

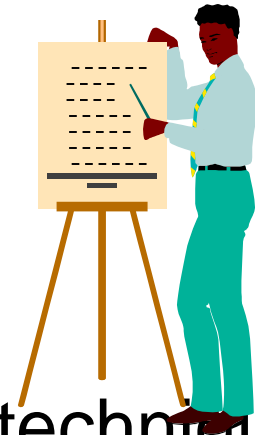
**Topic**

**8**

# Managing Exchange Rate Risk: Transaction Exposure

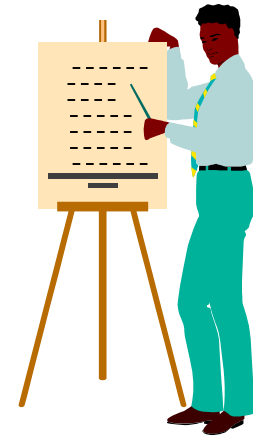


# Chapter Objectives



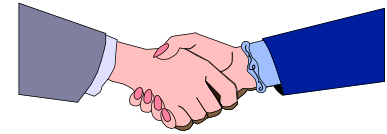
- To identify the commonly used techniques for hedging transaction exposure;
- To explain how each technique can be used to hedge future payables and receivables;
- To compare the advantages and disadvantages of the identified hedging techniques; and

# Chapter Objectives



- To suggest other methods of reducing exchange rate risk when hedging techniques are not available.

# Transaction Exposure



- *Transaction exposure* exists when the future cash transactions of a firm are affected by exchange rate fluctuations.
- When transaction exposure exists, the firm faces three major tasks:
  - ❶ Identify its degree of transaction exposure,
  - ❷ Decide whether to hedge its exposure, and
  - ❸ Choose among the available hedging techniques if it decides on hedging.

# Identifying Net Transaction Exposure

- *Centralized Approach* - A centralized group consolidates subsidiary reports to identify, for the MNC as a whole, the expected net positions in each foreign currency for the upcoming period(s).
- Note that sometimes, a firm may be able to reduce its transaction exposure by pricing some of its exports in the same currency as that needed to pay for its imports.

# Techniques to Eliminate Transaction Exposure



- Hedging techniques include:
  - Futures hedge,
  - Forward hedge,
  - Money market hedge, and
  - Currency option hedge.
- MNCs will normally compare the cash flows that could be expected from each hedging technique before determining which technique to apply.

# Techniques to Eliminate Transaction Exposure



- A *futures hedge* involves the use of currency futures.
- To hedge future payables, the firm may purchase a currency futures contract for the currency that it will be needing.
- To hedge future receivables, the firm may sell a currency futures contract for the currency that it will be receiving.

# Techniques to Eliminate Transaction Exposure



- A *forward hedge* differs from a futures hedge in that forward contracts are used instead of futures contract to lock in the future exchange rate at which the firm will buy or sell a currency.
- Recall that forward contracts are common for large transactions, while the standardized futures contracts involve smaller amounts.

# Techniques to Eliminate Transaction Exposure



- An exposure to exchange rate movements need not necessarily be hedged, despite the ease of futures and forward hedging.
- Based on the firm's degree of risk aversion, the hedge-versus-no-hedge decision can be made by comparing the known result of hedging to the possible results of remaining unhedged.

# Techniques to Eliminate Transaction Exposure



*Real cost of hedging payables ( $RCH_p$ ) =*  
**+ nominal cost of payables with hedging**  
**– nominal cost of payables without hedging**

*Real cost of hedging receivables ( $RCH_r$ ) =*  
**+ nominal home currency revenues received without hedging**  
**– nominal home currency revenues received with hedging**

