Chapter 8

Types of Exposure

- Transaction exposure
  - Sensitivity of realized domestic currency values of the firm’s contractual cash flows denominated in foreign currencies to unexpected changes in exchange rates
- Economic exposure
  - Extent to which the value of the firm would be affected by unanticipated changes in exchange rates
- Translation exposure
  - Potential that the firm’s consolidated financial statements can be affected by changes in exchange rates

Transaction Exposure

- Receivables or payables denominated in foreign currency
  - Receivables
    - If home currency appreciates, you receive less in terms of the domestic currency
  - Payables
    - If home currency depreciates, it requires more of domestic currency

Forward Market Hedge

- If you are going to owe foreign currency in the future, agree to buy the foreign currency now by entering into long position in a forward contract.
- If you are going to receive foreign currency in the future, agree to sell the foreign currency now by entering into short position in a forward contract.

Forward Market Hedge: an Example

You are a U.S. importer of British woolens and have just ordered next year’s inventory. Payment of £100M is due in one year.

Question: How can you fix the cash outflow in dollars?
Answer: One way is to put yourself in a position that delivers £100M in one year—a long forward contract on the pound.

Forward Market Hedge

Suppose the forward exchange rate is $1.50/£. If he does not hedge the £100m payable, in one year his gain (loss) on the unhedged position is shown in green.

The importer will be better off if the pound depreciates: he still buys £100m but at an exchange rate of only $1.20/£ he saves $30 million relative to $1.50/£. But he will be worse off if the pound appreciates.
Forward Market Hedge

If he agrees to buy £100m in one year at $1.50/£ his gain (loss) on the forward are shown in blue.

$30m
Long forward
$0

If you agree to buy £100 million at a price of $1.50 per pound, you will make $30 million if the price of a pound reaches $1.80.

Value of £1 in $ in one year
$1.20/£ $1.50/£ $1.80/£

If you agree to buy £100 million at a price of $1.50 per pound, you will lose $30 million if the price of a pound is only $1.20.

Money Market Hedge

□ This is the same idea as covered interest arbitrage.
□ To hedge a foreign currency payable, buy the foreign currency today and hold it.
□ Buy the present value of the foreign currency payable today.
□ Invest that amount at the foreign rate.
□ At maturity your investment will have grown enough to cover your foreign currency payable.

Money Market Hedge

A U.S.–based importer of Italian bicycles
□ In one year owes €100,000 to an Italian supplier.
□ The spot exchange rate is $1.25 = €1.00
□ The one-year interest rate in Italy is \( i_€ = 4\% \)

Can hedge this payable by buying €96,153.85 = \( \frac{€100,000}{1.04} \) today and investing €96,153.85 at 4% in Italy for one year. At maturity, he will have €100,000 = €96,153.85 \times (1.04)

Dollar cost today = $120,192.31 = €96,153.85 \times \frac{1.25}{€1.00}

Options Market Hedge

□ Options provide a flexible hedge against the downside, while preserving the upside potential.
□ To hedge a foreign currency payable buy calls on the currency.
□ If the currency appreciates, your call option lets you buy the currency at the exercise price of the call.
□ To hedge a foreign currency receivable buy puts on the currency.
□ If the currency depreciates, your put option lets you sell the currency for the exercise price.
Options Market Hedge

Suppose the forward exchange rate is $1.50/£.
If an importer who owes £100m does not hedge the payable, in one year his gain (loss) on the unhedged position is shown in green.

The importer will be better off if the pound depreciates: he still buys £100m but at an exchange rate of only $1.20/£ he saves $30 million relative to $1.50/£.

But he will be worse off if the pound appreciates. He pays $0.05 per pound for the call.

Options Markets Hedge

The payoff of the portfolio of a call and a payable is shown in red. He can still profit from decreases in the exchange rate below $1.45/£ but has a hedge against unfavorable increases in the exchange rate.

Options Markets Hedge

If the exchange rate increases to $1.80/£ the importer makes $25 m on the call but loses $30 m on the payable for a maximum loss of $5 million. This can be thought of as an insurance premium.

Options Markets Hedge

IMPORTERS who OWE foreign currency in the future should BUY CALL OPTIONS.
- If the price of the currency goes up, his call will lock in an upper limit on the dollar cost of his imports.
- If the price of the currency goes down, he will have the option to buy the foreign currency at a lower price.

EXPORTERS with accounts receivable denominated in foreign currency should BUY PUT OPTIONS.
- If the price of the currency goes down, puts will lock in a lower limit on the dollar value of his exports.
- If the price of the currency goes up, he will have the option to sell the foreign currency at a higher price.

