net interest amount. Second, the parties make periodic interest payments to each other during the life of the swap agreement. Third, at the termination of the swap, the parties again exchange the currencies in which the principals are denominated.

Example 7.2

Assume that the current spot rate for British pounds is £0.5 per dollar ($2 per pound), the US interest rate is 10 percent, and the British interest rate is 8 percent. BT (British Telecommunications) wishes to exchange £5 million for dollars. In return for these pounds, GM would pay $10 million to BT at the initiation of the swap. The term of the swap is 5 years, and the two firms will make annual interest payments.

With the interest rates given above, GM will pay 8 percent on the £5 million it received; so the annual payment from GM to BT will be £400,000. BT received $10 million and will pay interest at 10 percent; so BP will pay $1 million each year to GM. In actual practice, the counterparties will make only net payments. For example, if the spot rate for pounds changes to £0.45 per dollar at year 1, one pound is worth $2.22. Valuating the interest obligations in dollars at this exchange rate, BT owes $1 million and GM owes $888,000 (£400,000 × $2.22). Hence, BT will pay the $112,000 difference. At other times, the exchange rate could be different, thereby making the net payment reflect the different exchange rate.

At the end of 5 years, the two counterparties again exchange principal. In this example, BT would pay $10 million and GM would pay £5 million. This final payment terminates the currency swap. Figure 7.3(a) shows the initial exchange of principal; figure 7.3(b) represents the annual interest payment; and figure 7.3(c) shows the second exchange of principal that completes the swap.

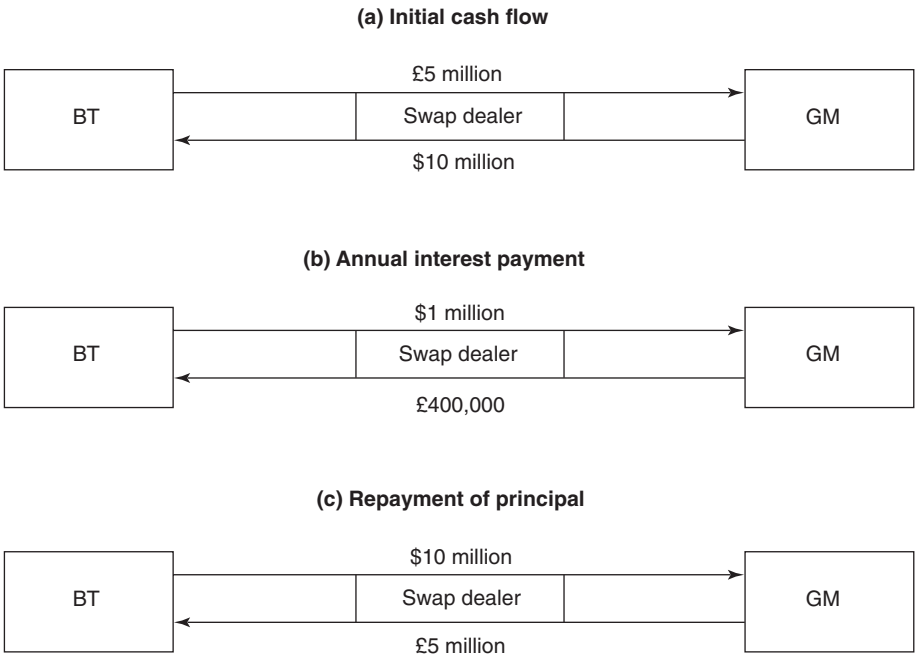

Figure 7.3 A currency swap

7.2.4 *Swaptions, caps, floors, and collars*

In this section, we consider several related instruments before we complete our survey of financial swaps. These instruments are swaptions, caps, floors, and collars.

A **swaption** is an option to enter into a plain vanilla interest rate swap. A **call swaption** gives the holder the right to receive fixed-interest payments. A **put swaption** gives the holder the right to make fixed-interest payments. Call swaptions are attractive when interest rates are expected to fall. Put swaptions are attractive when interest rates are expected to rise. Banks and investment firms usually act as dealers rather than as brokers. In other words, these banks and investment firms stand ready to enter into swaptions on either the buying or selling side.

