In recent years, various derivative instruments have been created to manage or capitalize on exchange rate movements. These so-called foreign exchange derivatives (or “forex” derivatives) include forward contracts, currency futures contracts, currency swaps, and currency options. Foreign exchange derivatives account for about half of the daily foreign exchange transaction volume.

The potential benefits from using foreign exchange derivatives are dependent on the expected exchange rate movements. Thus, it is necessary to understand why exchange rates change over time before exploring the use of foreign exchange derivatives.

**FOREIGN EXCHANGE MARKETS**

As international trade and investing have increased over time, so has the need to exchange currencies. Foreign exchange markets consist of a global telecommunications network among the large commercial banks that serve as financial intermediaries for such exchange. These banks are located in New York, Tokyo, Hong Kong, Singapore, Frankfurt, Zurich, and London. Foreign exchange transactions at these banks have been increasing over time.

At any given time, the price at which banks will buy a currency (bid price) is slightly lower than the price at which they will sell it (ask price). Like markets for other commodities and securities, the market for foreign currencies is more efficient because of financial intermediaries (commercial banks). Otherwise, individual buyers and sellers of currency would be unable to identify counterparties to accommodate their needs.

**Institutional Use of Foreign Exchange Markets**

Exhibit 16.1 summarizes how financial institutions utilize the foreign exchange markets and foreign exchange derivatives. The degree of international investment by financial institutions is influenced by potential return, risk, and government regulations. Commercial banks use international lending as their primary form of international investing. Mutual funds, pension funds, and insurance companies purchase foreign securities. In recent years, technology has reduced information costs and other transaction costs associated with purchasing foreign securities, prompting an increase in institutional purchases of foreign securities. Consequently, financial institutions are increasing their use of the foreign exchange markets to exchange currencies. They are also increasing their use of foreign exchange derivatives to hedge their investments in foreign securities.
Exchange Rate Quotations

The **direct exchange rate** specifies the value of a currency in U.S. dollars. For example, the Mexican peso may have a value such as $0.10 while the British pound is valued at $2.00. The **indirect exchange rate** specifies the number of units of a currency equal to a U.S. dollar. For the example values given here, the indirect exchange rates are 10 pesos per dollar and 0.50 pounds per dollar. The indirect exchange rate is the reciprocal of the direct exchange rate.

**Forward Rate**

For widely used currencies, **forward rates** are available and are commonly quoted next to the respective spot rates. The forward rates indicate the rate at which a currency can be exchanged in the future. If the forward rate is above the spot rate, it contains a premium. If the forward rate is below the spot rate, it contains a negative premium (also called a discount).

**Cross-Exchange Rates**

Most exchange rate quotation tables express currencies relative to the dollar. In some instances, however, the exchange rate between two nondollar currencies is needed.

**EXAMPLE**

If a Canadian firm needs Mexican pesos to buy Mexican goods, it is concerned about the value of the Mexican peso relative to the Canadian dollar. This type of rate is known as a cross-exchange rate because it reflects the amount of one foreign currency per unit of another foreign currency. Cross-exchange rates can be easily determined with the use of foreign exchange quotations. The general formula follows:

\[
\text{Value of 1 unit of Currency A in units of Currency B} = \frac{\text{Value of Currency A in $}}{\text{Value of Currency B in $}}
\]
If the peso is worth $0.07 and the Canadian dollar (C$) is worth $0.70, the value of the peso in Canadian dollars is calculated as follows:

\[
\text{Value of peso in C$} = \frac{\text{Value of peso in $}}{\text{Value of C$ in $}} = \frac{0.07}{0.70} = 0.10
\]

Thus, a Mexican peso is worth C$0.10. The exchange rate can also be expressed as the number of pesos equal to one Canadian dollar. This figure can be computed by taking the reciprocal: \(0.70/0.07 = 10\), which indicates that a Canadian dollar is worth 10 pesos according to the information provided.

**Types of Exchange Rate Systems**

From 1944 to 1971, the exchange rate at which one currency could be exchanged for another was maintained by governments within 1 percent of a specified rate. This period was known as the **Bretton Woods era** because the agreement establishing the system was negotiated at the Bretton Woods Conference in Bretton Woods, New Hampshire. The manner by which governments were able to control exchange rates is discussed later in the chapter.

By 1971, the U.S. dollar was clearly overvalued. That is, its value was maintained only by central bank intervention. In 1971, an agreement among all major countries (known as the **Smithsonian Agreement**) allowed for devaluation of the dollar. In addition, the Smithsonian Agreement called for a widening of the boundaries from 1 percent to \(2\frac{1}{2}\) percent around each currency’s set value. Governments intervened in the foreign exchange markets whenever exchange rates threatened to wander outside the boundaries.

In 1973, the boundaries were eliminated. Since then, the exchange rates of major currencies have been floating without any government-imposed boundaries. A government may still intervene in the foreign exchange markets to influence the market value of its currency, however. A system with no boundaries and in which exchange rates are market determined but still subject to government intervention is called a **dirty float**. This is to be distinguished from a **freely floating system**, in which the foreign exchange market is totally free from government intervention. Most countries allow their local currency to float but periodically intervene in the foreign exchange market to influence the value of that currency, as will be explained shortly.

**Pegged Exchange Rate System** Some countries today use a pegged exchange rate system. For example, Hong Kong has tied the value of its currency (the Hong Kong dollar) to the U.S. dollar (HK$78 = $1) since 1983. Thus, its currency’s value is fixed relative to the U.S. dollar, which means that its value moves in tandem with the U.S. dollar against other currencies, including other Asian currencies. Thus, if the Japanese yen depreciates against the U.S. dollar, it will also depreciate against the Hong Kong dollar.

A country that pegs its currency cannot control its local interest rate because its interest rate must be aligned with the interest rate of the currency to which its currency is tied. If Hong Kong lowered its interest rates to stimulate its economy, investors based in Hong Kong would then be enticed to exchange Hong Kong dollars for U.S. dollars and invest in the United States, where interest rates are higher. Since the Hong Kong dollar is tied to the U.S. dollar, the investors would be able to exchange their investment proceeds back to Hong Kong dollars at the end of the investment period without concern for exchange rate risk, which does not exist because the exchange rate is fixed. Therefore, Hong Kong does not attempt to control its own interest rate, which is typically equal to the U.S. interest rate plus a slight premium for risk. As the U.S. interest rate changes, so does Hong Kong’s interest rate by about the same degree and in the same direction.

