

# Chapter Objectives

- Describe common policies for hedging transaction exposure.
- Compare the techniques commonly used to hedge payables.
- Compare the techniques commonly used to hedge receivables.
- Describe limitations of hedging.
- Suggest other methods of reducing exchange rate risk when hedging techniques are not available.

# Policies for Hedging Transaction Exposure

## Hedging Most of the Exposure

- Hedging most of the transaction exposure allows MNCs to more accurately forecast future cash flows (in their home currency) so that they can make better decisions regarding the amount of financing they will need.

## Selective Hedging

- MNC must identify its degree of transaction exposure.
- MNC must consider the various techniques to hedge the exposure so that it can decide which hedging technique is optimal and whether to hedge its transaction exposure.

# Hedging Exposure to Payables (1 of 8)

An MNC may decide to hedge part or all of its known payables transactions using:

- Forward or futures hedge
- Money market hedge
- Currency option hedge

# Hedging Exposure to Payables (2 of 8)

## Forward or Futures Hedge on Payables

- Allows an MNC to lock in a specific exchange rate at which it can purchase a currency and hedge payables. A forward contract is negotiated between the firm and a financial institution. The contract will specify the:
  - currency that the firm will pay.
  - currency that the firm will receive.
  - amount of currency to be received by the firm.
  - rate at which the MNC will exchange currencies (called the forward rate).
  - future date at which the exchange of currencies will occur.

# Hedging Exposure to Payables (3 of 8)

## Money Market Hedge on Payables

- Involves taking a money market position to cover a future payables position.
- If a firm prefers to hedge payables without using its cash balances, then it must
  - Borrowed funds in the home currency and
  - Short-term investment in the foreign currency.
- **Money market hedge versus forward hedge**
  - Since the results of both hedges are known beforehand, the firm can implement the one that is more feasible.

# Hedging Exposure to Payables (4 of 8)

## Call Option Hedge on Payables

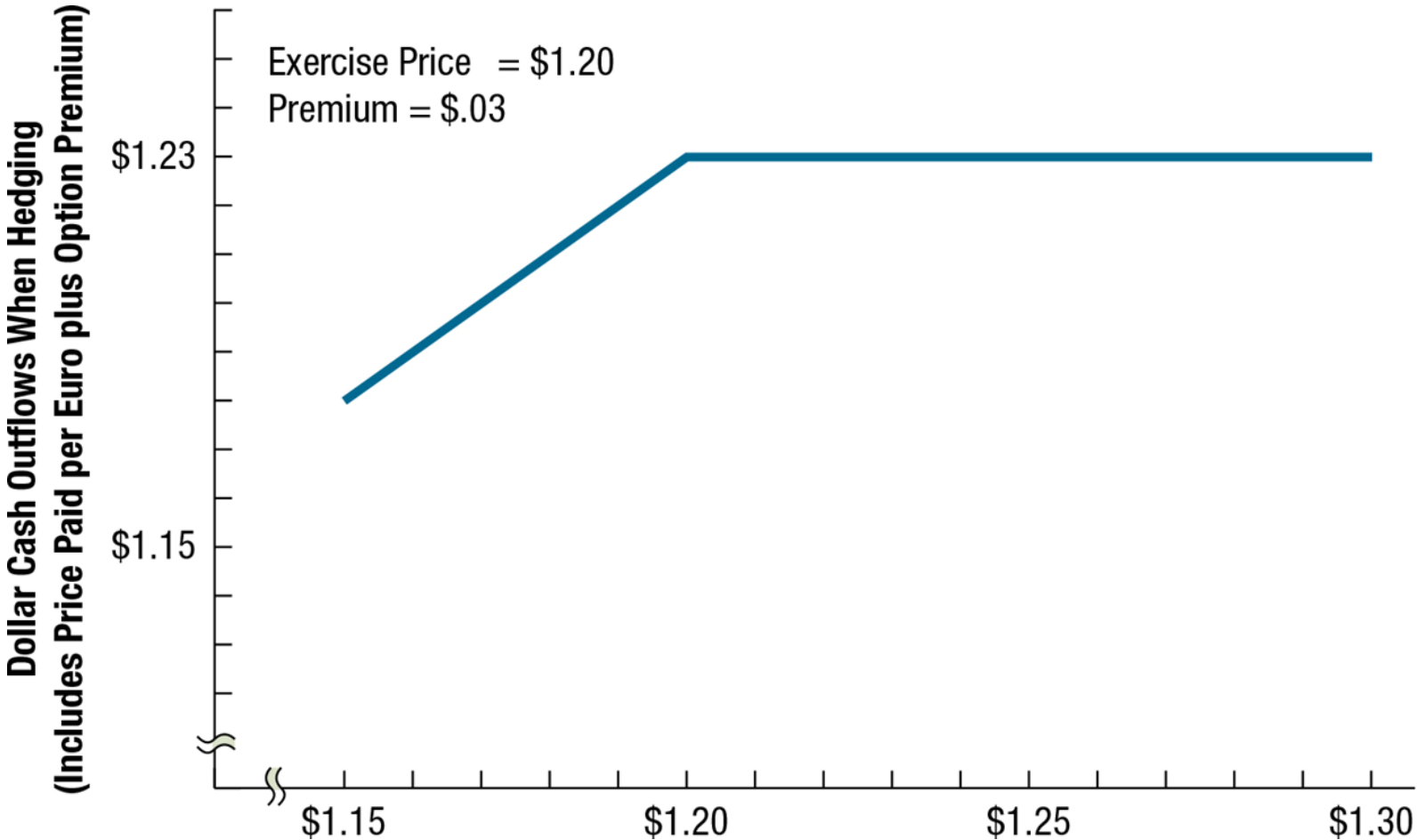
- A currency call option provides the right to buy a specified amount of a particular currency at a specified **strike price** or **exercise price** within a given period of time.
- The currency call option does not obligate its owner to buy the currency at that price. The MNC has the flexibility to let the option expire and obtain the currency at the existing spot rate when payables are due.