# Techniques to Eliminate Transaction Exposure



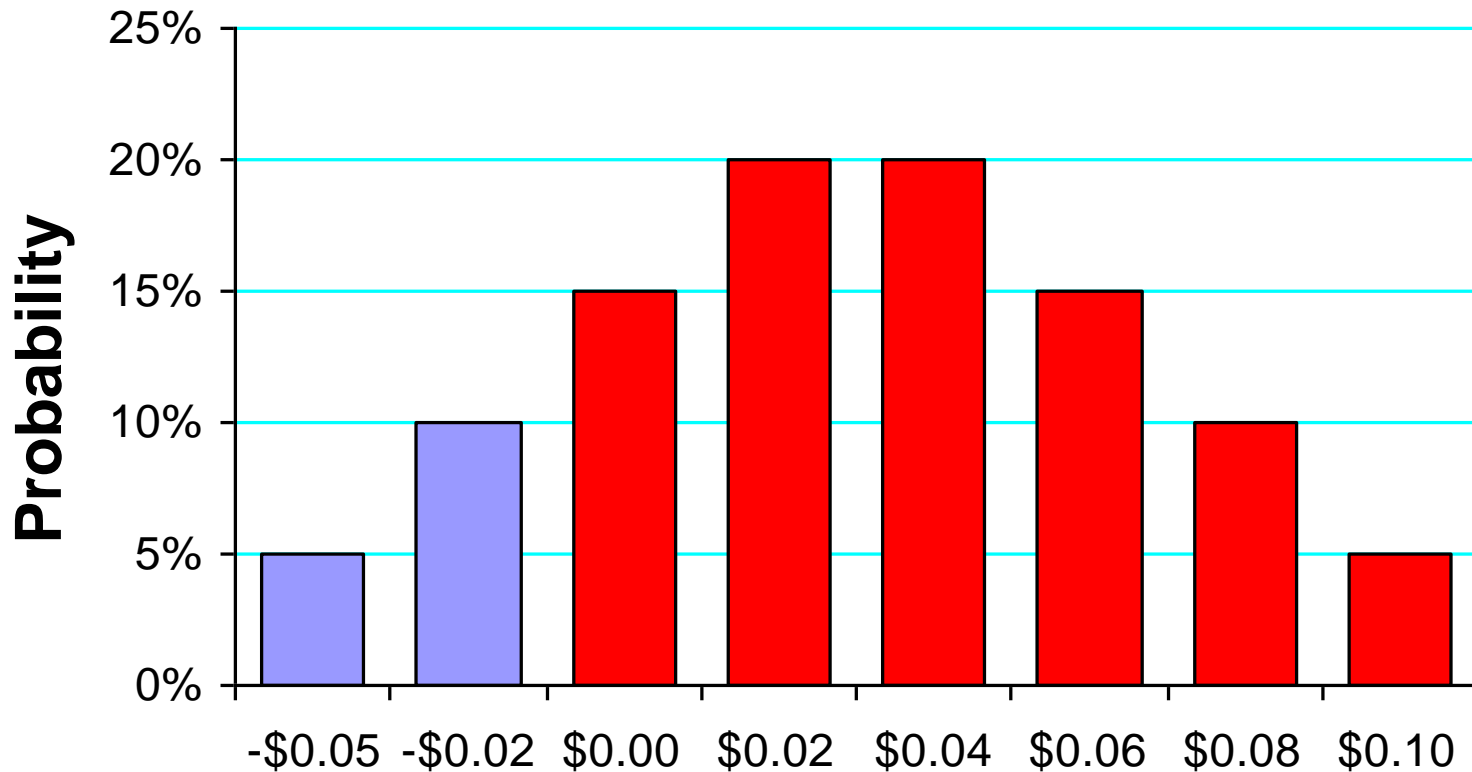
- If the real cost of hedging is negative, then hedging is more favorable than not hedging.
- To compute the expected value of the real cost of hedging, first develop a probability distribution for the future spot rate, and then use it to develop a probability distribution for the real cost of hedging.

## The Real Cost of Hedging for Each £ in Payables

<b>Probability</b>	<b>Nominal Cost With Hedging</b>	<b>Nominal Cost Without Hedging</b>	<b>Real Cost of Hedging</b>
5 %	\$1.40	\$1.30	\$0.10
10	\$1.40	\$1.32	\$0.08
15	\$1.40	\$1.34	\$0.06
20	\$1.40	\$1.36	\$0.04
20	\$1.40	\$1.38	\$0.02
15	\$1.40	\$1.40	\$0.00
10	\$1.40	\$1.42	-\$0.02
5	\$1.40	\$1.45	-\$0.05