The government of Venezuela has historically pegged its currency (the bolivar) to the dollar, although there have been periodic devaluations. The most recent devaluation was on January 9, 2010, when Venezuela devalued the bolivar by 50 percent to 1 bolivar = $0.232.
The new pegged exchange rate reduced the value of the bolivar by 50 percent not only against the dollar but also against all other currencies. For any nondollar currencies that appreciate against the dollar, they appreciate against the bolivar to the same extent.

Because the devaluation of the bolivar makes foreign products expensive for consumers in Venezuela, it encourages more consumption of locally produced products at the expense of foreign products. Furthermore, since the devaluation cut the bolivar’s value in half, it increases foreign demand for Venezuela’s products. Thus the devaluation is intended to improve Venezuela’s economy and reduce its unemployment. However, one possible adverse effect of the devaluation is that the new exchange rate could eliminate foreign competition as foreign products become too expensive. This would allow local producers in Venezuela to increase their prices without much concern about losing customers to foreign firms, which could lead to higher inflation in Venezuela.

China’s currency (the yuan) was pegged to the U.S. dollar until 2005. Many U.S. politicians argued that China was maintaining its currency at a level that was too low, which caused an annual U.S. balance of trade deficit of about $200 billion with that country. In July 2005, China implemented a new system that allowed the yuan to float within narrow boundaries based on a set of major currencies. Yet this had only a limited effect on the relative pricing of Chinese and U.S. products, and the balance of trade between the two countries remained large.

**Eurozone Arrangement**

In January 1999, the euro replaced the national currencies of eleven European countries; since then, five more countries have converted their home currency to the euro. The countries that now use the euro as their home currency are: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, and Spain. The countries that participate in the euro make up a region that is referred to as the eurozone. Since all of these countries use the same currency, transactions between them do not require any exchange of currencies. Together, the participating countries produce more than 20 percent of the world’s gross domestic product, which exceeds the total production of the United States. In Europe, the countries of Denmark, Norway, Sweden, Switzerland, and the United Kingdom continue to use their own home currency.

The ten countries in Eastern Europe that joined the European Union in 2004 are eligible to participate in the euro if they meet specific economic goals, including a maximum limit on their budget deficit. Some of these countries peg their currency’s value to the euro, which allows them to assess how their economy is affected while that value moves in tandem with the euro against other currencies. Under this arrangement, they still have the flexibility to adjust their exchange rate system. If these countries ultimately adopt the euro as their currency, it will be more difficult for them to reverse such decisions.

**Eurozone Monetary Policy** The European Central Bank (ECB) is responsible for setting monetary policy for all countries in the eurozone. The bank’s objective is to maintain price stability (control inflation) in these countries, as it believes that price stability is necessary to achieve economic growth. Since the interest rate on the euro is based on the eurozone monetary policy, all participating countries have the same risk-free interest rate. Thus, eurozone monetary policy simultaneously affects the interest rate in all countries that have adopted the euro as their currency. Although a single monetary policy may allow for more consistent economic conditions across countries, it prevents any individual country from solving local economic problems via its own, unique monetary policy. However, the member countries can still apply their own fiscal policies (i.e., decisions on taxing and government expenditures).
FACTORS AFFECTING EXCHANGE RATES

As the value of a currency adjusts to changes in demand and supply conditions, it moves toward an equilibrium. In equilibrium, there is no excess or deficiency of that currency.

A large increase in the U.S. demand for European goods and securities will result in an increased demand for euros. Because the demand for euros will then exceed the supply of euros for sale, the foreign exchange dealers (commercial banks) will experience a shortage of euros and will respond by increasing the quoted price of euros. Hence the euro will appreciate, or increase in value.

Conversely, if European corporations begin to purchase more U.S. goods and European investors purchase more U.S. securities, the opposite forces will occur. There will be an increased sale of euros in exchange for dollars, causing a surplus of euros in the market. The value of the euro will therefore decline until it once again achieves equilibrium.

In reality, both the demand for euros and the supply of euros for sale can change simultaneously. The adjustment in the exchange rate will depend on the direction and magnitude of these changes.

A currency’s supply and demand are influenced by a variety of factors, including (1) differential inflation rates, (2) differential interest rates, and (3) government (central bank) intervention. These factors will be discussed next.

Differential Inflation Rates

Begin with an equilibrium situation and consider what will happen to the U.S. demand for euros, and to the supply of euros for sale, if U.S. inflation suddenly becomes much higher than European inflation. The U.S. demand for European goods will increase, reflecting an increased U.S. demand for euros. In addition, the supply of euros to be sold for dollars will decline as the European desire for U.S. goods decreases. Both forces will place upward pressure on the value of the euro.

Under the reverse situation, where European inflation suddenly becomes much higher than U.S. inflation, the U.S. demand for euros will decrease while the supply of euros for sale increases, placing downward pressure on the value of the euro.

A well-known theory about the relationship between inflation and exchange rates, purchasing power parity (PPP), suggests that the exchange rate will, on average, change by a percentage that reflects the inflation differential between the two countries of concern.

Assume an initial equilibrium situation where the British pound’s spot rate is $1.60, U.S. inflation is 3 percent, and British inflation is also 3 percent. If U.S. inflation suddenly increases to 5 percent then, according to PPP, the British pound will appreciate against the dollar by approximately 2 percent. The rationale is that, as a result of the higher U.S. prices, U.S. demand for British goods will increase and thereby place upward pressure on the pound’s value. Once the pound appreciates by 2 percent, the purchasing power of U.S. consumers will be the same whether they purchase U.S. goods or British goods. Although the prices of the U.S. goods will have risen by a higher percentage, the British goods will then be just as expensive to U.S. consumers because of the pound’s appreciation. Thus, a new equilibrium exchange rate results from the change in U.S. inflation.

In reality, exchange rates do not always change as suggested by the PPP theory. Other factors that influence exchange rates (discussed next) can distort the PPP relationship. Thus, all these factors must be considered when assessing why an exchange rate has changed. Furthermore, forecasts of future exchange rates must account for the potential direction and magnitude of changes in all factors that affect exchange rates.

Differential Interest Rates

Interest rate movements affect exchange rates by influencing the capital flows between countries. An increase in interest rates may attract foreign investors, especially if the higher interest rates do not reflect an increase in inflationary expectations.
EXAMPLE

Assume U.S. interest rates suddenly become much higher than European interest rates. The demand by U.S. investors for European interest-bearing securities decreases as these securities become less attractive. In addition, the supply of euros to be sold in exchange for dollars expands as European investors increase their purchases of U.S. interest-bearing securities. Both forces put downward pressure on the euro’s value.