# Hedging Exposure to Payables (5 of 8)

## Call Option Hedge on Payables (continued)

- ***Applying a Contingency Graph*** (Exhibit 11.1)
  - **Advantage:** provides an effective hedge
  - **Disadvantage:** premium must be paid
- ***Applying Currency Forecasts*** (Exhibit 11.2)
  - MNC can incorporate forecasts of the spot rate to more accurately estimate the cost of hedging with call options.
- **Consideration of Alternative Call Options**
  - Several different types of call options may be available, with different exercise prices and premiums for a given currency and expiration date.
  - Whatever call option is perceived to be most desirable for hedging a particular payables position would be analyzed, so that it could then be compared to the other hedging techniques.

# Exhibit 11.1 Contingency Graph for Hedging Payables With Call Options





# Exhibit 11.2 Using Currency Call Options to Hedge Euro Payables (exercise price = \$1.20, premium = \$.03)

(1)	(2)	(3)	(4)	(5) = (4) + (3)	(6)
SCENARIO	SPOT RATE WHEN PAYABLES ARE DUE	PREMIUM PER UNIT PAID ON CALL OPTIONS	AMOUNT PAID PER UNIT WHEN OWNING CALL OPTIONS	TOTAL AMOUNT PAID PER UNIT (INCLUDING THE PREMIUM) WHEN OWNING CALL OPTIONS	\$ AMOUNT PAID FOR 100,000 EUROS WHEN OWNING CALL OPTIONS
1	\$1.16	\$.03	\$1.16	\$1.19	\$119,000
2	1.22	.03	1.20	1.23	123,000
3	1.24	.03	1.20	1.23	123,000

# Hedging Exposure to Payables (6 of 8)

## Comparison of Techniques to Hedge Payables (Exhibit 11.3)

- The cost of the forward hedge or money market hedge can be determined with certainty.
- The currency call option hedge has different outcomes depending on the future spot rate at the time payables are due.