$$\text{Expected } RCH_p = \sum P_i \times RCH_i = \$0.0295$$

# The Real Cost of Hedging for Each £ in Payables



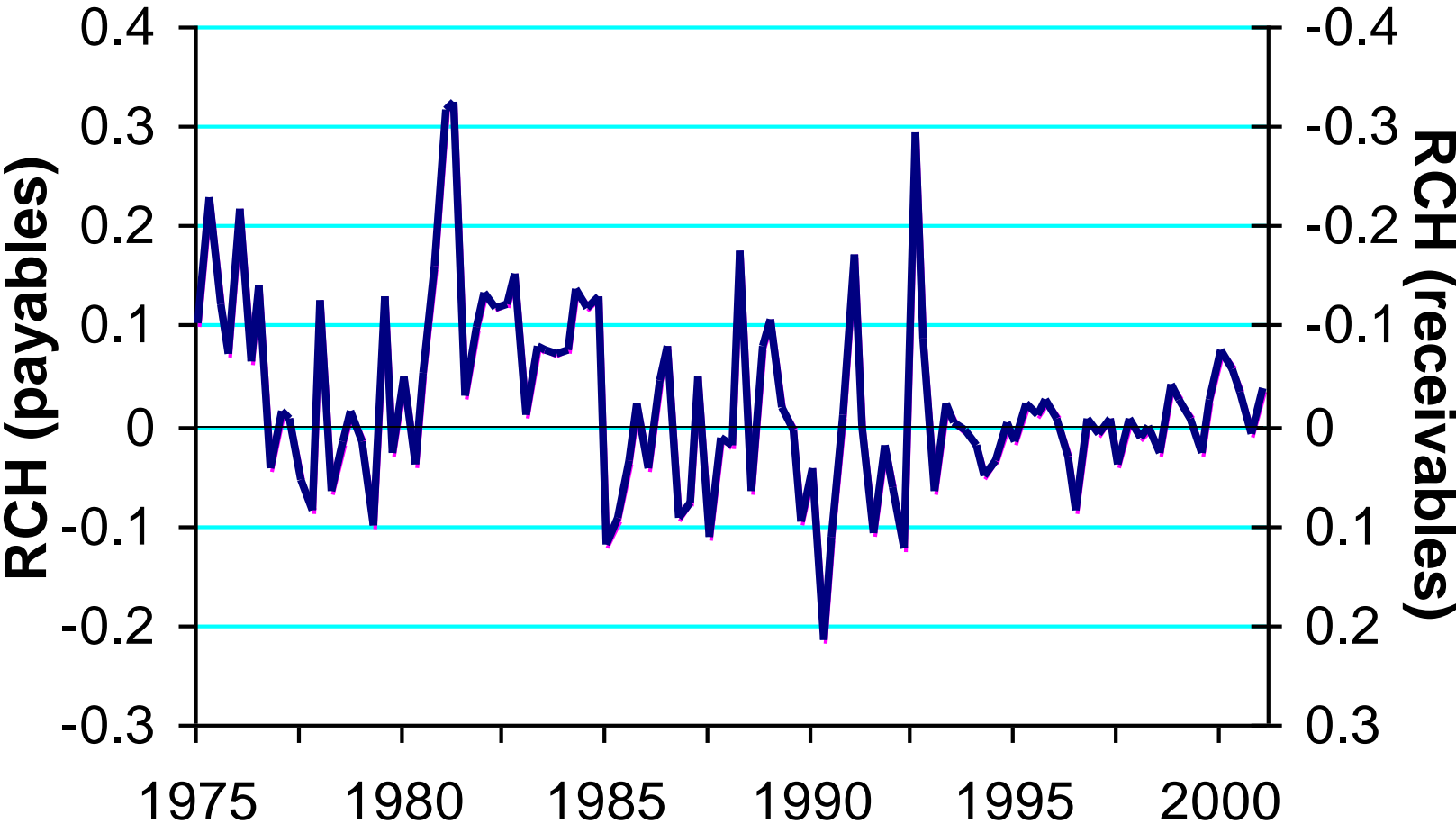
There is a 15% chance that the real cost of hedging will be negative.

# Techniques to Eliminate Transaction Exposure



- If the forward rate is an accurate predictor of the future spot rate, the real cost of hedging will be zero.
- If the forward rate is an unbiased predictor of the future spot rate, the real cost of hedging will be zero on average.