Conversely, opposite forces play out in the case of higher European than U.S. interest rates, resulting in upward pressure on the euro’s value. In general, the currency of the country with a higher increase (or smaller decrease) in interest rates is expected to appreciate, other factors held constant.

Central Bank Intervention

Central banks commonly consider adjusting a currency’s value to influence economic conditions. For example, the U.S. central bank may wish to weaken the dollar to increase demand for U.S. exports, which can stimulate the economy. However, a weaker dollar can also cause U.S. inflation by reducing foreign competition (because it raises the price of foreign goods to U.S. consumers). Alternatively, the U.S. central bank may prefer to strengthen the dollar to intensify foreign competition, which can reduce U.S. inflation.

Direct Intervention

A country’s government can intervene in the foreign exchange market to affect a currency’s value. Direct intervention occurs when a country’s central bank (such as the Federal Reserve Bank for the United States or the European Central Bank for the eurozone countries) sells some of its currency reserves for a different currency.

EXAMPLE

Assume that the Federal Reserve and the European Central Bank desire to strengthen the value of the euro against the dollar. They use dollar reserves to purchase euros in the foreign exchange market. In essence, they dump dollars in the foreign exchange market and thereby increase the demand for euros.

However, central bank intervention can be overwhelmed by market forces and so may not always succeed in reversing exchange rate movements. In fact, the efforts of the Fed and the ECB to boost the value of the euro in 2000 were not successful. Nevertheless, central bank intervention may significantly affect the foreign exchange markets in two ways. First, it may slow the momentum of adverse exchange rate movements. Second, commercial banks and other corporations may reassess their foreign exchange strategies if they believe the central banks will continue to intervene.

Indirect Intervention

The Fed can affect the dollar’s value indirectly by influencing the factors that determine its value. For example, the Fed can attempt to lower interest rates by increasing the U.S. money supply (assuming that inflationary expectations are not affected). Lower U.S. interest rates tend to discourage foreign investors from investing in U.S. securities, thereby putting downward pressure on the value of the dollar. Or, to boost the dollar’s value, the Fed can attempt to increase interest rates by reducing the U.S. money supply. Indirect intervention can be an effective means of influencing a currency’s value.

When countries experience substantial net outflows of funds (which put severe downward pressure on their currency), they commonly use indirect intervention by raising interest rates to discourage excessive outflows and thus limit the downward pressure on their currency’s value. However, this action adversely affects local borrowers (government agencies, corporations, and consumers) and may weaken the economy.

Indirect Intervention during the Peso Crisis

In 1994, Mexico experienced a large balance of trade deficit, perhaps because the peso was stronger than it should have been, which encouraged Mexican firms and consumers to buy an excessive amount of imports. By December 1994, there was substantial downward pressure on the peso. On December 20, 1994, Mexico’s central bank devalued the peso by about 13 percent.
Mexico’s stock prices plummeted, as many foreign investors sold their shares and withdrew their funds from Mexico in anticipation of further devaluation in the peso. On December 22, the central bank allowed the peso to float freely; it declined by another 15 percent. This was the beginning of the so-called Mexican peso crisis. The central bank increased interest rates as a form of indirect intervention to discourage foreign investors from withdrawing their investments in Mexico’s debt securities. The higher interest rates increased the cost of borrowing for Mexican firms and consumers, thereby slowing economic growth.

**Indirect Intervention during the Asian Crisis** In the fall of 1997, many Asian countries experienced weak economies and their banks suffered from substantial defaults on loans. Concerned about their investments, investors began to withdraw their funds. Some countries (e.g., Thailand and Malaysia) increased their interest rates as a form of indirect intervention aimed at encouraging investors to leave their funds in Asia. However, the higher interest rates increased the cost to firms that had borrowed funds there, making it more difficult for them to repay their loans. In addition, the high interest rates discouraged new borrowing by firms and weakened the region’s economies.

During the Asian crisis, investors also withdrew funds from Brazil and reinvested them in other countries, causing major capital outflows and putting extreme downward pressure on Brazil’s currency (the real). At the end of October, the central bank of Brazil responded by doubling its interest rates from about 20 percent to about 40 percent. This action discouraged investors from pulling funds out of Brazil because they could now earn twice the interest from investing in some securities there. Although the bank’s action was successful in defending the real, it reduced economic growth because the cost of borrowing funds was too high for many firms.

**Indirect Intervention during the Russian Crisis** A similar situation occurred in Russia in May 1998. Over the previous four months, the Russian currency (the ruble) had consistently declined and stock market prices had declined by more than 50 percent. Since the lack of confidence in Russia’s currency and stocks could cause massive outflows of funds, the Russian central bank attempted to minimize such outflows by tripling interest rates (from about 50 percent to 150 percent). The ruble was temporarily stabilized, but stock prices continued to decline because investors were concerned that the high interest rates would reduce economic growth.

**Indirect Intervention during the Greek Crisis** Greece is one of the European countries that uses the euro as its local currency. In the spring of 2010, it experienced weak economic conditions and a large increase in its government budget deficit. Its debt rating was lowered substantially by debt rating agencies to the point where it was paying about 11 percent on its debt, versus 4 percent for other countries in the eurozone. As the government of Greece attempted to cut its spending to correct the budget deficit, the economy weakened. There were even rumors that Greece would abandon the euro as its currency, which could have caused still more uncertainty about the euro and about the future of eurozone country economies. Thus the Greek crisis led to concerns about the eurozone and encouraged speculators to dump euros in favor of dollars or other currencies. In spring 2010, the euro declined by 20 percent.

The ECB responded with a stimulative monetary policy that was intended to keep interest rates low. Although the ECB might well have preferred a more restrictive monetary policy in order to keep inflation low, its policy evidently considered the potential weakening of the eurozone economy due to the Greek crisis. An important lesson from the crisis is how the conditions in one eurozone country can affect every country that uses the same currency.
FORECASTING EXCHANGE RATES

Market participants who use foreign exchange derivatives tend to take positions based on their expectations of future exchange rates. For example, multinational corporations take positions in foreign exchange derivatives to hedge their future cash flows denominated in foreign currencies, especially when they expect that they will be adversely affected by that exposure. Portfolio managers of financial institutions may take positions in foreign exchange derivatives to hedge their exposure if they anticipate a decline in the value of the currency denoting their stocks. Speculators may take positions in foreign exchange derivatives to benefit from the expectation that specific currencies will strengthen. Thus, the initial task is to develop a forecast of specific exchange rates. There are various techniques for forecasting, but no specific technique stands out because most have had limited success in forecasting future exchange rates. Most forecasting techniques can be classified as one of the following types:

- Technical forecasting
- Fundamental forecasting
- Market-based forecasting
- Mixed forecasting

Technical Forecasting

Technical forecasting involves the use of historical exchange rate data to predict future values. For example, the fact that a given currency has increased in value over four consecutive days may provide an indication of how the currency will move tomorrow. Sometimes a more complex statistical analysis is applied. For example, a computer program can be developed to detect particular historical trends.