# Exhibit 11.3 Comparison of Hedging Alternatives for Coleman Co. (1 of 2)

## Forward Hedge

Purchase euros (€) one year forward.

$$\begin{aligned}\text{Dollars needed in one year} &= \text{payables in €} \times \text{forward rate of euro} \\ &= 100,000 \text{ euros} \times \$1.20 \\ &= \$120,000\end{aligned}$$

## Money Market Hedge

Borrow \$, convert to €, invest €, repay \$ loan in one year.

$$\begin{aligned}\text{Amount in € to be invested} &= \frac{\text{€}100,000}{1 + .05} \\ &= 95.238 \text{ euros}\end{aligned}$$

$$\begin{aligned}\text{Amount in \$ needed to convert into € for deposit} &= \text{€}95,238 \times \$1.18 \\ &= \$112,381\end{aligned}$$

$$\begin{aligned}\text{Interest and principal owed on \$ loan after one year} &= \$112,381 \times (1 + .08) \\ &= \$121,371\end{aligned}$$

# Exhibit 11.3 Comparison of Hedging Alternatives for Coleman Co. (2 of 2)

## Call Option

Purchase call option. (The following computations assume that the option is to be exercised on the day euros are needed, or not at all; exercise price = \$1.20, premium = \$.03.)

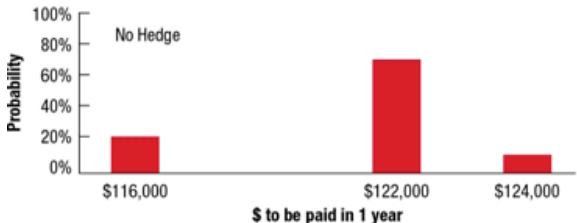
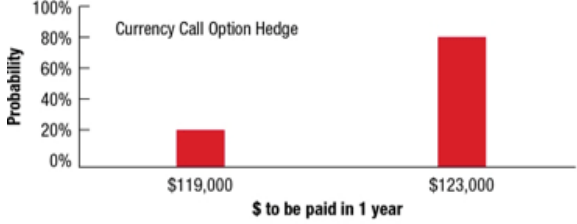
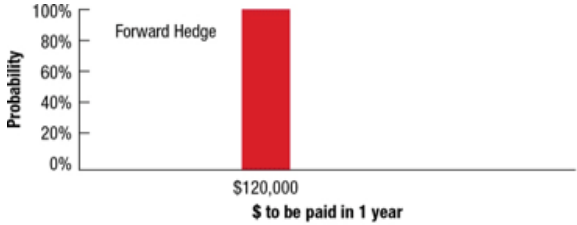
POSSIBLE SPOT RATE IN ONE YEAR	PREMIUM PER UNIT PAID FOR OPTION	EXERCISE OPTION?	TOTAL PRICE (INCLUDING OPTION PREMIUM PAID PER UNIT)	TOTAL PRICE PAID FOR 100,000 EUROS	PROBABILITY
\$1.16	\$.03	No	\$1.19	\$119,000	20%
1.22	.03	Yes	1.23	123,000	70
1.24	.03	Yes	1.23	123,000	10

# Hedging Exposure to Payables (7 of 8)

## Comparison of Techniques to Hedge Payables

- **Optimal Technique for Hedging Payables (Exhibit 11.4)**
  - Select **optimal hedging** technique by:
    - Considering whether futures or forwards are preferred.
    - Considering desirability of money market hedge versus futures/forwards based on cost.
    - Assessing the feasibility of a currency call option based on estimated cash outflows.
- Optimal hedge versus **no hedge** for payables.
  - Even when an MNC knows what its future payables will be, it may decide not to hedge in some cases.

# Exhibit 11.4 Graphic Comparison of Techniques to Hedge Payables



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# Hedging Exposure to Payables (8 of 8)

## Evaluating Past Decisions on Hedging Payables

Evaluate past hedging decisions by estimating the real cost of hedging payables, which is measured as follows:

$RCH_p = \text{Cash outflows when hedging payables} - \text{Cash outflows when unhedged}$

# Hedging Exposure to Receivables (1 of 4)

**Forward or futures hedge on receivables** allows the MNC to lock in the exchange rate at which it can sell a specific currency.

**Money market hedge on receivables** involves borrowing the currency that will be received and using the receivables to pay off the loan.