Swaptions are an alternative to caps, floors, and collars, all of which are traded by the same bank personnel who trade swaptions. An **interest rate cap** sets a maximum rate on floating-rate interest payments; an **interest rate floor** sets a minimum rate on floating-rate interest payments; and an **interest rate collar** combines a cap with a floor. A buyer of one of these instruments pays to the seller a one-time premium, which is a small percentage of the notional principal. The buyer of a cap receives a cash payment from the seller when the floating reference rate for the cap is higher than the cap's strike rate when the two rates are matched against each other on a given date. The buyer of a floor receives a cash payment from the seller when the floating reference rate for the floor is lower on a given date than the floor's strike rate.

7.3 Motivations for Swaps

There are three basic motivations for swaps. First, companies use swaps to provide protection against future changes in exchange rates. Second, companies use swaps to eliminate interest rate risks arising from normal commercial operations. Third, companies use swaps to reduce financing costs.

7.3.1 Currency risk management

Companies use currency swaps to eliminate currency risks arising from overseas commercial operations. A currency swap can take many forms. One type of currency swap accommodates two companies that have long-term needs in two different currencies. Assume the following two things: first, a US firm, hired to build several power plants in Canada, expects to receive payment in Canadian dollars in 3 years; and, second, a Canadian firm has bought machinery from the USA and will make payment in US dollars in 3 years. These two companies could arrange a currency swap that allows for an exchange of Canadian dollars for US dollars in 3 years at a predetermined exchange rate. In this way, the US firm could lock in the number of US dollars it will receive in exchange for the Canadian dollar payment in 3 years. By the same token, the Canadian firm could lock in the number of Canadian dollars it will receive in exchange for the US dollar payment in 3 years.

7.3.2 Commercial needs

Consider a typical mortgage company that accepts deposits and lends these funds for long-term mortgages. Deposit rates must adjust to changing interest rates because depositors can withdraw their funds on short notice. Most mortgagors, on the other hand, wish to borrow at a fixed rate for a long time. This may leave a mortgage company with floating-rate liabilities and fixed-rate assets, thereby making it vulnerable to rising rates. If interest rates rise, the mortgage company will be forced to increase the rate it pays on deposits, but it cannot increase the interest rate it charges on mortgages that have already been issued. To avoid this interest rate risk, the mortgage company might use interest rate swaps to transform its fixed-rate assets into floating-rate assets, or transform its floating-rate liabilities into fixed-rate liabilities.

Example 7.3

Let's extend example 7.1 to make the discussions on motivations for swaps concrete. A mortgage company (party A) has just lent $10 million for 5 years at 7 percent with annual payments, and it pays a deposit rate that equals LIBOR + 1 percent. With these rates, the company would lose money if the LIBOR were to exceed 6 percent. This vulnerability might prompt the mortgage company to consider an interest rate swap. In other words, in