There are also several time-series models that examine moving averages and thus allow a forecaster to identify patterns, such as currency tending to decline in value after a rise in moving average over three consecutive periods. Normally, consultants who use such a method will not disclose their particular rule for forecasting. If they did, potential clients might apply the rules themselves rather than pay for the consultant’s advice.

Technical forecasting of exchange rates is similar to technical forecasting of stock prices. If the pattern of currency values over time appears to be random, then technical forecasting is not appropriate. Unless historical trends in exchange rate movements can be identified, examination of past movements will not be useful for indicating future movements.

Fundamental Forecasting

Fundamental forecasting is based on fundamental relationships between economic variables and exchange rates. Given current values of these variables along with their historical impact on a currency’s value, corporations can develop exchange rate projections. For example, high inflation in a given country can lead to depreciation in its currency. Of course, all other factors that may influence exchange rates should also be considered.

A forecast may arise simply from a subjective assessment of the degree to which general movements in economic variables in one country are expected to affect exchange rates. From a statistical perspective, a forecast would be based on quantitatively measured impacts of factors on exchange rates.

Market-Based Forecasting

Market-based forecasting, or the process of developing forecasts from market indicators, is usually based on either the spot rate or the forward rate.
**Use of the Spot Rate**  To clarify why the spot rate can serve as a market-based forecast, assume the British pound is expected to appreciate against the dollar in the very near future. This will encourage speculators to buy the pound with U.S. dollars today in anticipation of its appreciation, and these purchases could immediately force the pound’s value upward. Conversely, if the pound is expected to depreciate against the dollar, speculators will sell off pounds now and hope to purchase them back at a lower price after they decline in value. Such action could force the pound to depreciate immediately. Thus, the current value of the pound should reflect the expectation of that currency’s value in the very near future. In other words, corporations can use the spot rate to forecast because it represents the market’s expectation of the spot rate in the near future.

**Use of the Forward Rate**  The forward rate can also serve as a forecast of the future spot rate. The reason is that speculators would take positions if there were a large discrepancy between the forward rate and expectations of the future spot rate. The 30-day forward rate of the British pound is $1.40, and the general expectation of speculators is that the future spot rate of the pound will be $1.45 in 30 days. Since speculators expect the future spot rate to be $1.45 and since the prevailing forward rate is $1.40, they might buy pounds 30 days forward at $1.40 and then sell them when received (in 30 days) at the spot rate existing then. If their forecast is correct, they will earn $0.05 ($1.45 − $1.40) per pound. If a large number of speculators implement this strategy, the substantial forward purchases of pounds will cause the forward rate to increase until this speculative demand stops. Perhaps this speculative demand will terminate when the forward rate reaches $1.45, since at this rate no profits could be expected from implementing the strategy. Thus, the forward rate should move toward the market’s general expectation of the future spot rate. In this sense, the forward rate serves as a market-based forecast because it reflects the market’s expectation of the spot rate at the end of the forward horizon (in this example, 30 days from now).

**Mixed Forecasting**  Because no single forecasting technique has been found to be consistently superior to the others, some multinational corporations (MNCs) use a combination of forecasting techniques. This method is referred to as **mixed forecasting**. Various forecasts for a particular currency value are developed using several forecasting techniques. Each of the techniques used is assigned a weight, and the techniques believed to be more reliable are assigned higher weights. Thus the MNC’s forecast of the currency will be a weighted average of the various forecasts developed.

**Foreign Exchange Derivatives**  Foreign exchange derivatives can be used to speculate on future exchange rate movements or to hedge anticipated cash inflows or outflows in a given foreign currency. As foreign securities markets have become more accessible, institutional investors have increased their international investments, which in turn has increased their exposure to exchange rate risk. Some institutional investors use foreign exchange derivatives to hedge their exposure. The most popular foreign exchange derivatives are forward contracts, currency futures contracts, currency swaps, and currency options contracts.

**Forward Contracts**  Forward contracts are contracts, typically negotiated with a commercial bank, that allow the purchase or sale of a specified amount of a particular foreign currency at a specified exchange rate (the forward rate) on a specified future date. A **forward market** facilitates
the trading of forward contracts. This market is not in one physical place; it is a telecommunication network through which large commercial banks match participants who wish to buy a currency forward with other participants who wish to sell a currency forward.

Many of the commercial banks that offer foreign exchange on a spot basis also offer forward transactions for widely traded currencies. By enabling a firm to lock in the price to be paid for a foreign currency, forward purchases or sales can hedge the firm’s risk that the currency’s value may change over time.

**EXAMPLE**

St. Louis Insurance Company plans to invest about $20 million in Mexican stocks two months from now. Because the Mexican stocks are denominated in pesos, the amount of stock that can be purchased depends on the peso’s value at the time of the purchase. If St. Louis Insurance Company is concerned that the peso will appreciate by the time of the purchase, it can buy pesos forward to lock in the exchange rate.

A corporation receiving payments denominated in a particular foreign currency in the future can lock in the price at which the currency can be sold by selling that currency forward.

**EXAMPLE**

The pension fund manager of Gonzaga, Inc., plans to liquidate the fund’s holdings of British stocks in six months but anticipates that the British pound will depreciate by that time. The pension fund manager can insulate the future transaction from exchange rate risk by negotiating a forward contract to sell British pounds six months forward. In this way, the British pounds received when the stocks are liquidated can be converted to dollars at the exchange rate specified in the forward contract.

Some commercial banks accommodate requests by firms to buy or sell currencies forward. If a bank’s forward purchase and sale contracts do not even out for a given date, the bank is exposed to exchange rate risk.

**EXAMPLE**

Nebraska Bank has contracts committed to selling C$100 million and purchasing C$150 million 90 days from now. It will receive C$50 million more than it sells. An increase in the Canadian dollar’s value 90 days from now will be advantageous, but if the Canadian dollar depreciates then the bank will be adversely affected by its exposure to the exchange rate risk.

