

# Topic 7 – Measuring Exposure to Exchange Rate Fluctuations

## Chapter 10: Measuring Exposure to Exchange Rate Fluctuations

- **Exchange rate risk:** risk that a company's performance is affected by exchange rate movements.
- Firms are commonly subject to the following forms of exchange rate exposure:
  1. Transaction exposure
  2. Economic exposure
  3. Translation exposure.

### Transaction exposure

- The **sensitivity** of the firm's **contractual transactions** in foreign currencies to ER movements.
- It is a subset of economic exposure
- In order to assess transaction exposure, an MNC must:
  - (1) estimate its net cash flows in each currency and
  - (2) measure the possible effects of its exposure to those currencies

### Economic exposure

- The value of a firm's cash flows can be affected by exchange rate movements if:
  - it executes transactions in foreign currencies
  - receives revenue from foreign customers, or
  - subject to foreign competition
- **Measures of economic exposure:**
  - (1) **Sensitivity analysis** – consider how sales and expense categories are affected by various exchange rate scenarios.
  - (2) **Regression analysis** – the regression coefficient  $a_1$ , which is estimated by regression analysis, indicates the sensitivity of  $PCF_t$  to  $e_t$ .
    - If  $a_1$  is (+)ive, the implication is that an  $\uparrow$  in the currency's value has a favorable effect on the firm's cash flows.
    - If  $a_1$  is (-)ive, implies an inverse relationship b/w the  $\Delta$  in the currency's value and the firm's CFs.

## Chapter 11: Managing Translation Exposure

### Hedging exposure to payables

- Transaction exposure exists when there are **contractual transactions** that cause a MNC to either **need or receive** a **specified amount** of a foreign currency at a **specified time** in the future.
- An MNC may decide to hedge **part or all** of its known payables transactions so that it is insulated from possible **appreciation** of the currency
- **Techniques**
  1. Futures hedge: buy futures contract
  1. Forward hedge: buy amount forward
  2. Money market hedge: borrow the currency to be paid
    - Involves taking a **money market position** to cover a futures payables position
    - **Invest future amount needed in foreign currency**
  3. Currency option hedge: call option

**Example:** AUSSI CO. is an Australian MNC that will need to pay **1m Euros** in 1 year.

#### 1. Forward contract

- It could obtain a forward contract to purchase the euros in one year.
- The one-year forward rate is AUD1.20, the same rate as currency futures contracts on euros. If AUSSI purchases Euros 1 year forward, its AUD cost in one year is ...
- $AUD=1m\ EUR \times AUD1.20/EUR1 = 1.2m$

## 2. Money market hedge

- AUSSI CO. needs to pay 1m Euros in one year (assume firm uses excess cash)
- Interest rate in Eurozone 5%
- Deposit amount to hedge payables = 1m EUR/ (1+0.05) = 952,381 EUR
- Spot rate AUD1.18 yields deposit amount in AUD  
= 952,381EUR x AUD1.18/EUR1  
= AUD 1,123,810
- If AUSSI Co. borrows amount instead of using excess cash, the AUD amount of the loan repayment is =  
AUD 1,123,810 x (1.08) = 1,213,714

## 3. Call option

- AUSSI Co. could purchase call options on EUR 1m to hedge its payables. Assume that call options have an exercise price of AUD1.20, a premium of AUD0.03, and an expiration date of 1 year from now.
- Scenarios:
  - (i) AUD1.16 → do not exercise → AUD = 1,190,000
  - (ii) AUD1.19 → do not exercise → AUD = 1,220,000
  - (iii) AUD1.20 → exercise → AUD = 1,230,000
  - (iv) AUD1.25 → exercise → AUD = 1,230,000
- Expected value (equal probabilities) = AUD 1,217,500

- Optimal Hedge: The one that results in the lowest payable
- Optimal Hedge v No Hedge:  $RCH_p = \text{Cost of hedging payables} - \text{Cost of payables if not hedged}$   
If > 0 then no hedge is better

## Hedging exposure to payables

- An MNC may decide to hedge part or all of its known receivables transactions so that it is insulated from possible **depreciation** of the currency
- Techniques
  1. Futures hedge: sell futures contract
  2. Forward hedge: sell amount forward
  3. Money market hedge: borrowing the currency to be received
  4. Currency option hedge: put option
- Optimal Hedge: The one that results in the highest receipts
- Optimal Hedge v No Hedge:  $RCH_p = \text{Cash received if hedged} - \text{Cash received if not hedged}$   
If > 0 then hedge is better

## Summary

**Exhibit 11.9** Review of Techniques for Hedging Transaction Exposure

TECHNIQUE	TO HEDGE PAYABLES	TO HEDGE RECEIVABLES
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.

## Alternatives Hedging Techniques

- When a perfect hedge is not available (or is too expensive) to eliminate transaction exposure, the firm should consider methods that can at least reduce exposure.
- Such methods include:
  1. **Leading and lagging:** involve adjusting timing of a payment/ receivable
  2. **Cross-hedging:** reducing exposure to a currency that cannot be hedged directly → hedge with highly correlated currency
  3. **Currency diversification:** low correlation of currencies diversifies exposure