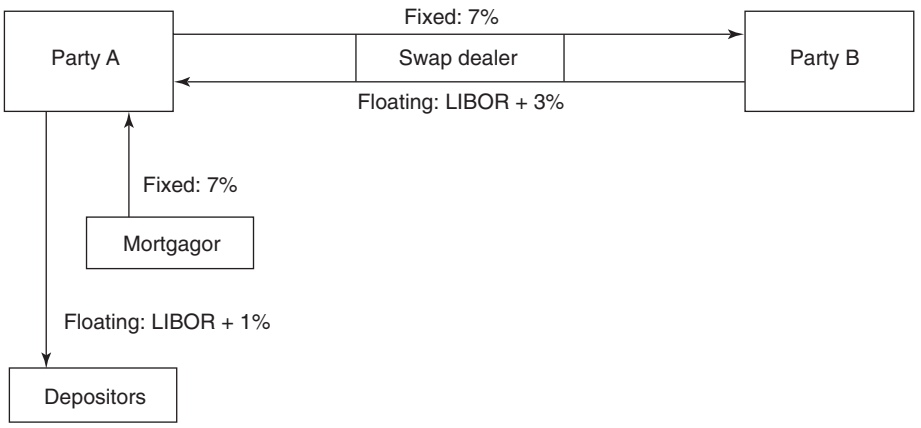

Figure 7.4 Motivation for the interest rate swap

exchange for the fixed-rate mortgages that it holds, the company might want to pay a fixed rate of interest and receive a floating rate of interest.

Figure 7.4 shows example 7.1 (figure 7.2) with additional information about the mortgage company (party A). The company receives payments at a fixed rate of 7 percent on the mortgage. After it enters the swap, the company also pays 7 percent on a notional principal of $10 million to party B. In effect, it receives mortgage payments and passes them through to party B under the swap agreement. In return, party A receives a floating rate of LIBOR + 3 percent from party B. From this cash flow, the company pays its depositors LIBOR + 1 percent and thus this leaves a periodic inflow of 2 percent to the company.

In example 7.3, the mortgage company now has a fixed-rate inflow of 2 percent, and it has succeeded in escaping its exposure to interest rate risk. No matter what happens to the level of interest rates, the company will enjoy a net cash flow of 2 percent on $10 million. This example clarifies why a company has a strong motivation to enter the swap market. The mortgage company faces exposure to changing interest rates because of the very nature of the mortgage industry. However, the company secures a fixed-rate position by engaging in an interest rate swap.

7.3.3 Comparative advantage

In many instances, one company may borrow money at a lower rate of interest in the capital market than another firm. For example, a US company (GM) may borrow money at a favorable rate in the USA, but it might not have favorable access to the capital market in the UK.

Similarly, a British company (BT) may have good borrowing opportunities domestically, but poor opportunities in the USA.

These comparative advantages usually exist because of market imperfections or differences in risk. US banks may not have the same information as British banks have, or they may evaluate information differently. Tax considerations or some kind of government-sanctioned discrimination might cause foreign borrowers to be treated differently from domestic borrowers. Borrowers' risks might also vary from country to country, so that domestic firms might be considered to be less risky than foreign firms. Companies can frequently use swaps not only to save money but also to diversify their funding sources (see Global Finance in Action 7.2).

Example 7.4

In example 7.2, we assumed that two companies (GM and BT) faced the same rate for each currency. Let's now assume that BT has access to pounds at a rate of 7 percent, while GM must pay 8 percent to borrow pounds. On the other hand, GM can borrow dollars at 9 percent, while BT must pay 10 percent for its dollar borrowings. As a result, BT enjoys a comparative advantage in borrowing pounds and GM has a comparative advantage in borrowing dollars. These rate differentials raise the possibility that each firm can exploit its comparative advantage and share the gains by reducing overall borrowing costs. This possibility is shown in figures 7.5(a)–(c), which resemble figures 7.3(a)–(c).

In figure 7.5(a), BT borrows £5 million from a British lender at 7 percent, while GM borrows $10 million from a US lender at 9 percent. After these borrowings, both companies have the funds to engage in a currency swap that we have already analyzed in example 7.2. To initiate the swap, BT forwards the £5 million it has just borrowed to GM, which reciprocates with the $10 million it has borrowed. In effect, the two companies have made independent borrowings and then exchanged the proceeds.

Figure 7.5(b) shows that the swap terms are identical with these two loan terms. BT pays interest payments of 9 percent ($900,000) on the $10 million it received from GM, and GM pays interest payments at 7 percent (£350,000) on the £5 million it received from BT. Note that these rates are the same ones that the two firms must pay their lenders. Now we can clearly see how the swap benefits both parties. Had each party borrowed the other currency on its own, BT would have paid a full 10 percent and GM would have paid a full 8 percent. By using the swap, both parties achieve an effective borrowing rate that is 1 percent lower than they could have obtained by borrowing the currency that they needed directly. By engaging in the swap, both firms use the comparative advantage of the other to reduce borrowing costs. Figure 7.5(c) shows the termination of cash flows for the swap when both parties repay the principal.