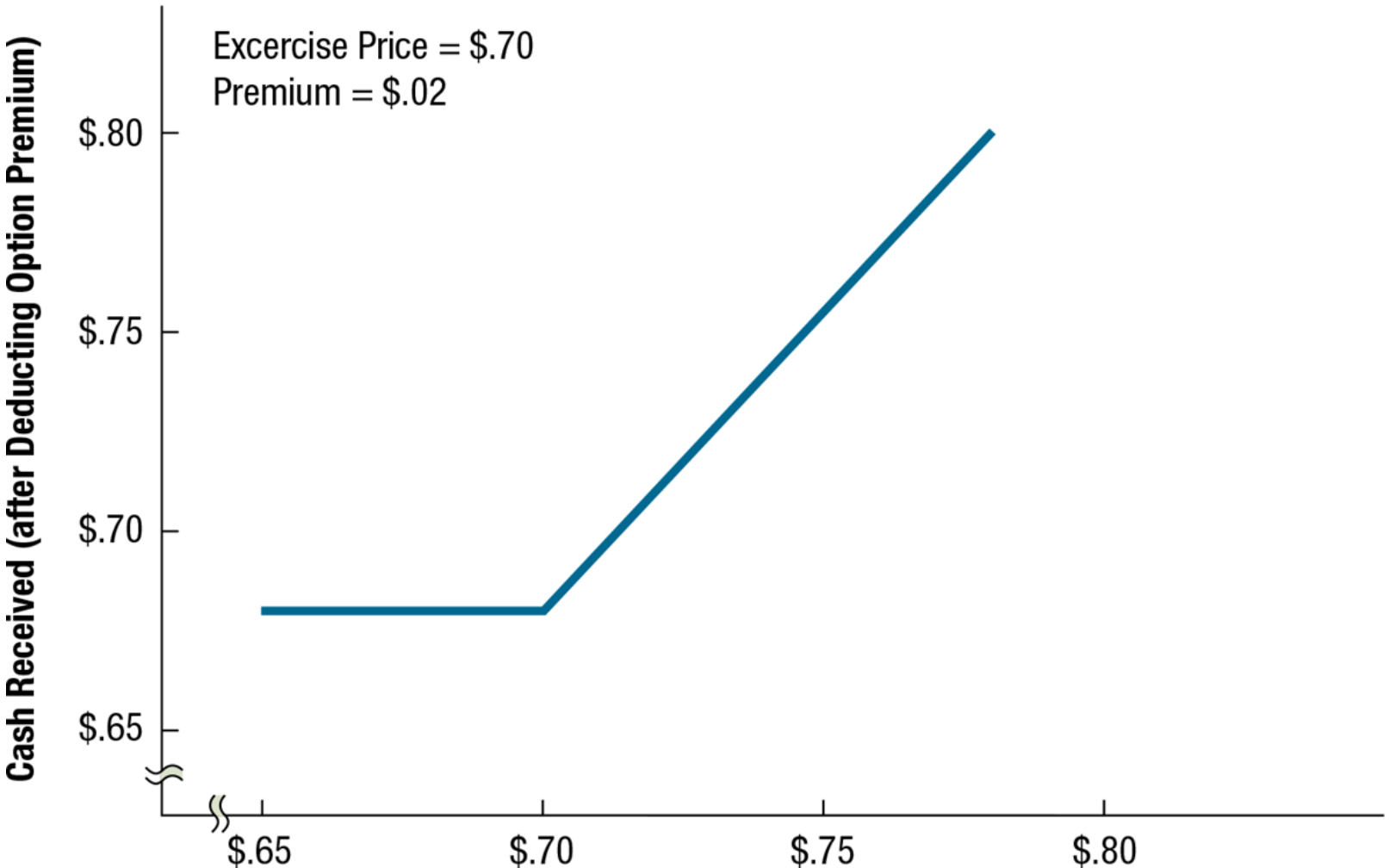


# Hedging Exposure to Receivables (2 of 4)

**Put option hedge on receivables** provides the right to sell a specified amount of a particular currency at a specified strike price by a specified expiration date.

- Applying a Contingency Graph (Exhibit 11.5)
  - Advantage: provides an effective hedge
  - Disadvantage: premium must be paid
- Applying Currency Forecasts (Exhibit 11.6)
  - MNC can use currency forecasts to more accurately estimate the dollar cash inflows to be received when hedging with put options.
- Consideration of Alternative Put Options
  - Several different types of put options may be available that feature different exercise prices and premiums for a given currency and expiration date.