# The Real Cost of Hedging British Pounds Over Time

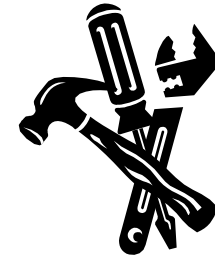


# Techniques to Eliminate Transaction Exposure

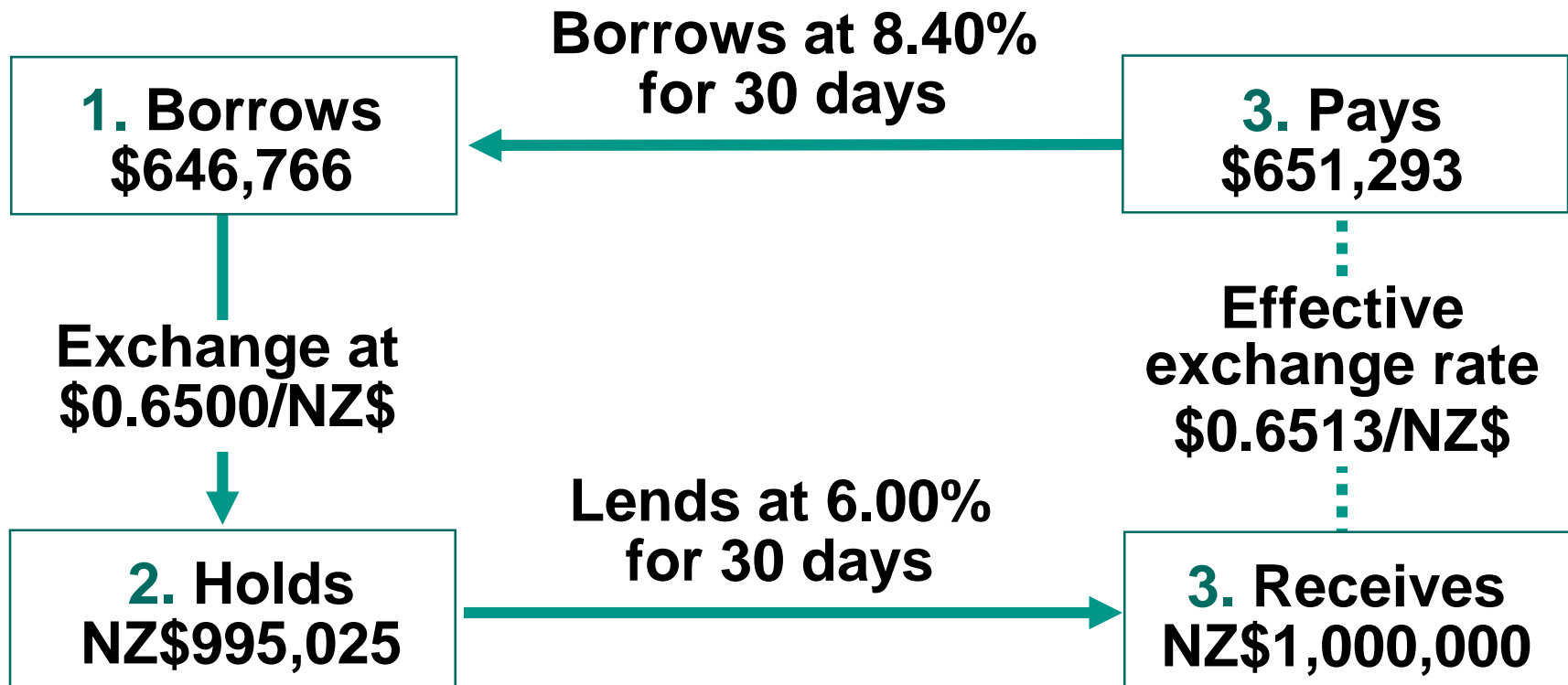


- A *money market hedge* involves taking one or more money market positions to cover a transaction exposure.
- Often, two positions are required.
  - ⌘ Payables: ① Borrow in the home currency, and ② invest in the foreign currency.
  - ⌘ Receivables: ① borrow in the foreign currency, and ② invest in the home currency.

# Techniques to Eliminate Transaction Exposure



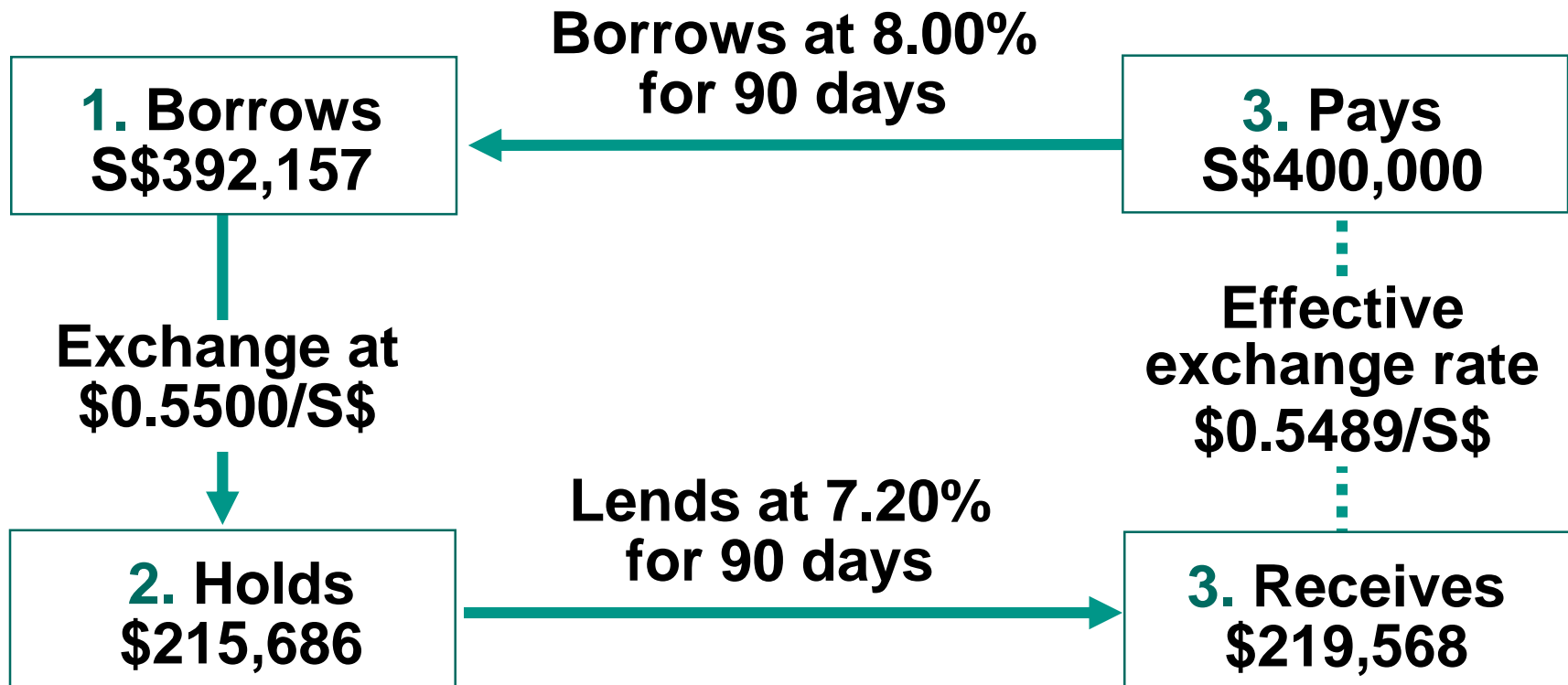
*A firm needs to pay NZ\$1,000,000 in 30 days.*