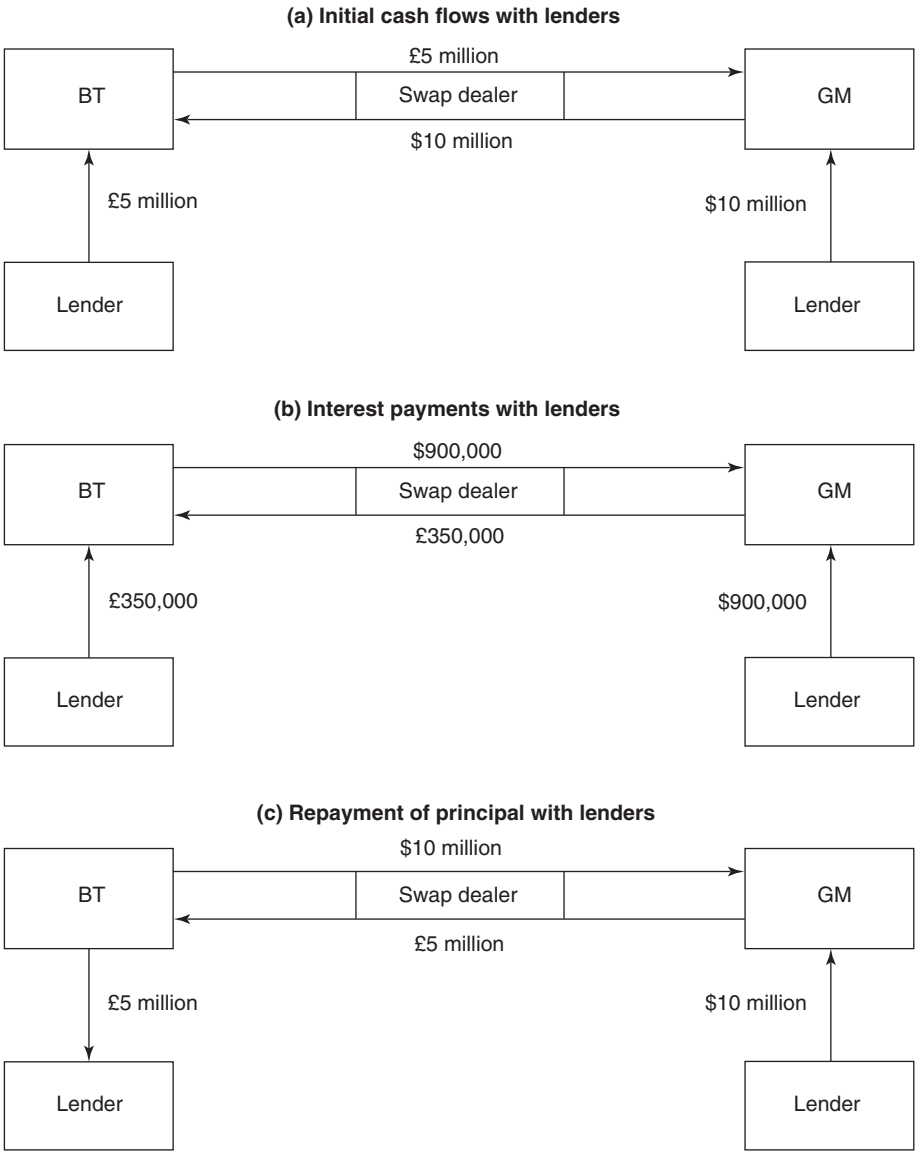

Figure 7.5 Motivation for the currency swap

Global Finance in Action 7.2

Companies Use Swaps to Save Money and Diversify their Funding Sources

The European Investment Bank (EIB) and the Tennessee Valley Authority (TVA) entered into a back-to-back swap deal that gave both cheaper funding than they could have entered through conventional bond issue. Lehman Brothers, which was the co-bookrunner for both deals, said that in addition to saving money, both organizations diversified their funding sources. Some 65 percent of the TVA bond was placed in Europe, 20 percent in Asia, and 15 percent in the USA. About half of the EIB issue was placed in the USA, 35 percent in Europe, and 15 percent in Asia