# Exhibit 11.5 Contingency Graph for Hedging Receivables with Put Options



## Exhibit 11.6 Use of Currency Put Options for Hedging Swiss Franc Receivables (exercise price = \$.72; premium = \$.02)

(1) SCENARIO	(2) SPOT RATE WHEN PAYMENT ON RECEIVABLES IS RECEIVED	(3) PREMIUM PER UNIT ON PUT OPTIONS	(4) AMOUNT RECEIVED PER UNIT WHEN OWNING PUT OPTIONS	(5) = (4) - (3) NET AMOUNT RECEIVED PER UNIT (AFTER ACCOUNTING FOR PREMIUM PAID)	(6) DOLLAR AMOUNT RECEIVED FROM HEDGING SF200,000 RECEIVABLES WITH PUT OPTIONS
1	\$.71	\$.02	\$.72	\$.70	\$140,000
2	.74	.02	.74	.72	144,000
3	.76	.02	.76	.74	148,000

# Hedging Exposure to Receivables (3 of 4)

## Comparison of Techniques for Hedging Receivables (Exhibit 11.7)

- **Optimal Technique for Hedging Receivables:** (Exhibit 11.8)
  - Consider whether futures or forwards are preferred.
  - Consider desirability of money market hedge versus futures/forwards based on cost.
  - Assess the feasibility of a currency put option based on estimated cash outflows.
- **Optimal hedge versus no hedge on receivables**
  - An MNC may know what its future receivables will be yet still decide not to hedge. In that case, the MNC needs to determine the probability distribution of its revenue from receivables when not hedging

# Exhibit 11.7 Comparison of Hedging Alternatives for Viner Co. (1 of 2)

## Forward Hedge

Sell Swiss francs six months forward.

$$\begin{aligned}\text{Dollars to be received in six months} &= \text{receivables in SF} \times \text{forward rate of SF} \\ &= \text{SF}200,000 \times \$.71 \\ &= \$142,000\end{aligned}$$

## Money Market Hedge

Borrow SF, convert to \$, invest \$, use receivables to pay off loan in six months.

$$\begin{aligned}\text{Amount in SF borrowed} &= \frac{\text{SF}200,000}{1 + .03} \\ &= \text{SF}194,175 \\ \text{\$ received from converting SF} &= \text{SF}194,175 \times \$70 \text{ per SF} \\ &= \$135,922 \\ \text{\$ accumulated after six months} &= \$135,922 \times (1 + .02) \\ &= \$138,640\end{aligned}$$

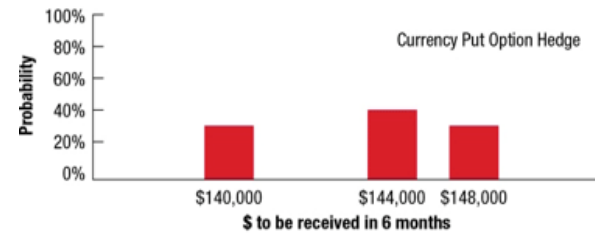
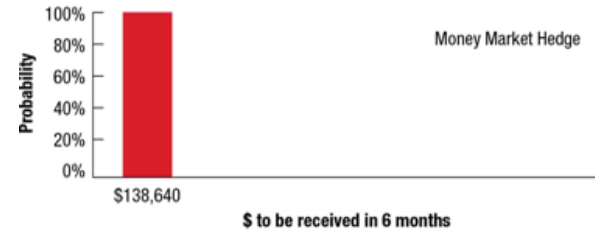
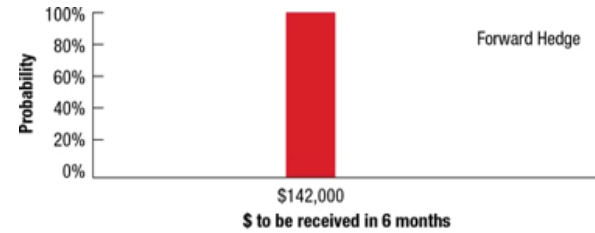
# Exhibit 11.7 Comparison of Hedging Alternatives for Viner Co. (2 of 2)

## Put Option Hedge

Purchase put option. (Assume the options will be exercised on the day SF are to be received, or not at all; exercise price = \$.72, premium = \$.02.)