# Techniques to Eliminate Transaction Exposure



*A firm expects to receive S\$400,000 in 90 days.*



# Techniques to Eliminate Transaction Exposure



- Note that taking just one money market position may be sufficient.
  - ⌘ A firm that has excess cash need not borrow in the home currency when hedging payables.
  - ⌘ Similarly, a firm that is in need of cash need not invest in the home currency money market when hedging receivables.

# Techniques to Eliminate Transaction Exposure



- For the two examples shown, the known results of money market hedging can be compared with the known results of forward or futures hedging to determine which the type of hedging that is preferable.

# Techniques to Eliminate Transaction Exposure



- If interest rate parity (IRP) holds, and transaction costs do not exist, a money market hedge will yield the same result as a forward hedge.
- This is so because the forward premium on a forward rate reflects the interest rate differential between the two currencies.

# Techniques to Eliminate Transaction Exposure



- A *currency option hedge* involves the use of currency call or put options to hedge transaction exposure.
- Since options need not be exercised, firms will be insulated from adverse exchange rate movements, and may still benefit from favorable movements.
- However, the firm must assess whether the premium paid is worthwhile.

# Using Currency Call Options for Hedging Payables

***British Pound Call Option:  
Exercise Price = \$1.60, Premium = \$.04.***

***For each £ :***

<b>Scenario</b>	<b>Nominal Cost without Hedging = Spot Rate</b>	<b>Nominal Cost with Hedging = Min(Spot,\$1.60)+\$.04</b>
<b>1</b>	<b>\$1.58</b>	<b>\$1.62</b>
<b>2</b>	<b>\$1.62</b>	<b>\$1.64</b>
<b>3</b>	<b>\$1.66</b>	<b>\$1.64</b>

# Using Put Options for Hedging Receivables

***New Zealand Dollar Put Option:  
Exercise Price = \$0.50, Premium = \$.03.***

***For each NZ\$ :***

<b>Scenario</b>	<b>Nominal Income without Hedging = Spot Rate</b>	<b>Nominal Income with Hedging = Max(Spot,\$0.50)- \$.03</b>
<b>1</b>	<b>\$0.44</b>	<b>\$0.47</b>
<b>2</b>	<b>\$0.46</b>	<b>\$0.47</b>
<b>3</b>	<b>\$0.51</b>	<b>\$0.48</b>

# Techniques to Eliminate Transaction Exposure



## *Hedging Payables    Hedging Receivables*

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*Futures hedge*

Purchase currency futures contract(s).

Sell currency futures contract(s).

*Forward hedge*

Negotiate forward contract to buy foreign currency.

Negotiate forward contract to sell foreign currency.

*Money market hedge*

Borrow local currency. Convert to and then invest in foreign currency.

Borrow foreign currency. Convert to and then invest in local currency.

*Currency option*

Purchase currency call option(s).

Purchase currency put option(s).