**Estimating the Forward Premium**  The forward rate of a currency will sometimes exceed the existing spot rate, thereby exhibiting a premium. At other times, it will be below the spot rate, exhibiting a discount. Forward contracts are sometimes referred to in terms of their percentage premium or discount rather than their actual rate. For example, assume that the spot rate (S) of the Canadian dollar is $0.70 while the 180-day (n = 180) forward rate (FR) is $0.71. The forward rate premium (p) would be

\[
p = \frac{FR - S}{S} \times \frac{360}{n} = \frac{$0.71 - $0.70}{S} \times \frac{360}{180} = \frac{0.01}{S} \times 2 = 2.86\%
\]

This premium simply reflects the percentage by which the forward rate exceeds the spot rate on an annualized basis.

**Currency Futures Contracts**

An alternative to the forward contract is a currency futures contract, which is a standardized contract that specifies an amount of a particular currency to be exchanged on a specified date and at a specified exchange rate. A firm can purchase a futures contract to hedge payables in a foreign currency by locking in the price at which it could purchase that specific currency at a particular point in time. To hedge receivables denominated in a foreign currency...
currency, it could sell futures and thereby lock in the price at which it could sell that currency. A futures contract represents a standard number of units. Currency futures contracts also have specific maturity (or "settlement") dates from which the firm must choose. Futures contracts are standardized, whereas forward contracts can specify whatever amount and maturity date the firm desires. Forward contracts have this flexibility because they are negotiated with commercial banks rather than on a trading floor.

**Currency Swaps**

A currency swap is an agreement that allows one currency to be periodically swapped for another at specified exchange rates. It essentially represents a series of forward contracts. Commercial banks facilitate currency swaps by serving as the intermediary that links two parties with opposite needs. Alternatively, commercial banks may be willing to take the position counter to that desired by a particular party. In such a case, they expose themselves to exchange rate risk unless the position they have assumed will offset existing exposure.

**Currency Options Contracts**

Another foreign exchange derivative used for hedging is the currency option. Its primary advantage over forward and futures contracts is in stipulating that the parties have the right but not the obligation to purchase or sell a particular currency at a specified price within a given period.

A currency call option provides the right to purchase a particular currency at a specified price (called the exercise price) within a specified period. This type of option can be used to hedge future cash payments denominated in a foreign currency. If the spot rate remains below the exercise price, the option will not be exercised because the firm could purchase the foreign currency at a lower cost in the spot market. However, a fee (or a premium) must be paid for options, so there is a cost to hedging with options even if the options are not exercised.

A put option provides the right to sell a particular currency at a specified price (the exercise price) within a specified period. If the spot rate remains above that price, the option will not be exercised because the firm could sell the foreign currency at a higher price in

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**Currency Futures**

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<th>Japanese Yen (CME)</th>
<th>USD 125,000,000, $ per 100Y</th>
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<td>.8150</td>
<td>0</td>
<td>124,757</td>
</tr>
</tbody>
</table>

**WEB**

[Click on “FX” to find quotes on currency options contracts.](http://www.cmegroup.com)
Use of Foreign Exchange Derivatives for Hedging

When deciding whether to use forward, futures, or options contracts for hedging, a firm should consider the following characteristics of each contract. First, if the firm requires a tailor-made hedge that cannot be matched by existing futures contracts, a forward contract may be preferred. Otherwise, forward and futures contracts should generate somewhat similar results.

The choice between an obligation type of contract (forward or futures) or an options contract depends on the expected trend of the spot rate. If the currency in which payables are denominated appreciates, the firm will benefit more from a futures or forward contract than from a call option contract. The call option contract requires an up-front fee, but it is a wiser choice when the firm is less certain of a currency's future direction. The call option allows the firm to hedge against possible appreciation and also to ignore the contract, and use the spot market instead, if the currency depreciates. Similarly, put options may be preferred over futures or forward contracts for hedging receivables when future currency movements are especially uncertain, because the firm has the flexibility of letting the options expire if the currencies strengthen.

Use of Foreign Exchange Derivatives for Speculating

The forward, currency futures, and currency options markets may be used for speculating as well as for hedging. A speculator who expects the Singapore dollar to appreciate could consider any of the following strategies.

1. Purchase Singapore dollars forward; when they are received, sell them in the spot market.
2. Purchase futures contracts on Singapore dollars; when the Singapore dollars are received, sell them in the spot market.
3. Purchase call options on Singapore dollars; at some point before the expiration date, when the spot rate exceeds the exercise price, exercise the call option and then sell the Singapore dollars received in the spot market.

Conversely, a speculator who expects the Singapore dollar to depreciate could consider any of these strategies.

1. Sell Singapore dollars forward, and then purchase them in the spot market just before fulfilling the forward obligation.
2. Sell futures contracts on Singapore dollars; purchase Singapore dollars in the spot market just before fulfilling the futures obligation.
3. Purchase put options on Singapore dollars; at some point before the expiration date, when the spot rate is less than the exercise price, purchase Singapore dollars in the spot market and then exercise the put option.

Speculating with Currency Futures

As an example of speculating with currency futures, consider the following information.

- Spot rate of the British pound is $1.56 per pound.
- Price of a futures contract is $1.57 per pound.
- Expectation of the pound’s spot rate on the settlement date of the futures contract is $1.63 per pound.

Given that the future spot rate is expected to be higher than the futures price, you could buy currency futures. You would receive pounds on the settlement date for $1.57. If your expectations are correct, you would then sell the pounds for $0.06 more per unit.
than you paid for them. The risk of your speculative strategy is that the pound may decline rather than increase in value. If it declines to $1.55 by the settlement date, you would have sold the pounds for $0.02 less per unit than you paid.

To account for uncertainty, speculators may develop a probability distribution for the future spot rate as follows.

<table>
<thead>
<tr>
<th>FUTURE SPOT RATE OF BRITISH POUND</th>
<th>PROBABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.50</td>
<td>10%</td>
</tr>
<tr>
<td>1.59</td>
<td>20</td>
</tr>
<tr>
<td>1.63</td>
<td>50</td>
</tr>
<tr>
<td>1.66</td>
<td>20</td>
</tr>
</tbody>
</table>

This probability distribution suggests that four outcomes are possible. For each possible outcome, the anticipated gain or loss can be determined:

<table>
<thead>
<tr>
<th>POSSIBLE OUTCOME FOR FUTURE SPOT RATE</th>
<th>PROBABILITY</th>
<th>GAIN OR LOSS PER UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.50</td>
<td>10%</td>
<td>-$0.07</td>
</tr>
<tr>
<td>1.59</td>
<td>20</td>
<td>0.02</td>
</tr>
<tr>
<td>1.63</td>
<td>50</td>
<td>0.06</td>
</tr>
<tr>
<td>1.66</td>
<td>20</td>
<td>0.09</td>
</tr>
</tbody>
</table>

This analysis measures the probability and potential magnitude of a loss from the speculative strategy.