Are derivatives safe? Clearly, companies can misuse derivative instruments. However, used properly, they can be remarkably effective. Proper risk management involves a three-stage process: (1) identify where the risks lie; (2) design an appropriate strategy for managing them; and (3) select the right tools to execute the strategy. Professor Merton Miller, a Nobel Prize winner in economics, is a firm advocate of derivatives. "Contrary to the widely held perception, derivatives have made the world a safer place," Miller argues. Pointing to statistics that show that volatility is lower now than it was in many previous decades, he says, "They have made it possible for firms and institutions to deal efficiently and cost-effectively with risks and hazards that have plagued them for decades." One point he makes is that the world's banks have thrown away vastly more money in bad real estate deals than they will ever lose on intelligently managed derivatives portfolios.

Source: D. A. Ball, W. H. McCulloch, J. M. Geringer, P. L. Frantz, and M. S. Minor, *International Business*, Boston, MA: McGraw-Hill/Irwin, 2004, pp. 636–737.

SUMMARY

The swap market has emerged largely because financial swaps escape many of the limitations inherent in currency futures and options markets. First, because swaps are custom tailored to the needs of two parties, swap agreements are more likely to meet the specific needs of the counterparties than currency futures and options. Second, major financial institutions are readily identifiable on futures and options exchanges, but only the counterparties know that the swap takes place. Hence, the swap market affords a privacy that cannot be obtained in foreign-exchange trading. Finally, currency futures and options trading are subject to considerable government regulation, but the swap market has virtually no government regulation.

Nevertheless, financial swaps have limitations of their own. First, to have a swap transaction, one potential counterparty must find another counterparty that is willing to take the opposite side of the transaction. Second, a swap agreement cannot be altered without the agreement of both parties, because the swap agreement is a contract between two counterparties. Third, the exchanges effectively guarantee currency futures and options contracts for all parties, but the swap market has no such guarantor.

Questions

1 Why have currency swaps replaced parallel loans?
2 Explain both interest rate swaps and currency swaps. Which instrument has a greater credit risk: an interest rate swap or a currency swap?
3 How can a typical mortgage company use an interest rate swap to escape the interest rate risk?
4 How can multinational companies utilize a currency swap to reduce borrowing costs?
5 If you expect short-term interest rates to rise more than the yield curve should suggest, would you rather pay a fixed long-term rate and receive a floating short-term rate, or receive a fixed long-term rate and pay a floating short-term rate?
6 What is the role of the notional principal in understanding swap transactions? Why is this principal amount regarded as only notional?
7 Comment on the following statement: "If one party benefits from a swap, the other party must lose."
8 What are call swaptions and put swaptions? Compare a call swaption with an interest rate cap.
9 Describe an interest rate collar. How will it be used?
10 What are advantages of financial swaps over currency futures and options?
11 What are major limitations of financial swaps?

Problems

1 A swap agreement covers a 5-year period and involves annual interest payments on a $1 million principal amount. Party A agrees to pay a fixed rate of 12 percent to party B. In return, party B agrees to pay a floating rate of LIBOR + 3 percent to party A. The LIBOR is 10 percent at the time of the first payment. What is the difference (the net payment) between the two interest obligations?
2 Assume that the current spot rate for the Polish zloty is 2.5 zlotys per dollar ($0.40 per zloty), the US interest rate is 10 percent, and the Polish interest rate is 8 percent. Party C wishes to exchange 25 million zlotys for dollars. In return for these zlotys, party D would pay $10 million to party C at the initiation of the swap. The term of the swap is 5 years and the two firms will make annual interest payments. The spot rate for the zloty changes to 2.2222 zlotys per dollar or $0.45 per zloty at year 1. What is the net payment for year 1?
3 A mortgage company (party E) has just lent $1 million for 5 years at 12 percent with annual payments, and it pays a deposit rate that equals LIBOR + 1 percent. With these rates, the company would lose money if the LIBOR exceeds 11 percent. This vulnerabil-