# Techniques to Eliminate Transaction Exposure



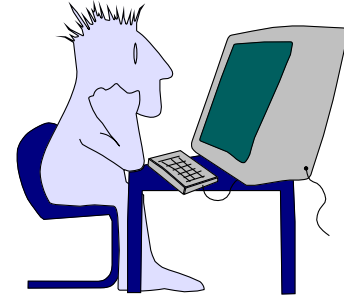
- A comparison of hedging techniques should focus on minimizing payables, or maximizing receivables.
- Note that the cash flows associated with currency option hedging and remaining unhedged cannot be determined with certainty.

# Techniques to Eliminate Transaction Exposure



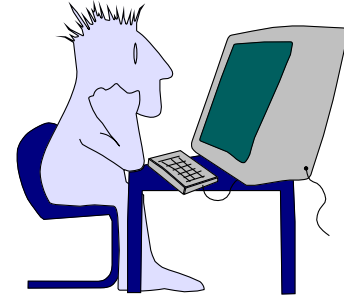
- In general, hedging policies vary with the MNC management's degree of risk aversion and exchange rate forecasts.
- The hedging policy of an MNC may be to hedge most of its exposure, none of its exposure, or to selectively hedge its exposure.

# Online Application



- Forward rates can be found online at
  - <http://www.ny.frb.org/pihome/statistics/forex10.shtml>
  - <http://pacific.commerce.ubc.ca/xr/telerate.html>
  - <http://www.bmo.com/economic/regular/fxrates.html>

# Online Application



- The Chicago Mercantile Exchange provides current and historical futures and option prices at <http://www.cme.com/prices/index.cfm>.
- Also visit
  - the Chicago Board Options Exchange at <http://www.cboe.com>, and
  - the London International Financial Futures and Options Exchange at [www.liffe.com](http://www.liffe.com).

# Limitations of Hedging

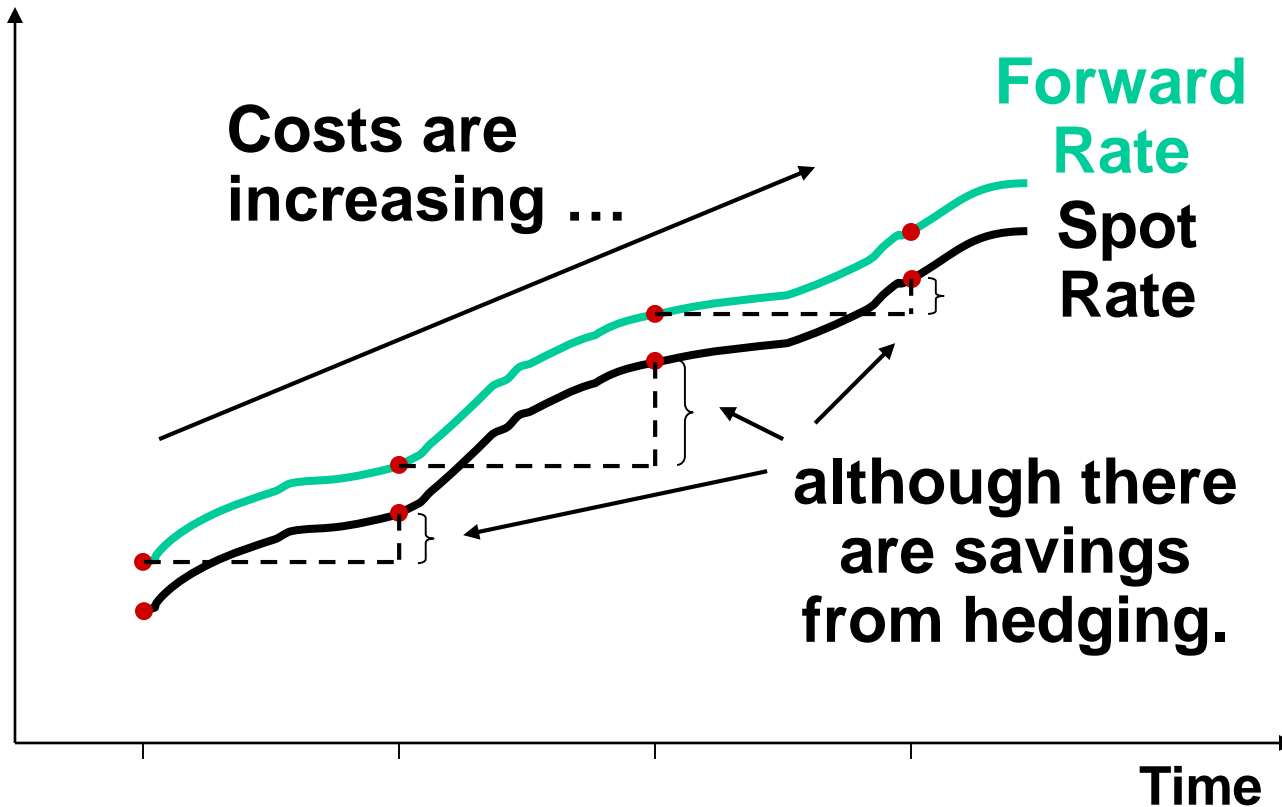
- Some international transactions involve an uncertain amount of foreign currency, such that overhedging may result.
- One way of avoiding overhedging is to hedge only the minimum known amount in the future transaction(s).