**Speculating with Currency Options** Consider the information from the previous example and assume that a British call option is available with an exercise price of $1.57 and a premium of $0.03 per unit. Recall that your best guess of the future spot rate was $1.63. If your guess is correct, you will earn $0.06 per unit on the difference between what you paid (the exercise price of $1.57) and the price for which you could sell a pound ($1.63). After the premium paid for the option ($0.03 per unit) is deducted, the net gain is $0.03 per unit.

The risk of purchasing this option is that the pound’s value might decline over time. If so, you will be unable to exercise the option, and your loss will be the premium paid for it. To assess the risk involved, a probability distribution can be developed. In Exhibit 16.2, the

| EXHIBIT 16.2 Estimating Speculative Gains from Options Using a Probability Distribution |
|-----------------------------------|---------------|-----------------|-----------------|-----------------|
| POSSIBLE OUTCOME FOR FUTURE SPOT RATE | PROBABILITY | WILL THE OPTION BE EXERCISED BASED ON THIS OUTCOME? | GAIN PER UNIT FROM EXERCISING OPTION | PREMIUM PAID PER UNIT FOR THE OPTION | NET GAIN OR LOSS PER UNIT |
| $1.50 | 10% | No | — | $.03 | -$.03 |
| 1.59 | 20 | Yes | $.02 | $.03 | -$.01 |
| 1.63 | 50 | Yes | .06 | .03 | .03 |
| 1.66 | 20 | Yes | .09 | .03 | .06 |
probability distribution from the previous example is applied here. The distribution of net gains from the strategy is shown in the sixth column.

Speculators should always compare the potential gains from currency options and currency futures contracts to determine which type of contract (if any) to trade. It is possible for two speculators to have similar expectations about potential gains from both types of contracts yet to prefer different types of contracts because they have different degrees of risk aversion.

**International Arbitrage**

Exchange rates and exchange rate derivatives are market determined. If they become misaligned, various forms of arbitrage can occur, forcing realignment. Common types of international arbitrage are explained next.

**Locational Arbitrage**

**Locational arbitrage** is the act of capitalizing on a discrepancy between the spot exchange rate at two different locations by purchasing the currency where it is priced low and selling it where it is priced high.

The exchange rates of the European euro quoted by two banks differ, as shown in Exhibit 16.3. The ask quote is higher than the bid quote to reflect the transaction costs charged by each bank. Because Baltimore Bank is asking $1.046 for euros and Sacramento Bank is willing to pay (bid) $1.050 for euros, an institution could execute locational arbitrage. That is, it could achieve a risk-free return without tying funds up for any length of time by buying euros at one location (Baltimore Bank) and simultaneously selling them at the other location (Sacramento Bank).

As locational arbitrage is executed, Baltimore Bank will begin to raise its ask price on euros in response to the strong demand. In addition, Sacramento Bank will begin to lower its bid price in response to the excess supply of euros it has recently received. Once Baltimore’s ask price is at least as high as Sacramento’s bid price, locational arbitrage will no longer be possible. Because some financial institutions (particularly the foreign exchange departments of commercial banks) watch for locational arbitrage opportunities, any discrepancy in exchange rates among locations is quickly eliminated.

**Triangular Arbitrage**

If the quoted cross-exchange rate between two foreign currencies is not aligned with the two corresponding exchange rates, there is a discrepancy in the exchange rate quotations. Under this condition, investors can engage in **triangular arbitrage**, which involves buying or selling the currency that is subject to a mispriced cross-exchange rate.

If the spot rate is $0.07 for the Mexican peso and $0.70 for the Canadian dollar, the cross-exchange rate should be C$1 = 10 pesos (computed as $0.70/$0.07). Assume that the Canadian dollar/peso exchange rate is quoted as C$1 = 10.3 pesos. In this case, the quote for the Canadian dollar is higher than it should be. An investor could benefit by using U.S. dollars to buy Canadian dollars, using those Canadian dollars to buy pesos, and then using the pesos to buy U.S. dollars. These three transactions would be executed at about the same time, before the exchange rates change. With $1,000,
you could buy C$1,428.57 (computed as 1,000 ÷ 0.70), convert those Canadian dollars into 14,714 pesos (computed as 1,428.57 × 10.3), and then convert the pesos into $1,030 (computed as 14,714 × 0.07). Thus, you would have a gain of $30. Of course, the gain would be larger if you engaged in triangular arbitrage using a larger amount of money.

Whenever there is a discrepancy in exchange rates, financial institutions with large amounts of money will engage in triangular arbitrage, causing the quoted exchange rates to quickly adjust. The arbitrage transaction of using U.S. dollars to buy Canadian dollars will cause the Canadian dollar to appreciate with respect to the U.S. dollar. The arbitrage transaction of using Canadian dollars to buy pesos will cause the Canadian dollar to depreciate against the peso, and the transaction of using pesos to buy U.S. dollars will cause the peso to depreciate against the U.S. dollar. Once the cross-exchange rate adjusts to its appropriate level, triangular arbitrage will no longer be feasible. The rates may adjust within a matter of seconds in response to the market forces. Quoted cross-exchange rates normally do not reflect a discrepancy because, if they did, financial institutions would capitalize on the discrepancy until the exchange rates were realigned.

**Covered Interest Arbitrage**

The coexistence of international money markets and forward markets forces a special relationship, between a forward rate premium and the interest rate differential of two countries, that is known as interest rate parity. This relationship also has implications for currency futures contracts, since they are normally priced like forward contracts.

According the interest rate parity, the premium on the forward rate can be determined as

\[ p = \frac{(1 + i_h)}{(1 + i_f)} - 1 \]

where

- \( p \) = forward premium of foreign currency
- \( i_h \) = home country interest rate
- \( i_f \) = foreign interest rate

**EXAMPLE**

The spot rate of the New Zealand dollar is $0.50, the one-year U.S. interest rate is 9 percent, and the one-year New Zealand interest rate is 6 percent. Under conditions of interest rate parity, the forward premium of the New Zealand dollar will be

\[ p = \frac{(1 + 0.09)}{(1 + 0.06)} - 1 \approx 2.8\% \]

This means that the forward rate of the New Zealand dollar will be about $0.514, reflecting a 2.8 percent premium above the spot rate.

Examining the equation for interest rate parity reveals that if the interest rate is lower in the foreign country than in the home country, the forward rate of the foreign currency will exhibit a premium. In the opposite situation, the forward rate will exhibit a discount.