POSSIBLE SPOT RATE IN SIX MONTHS	PREMIUM PER UNIT PAID FOR OPTION	EXERCISE OPTION?	RECEIVED PER UNIT (AFTER ACCOUNTING FOR THE PREMIUM)	TOTAL DOLLARS RECEIVED FROM CONVERTING SF200,000	PROBABILITY
.71	\$.02	Yes	\$.70	\$140,000	30%
.74	.02	No	.72	144,000	40
.76	.02	No	.74	148,000	30

# Exhibit 11.8 Graph Comparison of Techniques to Hedge Receivables



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# Hedging Exposure to Receivables (4 of 4)

**Evaluating the hedge decision** by estimating the real cost of hedging receivables versus the cost of receivables if not hedged.

**Summary of Hedging Techniques** (Exhibit 11.9)



# Exhibit 11.9 Review of Techniques for Hedging Transaction Exposure

<b>TECHNIQUE</b>	<b>TO HEDGE PAYABLES</b>	<b>TO HEDGE RECEIVABLES</b>
Futures hedge	Purchase a currency futures contract (or contracts) representing the currency and amount related to the payables.	Sell a currency futures contract (or contracts) representing the currency and amount related to the receivables.
Forward hedge	Negotiate a forward contract to purchase the amount of foreign currency needed to cover the payables.	Negotiate a forward contract to sell the amount of foreign currency that will be received as a result of the receivables.
Money market hedge	Borrow local currency and convert to the currency denominating payables. Invest these funds until they are needed to cover the payables.	Borrow the currency denominating the receivables, convert it to the local currency, and invest it. Then pay off the loan with cash inflows from the receivables.
Currency option hedge	Purchase a currency call option (or options) representing the currency and amount related to the payables.	Purchase a currency put option (or options) representing the currency and amount related to the receivables.

# Limitations of Hedging

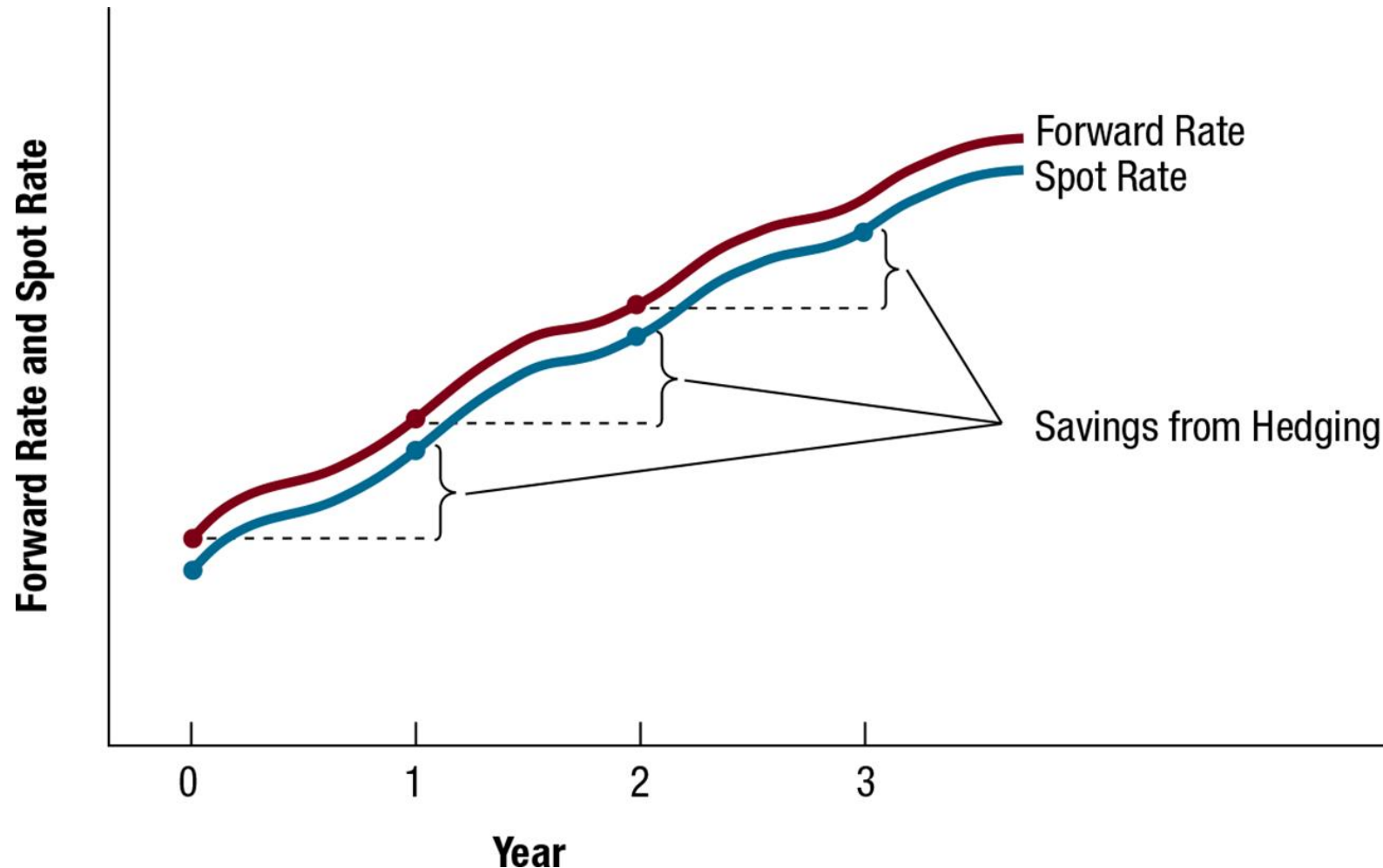
## Limitation of Hedging an Uncertain Payment