# Limitations of Hedging

- In the long run, the continual hedging of repeated transactions may have limited effectiveness.
- For example, the forward rate often moves in tandem with the spot rate. Thus, an importer who uses one-period forward contracts continually will have to pay increasingly higher prices during a strong-foreign-currency cycle.

# Limitations of Hedging

*Repeated Hedging of Foreign Payables when the Foreign Currency is Appreciating*



# Hedging Long-Term Transaction Exposure

- MNCs that are certain of having cash flows denominated in foreign currencies for several years may attempt to use long-term hedging.
- Three commonly used techniques for long-term hedging are:
  - ⌘ long-term forward contracts,
  - ⌘ currency swaps, and
  - ⌘ parallel loans.

# Hedging Long-Term Transaction Exposure

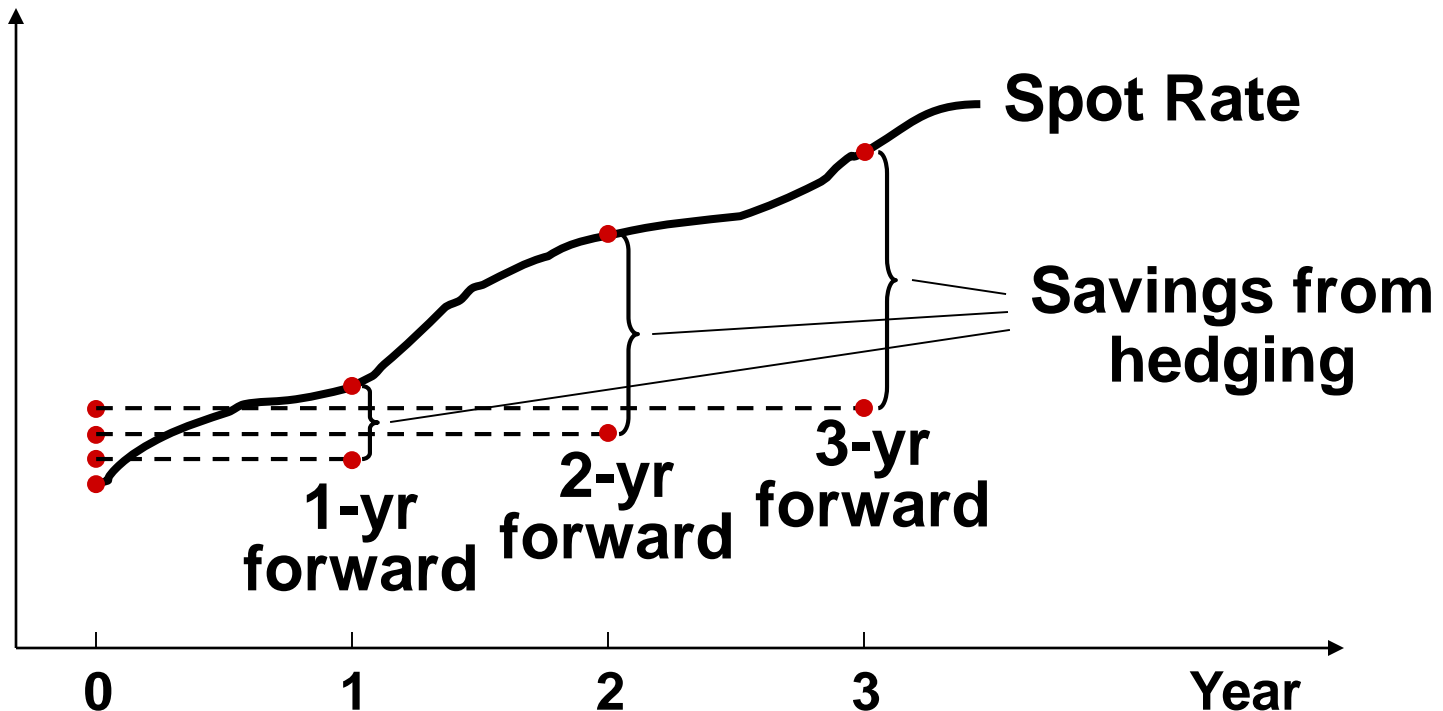
- *Long-term forward contracts*, or long forwards, with maturities of ten years or more, can be set up for very creditworthy customers.
- *Currency swaps* can take many forms. In one form, two parties, with the aid of brokers, agree to exchange specified amounts of currencies on specified dates in the future.