Interest rate parity suggests that the forward rate premium (or discount) should be about equal to the differential in interest rates between the countries of concern. If this relationship does not hold, market forces should occur that will restore it. The act of capitalizing on the discrepancy between the forward rate premium and the interest rate differential is called **covered interest arbitrage**.

**EXAMPLE**

Both the spot rate and the one-year forward rate of the Canadian dollar are $0.80. The Canadian interest rate is 10 percent and the U.S. interest rate is 8 percent. Hence U.S. investors can take advantage of the higher Canadian interest rate, without being exposed to exchange rate risk, by
executing covered interest arbitrage. Specifically, they will exchange U.S. dollars for Canadian dollars and invest at the rate of 10 percent. They will simultaneously sell Canadian dollars one year forward. Because they are able to purchase and sell Canadian dollars for the same price, their return is the 10 percent interest earned on their investment.

As the U.S. investors demand Canadian dollars in the spot market while selling Canadian dollars forward, they place upward pressure on the spot rate and downward pressure on the one-year forward rate of the Canadian dollar. Thus, the Canadian dollar’s forward rate will exhibit a discount. Once the discount becomes large enough, the interest rate advantage in Canada will be offset. In other words, what U.S. investors gain on the higher Canadian interest rate is offset by having to buy Canadian dollars at a higher (spot) rate than the selling (forward) rate. Then covered interest arbitrage will no longer generate a return that is any higher for U.S. investors than an alternative investment in the United States. Once the forward discount (or premium) offsets the interest rate differential in this manner, interest rate parity exists.

The interest rate parity equation determines the forward discount that the Canadian dollar must exhibit in order to offset the interest rate differential:

$$p = \frac{(1 + i_b)}{(1 + i_f)} - 1$$

$$\approx -1.82\%$$

If the forward rate is lower than the spot rate by 1.82 percent, the interest rate is offset and covered interest arbitrage would yield a return to U.S. investors similar to the U.S. interest rate.

The existence of interest rate parity prevents investors from earning higher returns from covered interest arbitrage than can be earned in the United States. Nevertheless, international investing may still be feasible if the investing firm does not simultaneously cover in the forward market. Of course, failure to do so usually exposes the firm to exchange rate risk; if the currency denominating the investment depreciates over the investment horizon, the return on the investment is reduced.

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**SUMMARY**

- Exchange rate systems vary in the degree to which a country’s central bank controls its currency’s exchange rate. Many countries allow their currency to float yet periodically engage in intervention to control the exchange rate. Some countries use a pegged exchange rate system in which the currency’s value is pegged to the U.S. dollar or to another currency. Several European countries have adopted the euro as their currency, and a single monetary policy is implemented in those countries.

- Exchange rates are influenced by differential inflation rates, differential interest rates, and central bank intervention. There is upward pressure on a foreign currency’s value when its home country has relatively low inflation or relatively high interest rates. Central banks can place upward pressure on a currency by purchasing that currency in the foreign exchange markets (by exchanging other currencies held in reserve for that currency). Alternatively, they can place downward pressure on a currency by selling that currency in the foreign exchange markets in exchange for other currencies.

- Exchange rates can be forecasted using technical, fundamental, and market-based methods. Each method has its own advantages and limitations.

- Foreign exchange derivatives include forward contracts, currency futures contracts, currency swaps, and currency options contracts. Forward contracts can be purchased to hedge future payables or be sold to hedge future receivables in a foreign currency. Currency futures contracts can be used in a manner similar to forward contracts to hedge payables or receivables in
Currency swaps can be used to lock in the exchange rate of a foreign currency to be received or purchased in the future. Currency call (put) options can be purchased to hedge future payables (receivables) in a foreign currency. Currency options offer more flexibility than the other foreign exchange derivatives, but a premium must be paid for them.

Foreign exchange derivatives can also be used to speculate on expected exchange rate movements. When speculators expect a foreign currency to appreciate, they can lock in the exchange rate at which they may purchase that currency by purchasing forward contracts, futures contracts, or call options on that currency. When speculators expect a currency to depreciate, they can lock in the exchange rate at which they may sell that currency by selling forward contracts or futures contracts on that currency. They could also purchase put options on that currency.

International arbitrage ensures that foreign exchange market prices are set properly. If exchange rates vary among the banks that serve the foreign exchange market, locational arbitrage will be possible. Foreign exchange market participants will purchase a currency at the bank with a low quote and sell it to another bank where the quote is higher. If a quoted cross-exchange rate is misaligned with the corresponding exchange rates, triangular arbitrage will be possible. This involves buying or selling the currency that is subject to the mispriced exchange rate. If the interest rate differential is not offset by the forward rate premium (as suggested by interest rate parity), covered interest arbitrage will be possible. This involves investing in a foreign currency and simultaneously selling the currency forward. Arbitrage will occur until interest rate parity is restored.

**Point Counter-Point**

**Do Financial Institutions Need to Consider Foreign Exchange Market Conditions When Making Domestic Security Market Decisions?**

**Point** No. If there is no exchange of currencies, there is no need to monitor the foreign exchange market.

**Counter-Point** Yes. Foreign exchange market conditions can affect an economy or an industry and therefore affect the valuation of securities. In addition, the valuation of a firm can be affected by currency movements because of its international business.

**Who Is Correct?** Use the Internet to learn more about this issue and then formulate your own opinion on this issue.

**Questions and Applications**

1. **Exchange Rate Systems** Explain the exchange rate system that existed during the 1950s and 1960s. How did the Smithsonian Agreement in 1971 revise it? How does today’s exchange rate system differ?

2. **Dirty Float** Explain the difference between a freely floating system and a dirty float. Which type is more representative of the U.S. system?

3. **Impact of Quotas** Assume that European countries impose a quota on goods imported from the United States and that the United States does not plan to retaliate. How could this affect the value of the euro? Explain.

4. **Impact of Capital Flows** Assume that stocks in the United Kingdom become very attractive to U.S. investors. How could this affect the value of the British pound? Explain.

5. **Impact of Inflation** Assume that Mexico suddenly experiences high and unexpected inflation. How could this affect the value of the Mexican peso according to purchasing power parity (PPP) theory?

6. **Impact of Economic Conditions** Assume that Switzerland has a very strong economy, putting upward pressure on both inflation and interest rates. Explain how these conditions could put pressure on the value of the Swiss franc, and determine whether the franc’s value will rise or fall.

7. **Central Bank Intervention** The Bank of Japan desires to decrease the value of the Japanese yen against the U.S. dollar. How could it use direct intervention to do this?

8. **Conditions for Speculation** Explain the conditions under which a speculator would like to
invest in a foreign currency today even when it has no use for that currency in the future.