- Some international transactions involve an uncertain amount of foreign currency, leading to **overhedging**.

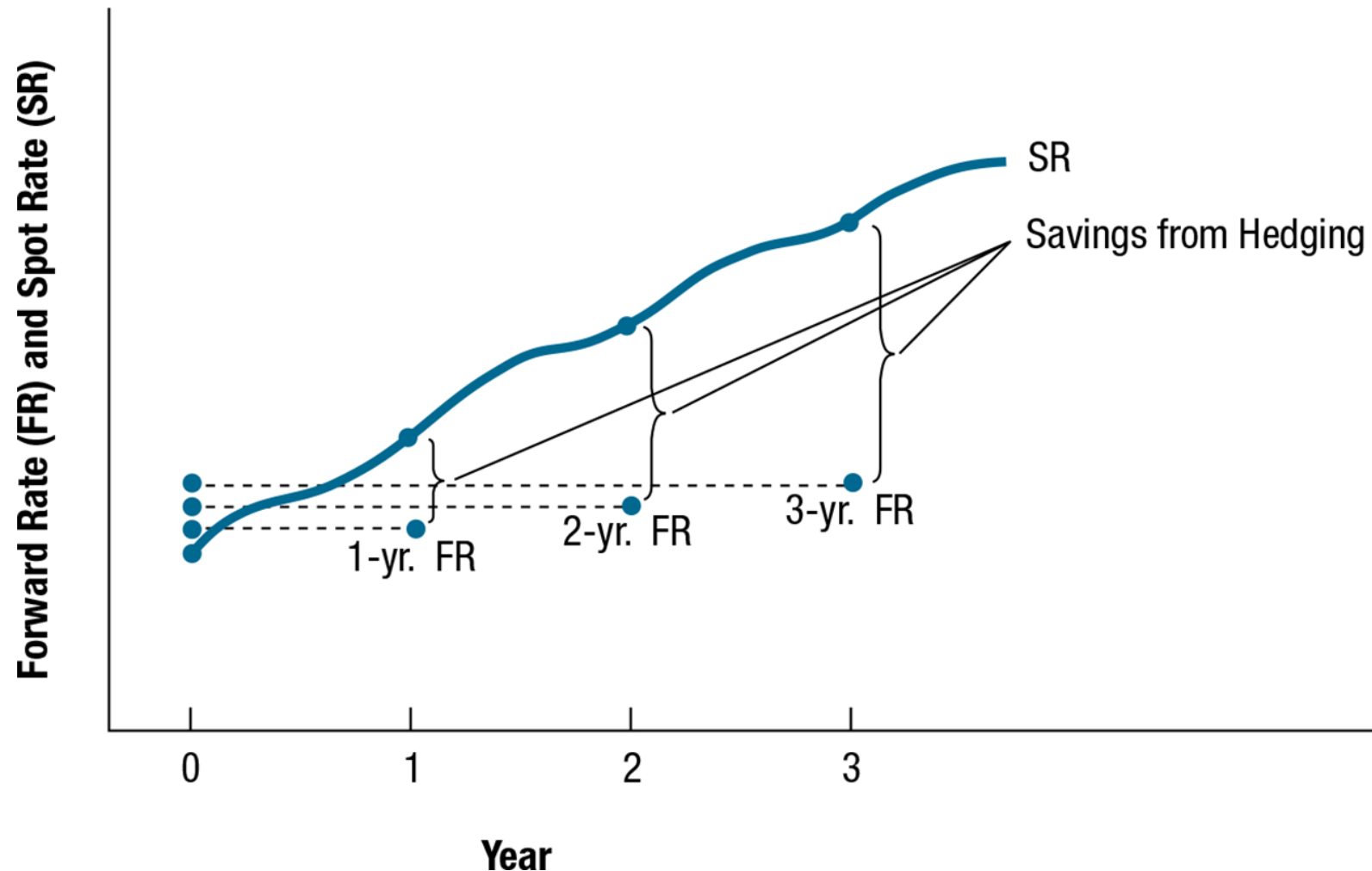
## Limitation of Repeated Short-Term Hedging