ity prompts the mortgage company to enter an interest rate swap with party F. This swap agreement covers a 5-year period and involves annual interest payments on a $1 million principal amount. Party E agrees to pay a fixed rate of 12 percent to Party F. In return, party F agrees to pay a floating rate of LIBOR + 3 percent to party E. Determine an annual net cash flow available for the mortgage company.

4 The current spot rate for the Polish zloty is 2.5 zlotys per dollar or $0.40 per zloty. Party G has access to zlotys at a rate of 7 percent, while party H must pay 8 percent to borrow zlotys. On the other hand, party H can borrow dollars at 9 percent, while party G must pay 10 percent for its dollar borrowings. Party G wishes to obtain $10 million in exchange for 25 million zlotys, while party H wants to obtain 25 million zlotys in exchange for $10 million. How can these two parties achieve a lower borrowing rate?

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Case Problem 7: Regulations of Derivatives Markets

Financial derivatives – forwards, futures, options, and swaps – are contracts whose values are linked to or derived from values of underlying assets, such as securities, commodities, and currencies. There are two types of markets for financial derivatives: organized exchanges and over-the-counter (OTC) markets. Organized exchanges such as the Chicago Mercantile Exchange are regulated by governments, while OTC markets such as banks are unregulated. Derivatives are used by corporations, banks, and investors to reduce a variety of risks, such as exposure to currency movements (hedging), or to make leveraged bets on the market direction of these instruments (speculation).

Derivatives markets have shown extraordinary growth over the past few years. For example, the size of the global OTC derivatives markets increased from $21 trillion of contracts in 1992 to $130 trillion of contracts in 2002 (see figure 7.6); the amount of outstanding exchange-traded derivatives exceeded $20 trillion in 2002. In addition, recent years have witnessed numerous accounts of derivative-related losses on the part of established and reputable firms. Large losses associated with the use of derivatives include the US oil subsidiary of Metallgesellschaft ($1 billion), Daiwa Bank of Japan ($1 billion), Kashima Oil of Japan ($1.5 billion), Showa Shell of Japan ($1.5 billion), Sumitomo Corp. of Japan ($1.8 billion), Orange County, California ($1.7 billion), Barings of the UK ($1.3 billion), Long-Term Capital Management of the USA ($3 billion), and Allied Irish Bank of the USA/UK ($691 million). All these derivative-related losses have occurred since 1994. The recent rapid growth of derivatives markets and large derivative-related losses have triggered concern and even alarm over the dangers posed by the widespread use of derivatives.

On February 27, 1995, speculative trading by a 28-year-old trader contributed to bringing down Barings PLC, the oldest merchant bank in the UK. In the days that followed, investigators found that the bank's total losses from 1992 to 1995 exceeded $1 billion, a sum larger than its entire $860 million in equity capital. Barings had hired the British trader Nicholas Leeson from Bankers Trust in 1992 to build global fixed-income securities in Singapore. The cause of these losses was a breakdown in Barings' risk management system that allowed Leeson to accumulate and conceal an unhedged $27 billion position in various exchange-traded futures and options contracts.