# Hedging Long-Term Transaction Exposure

- A *parallel loan*, or back-to-back loan, involves an exchange of currencies between two parties, with a promise to re-exchange the currencies at a specified exchange rate and future date.

# Hedging Long-Term Transaction Exposure

*Long-Term Hedging of Foreign Payables when the Foreign Currency is Appreciating*



# Alternative Hedging Techniques

- Sometimes, a perfect hedge is not available (or is too expensive) to eliminate transaction exposure.
- To reduce exposure under such a condition, the firm can consider:
  - ⌘ leading and lagging,
  - ⌘ cross-hedging, or
  - ⌘ currency diversification.

# Alternative Hedging Techniques

- The act of *leading and lagging* refers to an adjustment in the timing of payment request or disbursement to reflect expectations about future currency movements.
- Expediting a payment is referred to as *leading*, while deferring a payment is termed *lagging*.

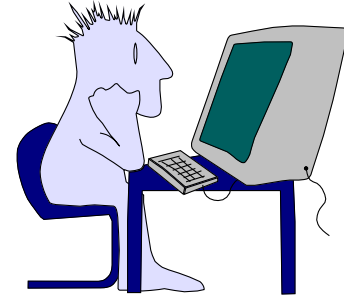
# Alternative Hedging Techniques

- When a currency cannot be hedged, a currency that is highly correlated with the currency of concern may be hedged instead.
- The stronger the positive correlation between the two currencies, the more effective this *cross-hedging* strategy will be.

# Alternative Hedging Techniques

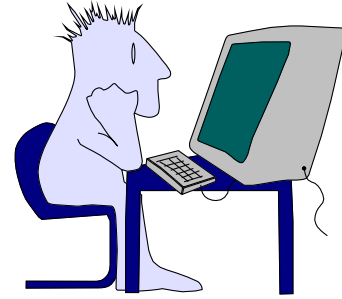
- With *currency diversification*, the firm diversifies its business among numerous countries whose currencies are not highly positively correlated.

# Online Application



- The annual reports for many MNCs may be found at <http://www.reportgallery.com>. Review some annual reports and see if you can find any comments that describe the MNCs' hedging of transaction exposures.

# Online Application



- Check out the Futures magazine website at <http://www.futuresmag.com/> for a discussion of the various aspects of derivatives trading, such as new products, strategies, and market analyses.
- Also check out <http://www.ino.com/>.

# Impact of Hedging Transaction Exposure on an MNC's Value

**Hedging Decisions on Transaction Exposure**

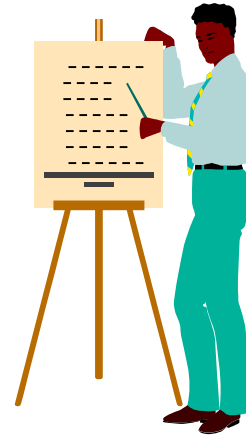
$$\text{Value} = \sum_{t=1}^n \left\{ \frac{\sum_{j=1}^m [E(CF_{j,t}) \times E(ER_{j,t})]}{(1+k)^t} \right\}$$

$E(CF_{j,t})$  = expected cash flows in currency  $j$  to be received by the U.S. parent at the end of period  $t$

$E(ER_{j,t})$  = expected exchange rate at which currency  $j$  can be converted to dollars at the end of period  $t$

$k$  = weighted average cost of capital of the parent

# Chapter Review



- Transaction Exposure
- Identifying Net Transaction Exposure

# Chapter Review

- Techniques to Eliminate Transaction Exposure
  - ⌘ Futures Hedge
  - ⌘ Forward Hedge
  - ⌘ Measuring the Real Cost of Hedging
  - ⌘ Money Market Hedge
  - ⌘ Currency Option Hedge
  - ⌘ Comparison of Hedging Techniques
  - ⌘ Hedging Policies of MNCs

# Chapter Review

- Limitations of Hedging
  - Limitation of Hedging an Uncertain Amount
  - Limitation of Repeated Short-Term Hedging
- Hedging Long-Term Transaction Exposure
  - Long-Term Forward Contract
  - Currency Swap
  - Parallel Loan

# Chapter Review

- Alternative Hedging Techniques
  - Leading and Lagging
  - Cross-Hedging
  - Currency Diversification
- How Transaction Exposure Management Affects an MNC's Value