9. Risk from Speculating Seattle Bank just took speculative positions by borrowing Canadian dollars and converting the funds to invest in Australian dollars. Explain a possible future scenario that could adversely affect the bank’s performance.


Advanced Questions

12. Interaction of Capital Flows and Yield Curve Assume a horizontal yield curve exists. How do you think the yield curve would be affected if foreign investors in short-term securities and long-term securities suddenly anticipate that the value of the dollar will strengthen? (You may find it helpful to refer back to the discussion of the yield curve in Chapter 3.)

13. How the Euro’s Value May Respond to Prevailing Conditions Consider the prevailing conditions for inflation (including oil prices), the economy, interest rates, and any other factors that could affect exchange rates. Based on these conditions, do you think the euro’s value will likely appreciate or depreciate against the dollar for the remainder of this semester? Offer some logic to support your answer. Which factor do you think will have the biggest impact on the euro’s exchange rate?

Interpreting Financial News

Interpret the following statements made by Wall Street analysts and portfolio managers.

a. “Our use of currency futures has completely changed our risk–return profile.”

b. “Our use of currency options resulted in an upgrade in our credit rating.”

c. “Our strategy of using forward contracts to hedge backfired on us.”

Managing in Financial Markets

Using Forex Derivatives for Hedging You are the manager of a stock portfolio for a financial institution, and about 20 percent of the stock portfolio that you manage is in British stocks. You expect the British stock market to perform well over the next year, and you plan to sell the stocks one year from now (and will convert the British pounds received to dollars at that time). However, you are concerned that the British pound may depreciate against the dollar over the next year.

a. Explain how you could use a forward contract to hedge the exchange rate risk associated with your position in British stocks.

b. If interest rate parity holds, does this limit the effectiveness of a forward contract as a hedge?

c. Explain how you could use an options contract to hedge the exchange rate risk associated with your position in stocks.

d. Assume that, although you are concerned about the potential decline in the pound’s value, you also believe that the pound could appreciate against the dollar over the next year. You would like to benefit from the potential appreciation but also wish to hedge against the possible depreciation. Should you use a forward contract or options contracts to hedge your position? Explain.

PROBLEMS

1. Currency Futures Use the following information to determine the probability distribution of per unit gains from selling Mexican peso futures.

- Spot rate of the peso is $0.10.
- Price of peso futures is $0.102 per unit.
- Your expectation of the peso spot rate at maturity of the futures contract is:

<table>
<thead>
<tr>
<th>POSSIBLE OUTCOME FOR FUTURE SPOT RATE</th>
<th>PROBABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.090</td>
<td>10%</td>
</tr>
<tr>
<td>0.095</td>
<td>70%</td>
</tr>
<tr>
<td>0.110</td>
<td>20%</td>
</tr>
</tbody>
</table>
2. **Currency Call Options** Use the following information to determine the probability distribution of net gains per unit from purchasing a call option on British pounds.

- Spot rate of the British pound is $1.45.
- Premium on the British pound option is $0.04 per unit.
- Exercise price of a British pound option is $1.46.
- Your expectation of the British pound spot rate prior to the expiration of the option is:

<table>
<thead>
<tr>
<th>Possible Outcome for Future Spot Rate</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1.48</td>
<td>30%</td>
</tr>
<tr>
<td>1.49</td>
<td>40%</td>
</tr>
<tr>
<td>1.52</td>
<td>30%</td>
</tr>
</tbody>
</table>

3. **Locational Arbitrage** Assume the following exchange rate quotes on British pounds:

<table>
<thead>
<tr>
<th></th>
<th>BID</th>
<th>ASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orleans Bank</td>
<td>$1.46</td>
<td>$1.47</td>
</tr>
<tr>
<td>Kansas Bank</td>
<td>1.48</td>
<td>1.49</td>
</tr>
</tbody>
</table>

4. **Covered Interest Arbitrage** Assume the following information:

- British pound spot rate = $1.58
- British pound one-year forward rate = $1.58
- British one-year interest rate = 11 percent
- U.S. one-year interest rate = 9 percent

Explain how U.S. investors could use covered interest arbitrage to lock in a higher yield than 9 percent. What would be their yield? Explain how the spot and forward rates of the pound would change as covered interest arbitrage occurs.

5. **Covered Interest Arbitrage** Assume the following information:

- Mexican one-year interest rate = 15 percent
- U.S. one-year interest rate = 11 percent

If interest rate parity exists, what would be the forward premium or discount on the Mexican peso’s forward rate? Would covered interest arbitrage be more profitable to U.S. investors than investing at home? Explain.

**Flow of Funds Exercise**

**Hedging with Foreign Exchange Derivatives**

Carson Company expects that it will receive a large order from the government of Spain. If the order occurs, Carson will be paid about 3 million euros. Since all of its expenses are in dollars, Carson would like to hedge this position. Carson has contacted a bank with brokerage subsidiaries that can help it hedge with foreign exchange derivatives.

a. How could Carson use currency futures to hedge its position?

b. What is the risk of hedging with currency futures?

c. How could Carson use currency options to hedge its position?

d. Explain the advantage and disadvantage to Carson of using currency options instead of currency futures.

**Internet/Excel Exercises**

Use the website [www.oanda.com](http://www.oanda.com) to assess exchange rates.

1. What is the most recent value of the Australian dollar in terms of U.S. dollars? For large transactions, how many British pounds does a U.S. dollar buy?

2. Review the pound’s value over the past year. Offer a possible explanation for the recent movements in the pound’s value.

3. What is the most recent value of the Hong Kong dollar in terms of U.S. dollars? Do you notice anything unusual about this value over time? What could explain an exchange rate trend such as this?
WSJ Exercise

Assessing Exchange Rate Movements

Use a recent issue of The Wall Street Journal to determine how a particular currency’s value has changed against the dollar since the beginning of the year. The “Currencies” table lists the percentage change in many currencies since the beginning of the year.

Online Articles with Real-World Examples

Find a recent practical article available online that describes a real-world example regarding a specific financial institution or financial market that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary of the article there and provide a link to the article so that other students can access it. If your class is live, your professor may ask you to summarize your application of the article in class. Your professor may assign specific students to complete this assignment or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples related to this chapter, consider using the following search terms (be sure to include the prevailing year as a search term to ensure that the online articles are recent):

1. foreign exchange AND institutional investors
2. inflation AND exchange rate
3. interest rate AND exchange rate
4. central bank intervention
5. foreign exchange controls
6. currency AND forecasting
7. currency AND forward contract
8. forward contract AND hedge
9. currency futures AND speculate
10. currency options AND hedge