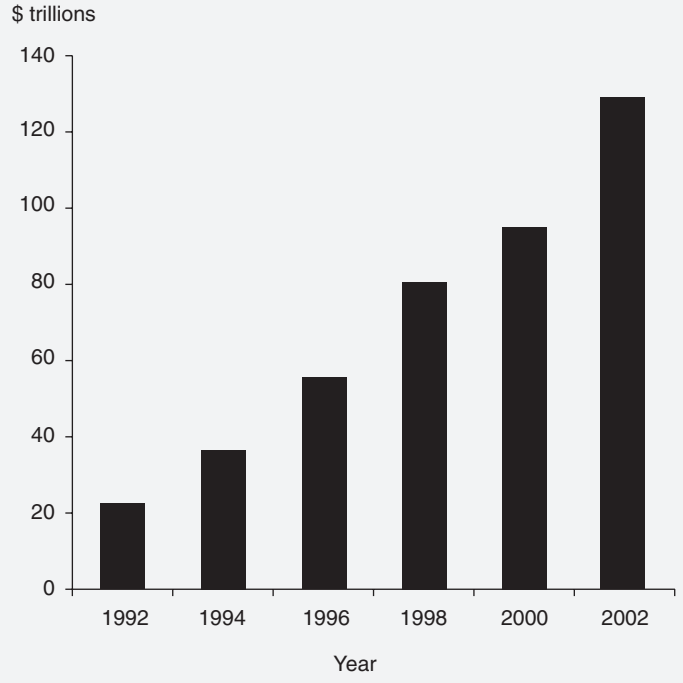

Figure 7.6 The size of the over-the-counter derivatives market
Source: Authors' graphic based on data from several issues of *The Wall Street Journal*.

What lessons do these losses and growth hold for policy-makers? Do they indicate the need for more strict government supervision of derivatives markets or for new laws and regulations to limit the use of these instruments? Apparently, US regulatory authorities think that derivatives pose inherent dangers. In the first half of 1997, Congress had introduced some half-dozen bills designed to ban or limit derivatives. In January 1997, the Securities and Exchange Commission (SEC) adopted a regulation requiring companies to present estimates of losses they could suffer from financial instruments. The Financial Accounting Standard Board (FASB) adopted its Statement 133, *Accounting for Derivative Instruments and Hedging Activities*, in 1998. FASB 133 requires companies to report the fair market value of their derivatives on their balance sheets and to include some derivatives gains or losses on their income statements. The legal status of derivatives was further cast into doubt in 1998, when the Commodity Futures Trading Commission (CFTC) suggested that it had the right to regulate trading in these instruments under the Commodity Futures Trading Commission Act of 1974. Especially big targets of these reforms are privately negotiated contracts through OTC markets.

Since 1997, several hundred letters from big companies, accountants, and even Federal Reserve Chairman Alan Greenspan have laid out the potential damage of these derivatives regulations. In February 2000, a White House panel on OTC derivatives urged Congress to exempt the $80 trillion derivatives market from government regulation. Nevertheless, standard-setters around the world – the USA, the UK, Canada, other industrial countries, and the International Accounting Standards Committee – have recently proposed and/or issued their standards to increase disclosure of off-balance-sheet derivatives transactions.

Case Questions

1 What are the major classes of risk in derivatives trading?
2 What is the potential damage of government derivative rules on derivatives users?
3 Had there been any warning signs that should have alerted the management of Barings to problems with its Singapore futures subsidiary?
4 What lessons for the management of financial institutions to be learned from the failure of Barings?
5 The website of the Securities and Exchange Commission (SEC), www.sec.gov, and the website of the Financial Accounting Standards Board (FASB), www.fasb.org, describe standard practices for financial reporting by companies in the USA. Access the above websites to learn proposed accounting standards and the status regarding reactions to these proposed standards.

Sources: R. Kolb, *Futures, Options, and Swaps*, 3rd edn, Malden, MA: Blackwell, 2000, pp. 779–83; S. McGee and E. MacDonald, "Pre-emptive Strike by Derivatives Players," *The Wall Street Journal*, Feb. 21, 1997, pp. C1, C13; A. Kuprianov, "Derivatives Debacles: Case Studies of Large Losses in Derivatives Markets," *Economic Quarterly*, Federal Reserve Bank of Richmond, Fall 1995, pp. 1–39.