Hedging Exports with Put Options

- Show the portfolio payoff of an exporter who is owed £1 million in one year.
- The current one-year forward rate is £1 = $2.
- Instead of entering into a short forward contract, he buys a put option written on £1 million with a maturity of one year and a strike price of £1 = $2.
- The cost of this option is $0.05 per pound.
Options Market Hedge:
Exporters buy a put option to protect the dollar value of their receivables.

- $1,950,000
- $50k
- $2m
- $2
- $2.05
- $1.8m
- $1,720,000
- $80k
- $1.80
- $1.72
- $1.88
- $1.72
- $1.80

Hedging Imports with Call Options

- Show the portfolio payoff of an importer who owes £1 million in one year.
- The current one-year forward rate is £1 = $1.80; but instead of entering into a short forward contract,
- He buys a call option written on £1 million with an expiry of one year and a strike of £1 = $1.80. The cost of this option is $0.08 per pound.

- Our importer who buys a call to protect himself from increases in the value of the pound creates a synthetic put option on the pound.

- He makes money if the pound falls in value.

- The cost of this “insurance policy” is $80,000

Options

- A motivated financial engineer can create almost any risk-return profile that a company might wish to consider.

- The key is that the company needs to be sure that it understands the true risk associated with the derivative contract.
Cross-Hedging
Minor Currency Exposure
- The major currencies are the: U.S. dollar, Canadian dollar, British pound, Euro, Swiss franc, Mexican peso, and Japanese yen.
- Everything else is a minor currency, like the Thai bhat.
- It is difficult, expensive, or impossible to use financial contracts to hedge exposure to minor currencies.

Hedging Contingent Exposure
- If only certain contingencies give rise to exposure, then options can be effective insurance.
- For example, if your firm is bidding on a hydroelectric dam project in Canada, you will need to hedge the Canadian-U.S. dollar exchange rate only if your bid wins the contract. Your firm can hedge this contingent risk with options.

Hedging through Invoice Currency
- The firm can shift, share, or diversify:
  - shift exchange rate risk
  - by invoicing foreign sales in home currency
  - share exchange rate risk
  - by pro-rating the currency of the invoice between foreign and home currencies
  - diversify exchange rate risk
  - by using a market basket index

Hedging via Lead and Lag
- If a currency is appreciating, pay those bills denominated in that currency early; let customers in that country pay late as long as they are paying in that currency.
- If a currency is depreciating, give incentives to customers who owe you in that currency to pay early; pay your obligations denominated in that currency as late as your contracts will allow.

Cross-Hedging
Minor Currency Exposure
- Cross-Hedging involves hedging a position in one asset by taking a position in another asset.
- The effectiveness of cross-hedging depends upon how well the assets are correlated.
- An example would be a U.S. importer with liabilities in Swedish krona hedging with long or short forward contracts on the euro. If the krona is expensive when the euro is expensive, or even if the krona is cheap when the euro is expensive it can be a good hedge. But they need to co-vary in a predictable way.

Hedging Recurrent Exposure with Swaps
- Recall that swap contracts can be viewed as a portfolio of forward contracts.
- Firms that have recurrent exposure can very likely hedge their exchange risk at a lower cost with swaps than with a program of hedging each exposure as it comes along.
- It is also the case that swaps are available in longer-terms than futures and forwards.
Exposure Netting

- A multinational firm should not consider deals in isolation, but should focus on hedging the firm as a portfolio of currency positions.
- As an example, consider a U.S.-based multinational with Korean won receivables and Japanese yen payables. Since the won and the yen tend to move in similar directions against the U.S. dollar, the firm can just wait until these accounts come due and just buy yen with won.
- Even if it’s not a perfect hedge, it may be too expensive or impractical to hedge each currency separately.

Should the Firm Hedge?

- Not everyone agrees that a firm should hedge:
  - Hedging by the firm may not add to shareholder wealth if the shareholders can manage exposure themselves.
  - Hedging may not reduce the non-diversifiable risk of the firm. Therefore shareholders who hold a diversified portfolio are not helped when management hedges.

Exposure Netting

- Many multinational firms use a reinvoice center. Which is a financial subsidiary that nets out the intrafirm transactions.
- Once the residual exposure is determined, then the firm implements hedging.

Should the Firm Hedge?

- In the presence of market imperfections, the firm should hedge.
  - Information Asymmetry
    - The managers may have better information than the shareholders.
  - Differential Transactions Costs
    - The firm may be able to hedge at better prices than the shareholders.
  - Default Costs
    - Hedging may reduce the firm's cost of capital if it reduces the probability of default.

Should the Firm Hedge?

- Taxes can be a large market imperfection.
  - Corporations that face progressive tax rates may find that they pay less in taxes if they can manage earnings by hedging than if they have “boom and bust” cycles in their earnings stream.

What Risk Management Products do Firms Use?

- Most U.S. firms meet their exchange risk management needs with forward, swap, and options contracts.
- The greater the degree of international involvement, the greater the firm’s use of foreign exchange risk management.