- The continual short-term hedging of repeated transactions may have limited effectiveness. (Exhibits 11.10 and 11.11)
- **Long-term Hedging as a Solution**
  - Some banks offer forward contracts for up to 5 years or 10 years on some commonly traded currencies.

# Exhibit 11.10 Repeated Hedging of Foreign Payables When the Foreign Currency Is Appreciating



# Exhibit 11.11 Long-Term Hedging of Payables When the Foreign Currency Is Appreciating



# Alternative Hedging Techniques

**Leading and Lagging:** Adjusting the timing of a payment or disbursement to reflect expectations about future currency movements.

**Cross-Hedging:** Hedging by using a currency that serves as a proxy for the currency in which the MNC is exposed.

**Currency Diversification:** Reducing exposure by diversifying business among numerous countries.

# Summary (1 of 4)

- An MNC may choose to hedge most of its transaction exposure or to selectively hedge. Some MNCs hedge most of their transaction exposure so that they can more accurately predict their future cash inflows or outflows and make better decisions regarding the amount of financing they will need. Many MNCs use selective hedging, in which they consider each type of transaction separately.
- To hedge payables, a futures or forward contract on the foreign currency can be purchased. Alternatively, a money market hedge strategy can be used; in this case, the MNC borrows its home currency and converts the proceeds into the foreign currency that will be needed in the future. Finally, call options on the foreign currency can be purchased.

# Summary (2 of 4)

- To hedge receivables, a futures or forward contract on the foreign currency can be sold. Alternatively, a money market hedge strategy can be used. In this case, the MNC borrows the foreign currency to be received and converts the funds into its home currency; the loan is to be repaid by the receivables. Finally, put options on the foreign currency can be purchased. When hedging techniques like forward and currency option contracts are not available, there are still some methods of reducing transaction exposure, such as leading and lagging, cross-hedging, and currency diversification. The currency option hedge has an advantage over the other hedging techniques in that the options do not have to be exercised. However, a premium must be paid to purchase the currency option, so there is a cost for the flexibility they provide.

# Summary (3 of 4)

- One limitation of hedging is that if the actual payment on a transaction is less than the expected payment, the MNC overhedged and is partially exposed to exchange rate movements. Alternatively, if an MNC hedges only the minimum possible payment in the transaction, it will be partially exposed to exchange rate movements if the transaction involves a payment that exceeds the minimum. Another limitation of hedging is that a short-term hedge is only effective for the period in which it was applied. One potential solution to this limitation is for an MNC to use long-term hedging rather than repeated short-term hedging. This choice is more effective if the MNC can be sure that its transaction exposure will persist into the distant future.



# Summary (4 of 4)

- When hedging techniques like forward and currency option contracts are not available, there are still some methods of reducing transaction exposure, such as leading and lagging, cross-hedging, and currency diversification.