Chapter Objectives

- To discuss the relevance of an MNC’s exposure to exchange rate risk;
- To explain how transaction exposure can be measured;
- To explain how economic exposure can be measured; and
- To explain how translation exposure can be measured.

Is Exchange Rate Risk Relevant?

**Purchasing Power Parity Argument**
- Exchange rate movements will be matched by price movements.
- PPP does not necessarily hold.

**The Investor Hedge Argument**
- MNC shareholders can hedge against exchange rate fluctuations on their own.
- The investors may not have complete information on corporate exposure. They may not have the capabilities to correctly insulate their individual exposure too.

**Currency Diversification Argument**
- An MNC that is well diversified should not be affected by exchange rate movements because of offsetting effects.
- This is a naive presumption.

**Stakeholder Diversification Argument**
- Well diversified stakeholders will be somewhat insulated against losses experienced by an MNC due to exchange rate risk.
- MNCs may be affected in the same way because of exchange rate risk.
Is Exchange Rate Risk Relevant?

Response from MNCs

• Many MNCs have attempted to stabilize their earnings with hedging strategies, which confirms the view that exchange rate risk is relevant.

Types of Exposure

• Although exchange rates cannot be forecasted with perfect accuracy, firms can at least measure their exposure to exchange rate fluctuations.

• Exposure to exchange rate fluctuations comes in three forms:
  ▫ Transaction exposure
  ▫ Economic exposure
  ▫ Translation exposure

Types of Exposure

Is Exchange Rate Risk Relevant?

Transaction Exposure

• The degree to which the value of future cash transactions can be affected by exchange rate fluctuations is referred to as transaction exposure.

• To measure transaction exposure:
  ▪ project the net amount of inflows or outflows in each foreign currency, and
  ▪ determine the overall risk of exposure to those currencies.

Transaction Exposure

• MNCs can usually anticipate foreign cash flows for an upcoming short-term period with reasonable accuracy.

• After the consolidated net currency flows for the entire MNC has been determined, each net flow is converted into either a point estimate or a range of a chosen currency, so as to standardize the exposure assessment for each currency.

Transaction Exposure

• An MNC’s overall exposure can be assessed by considering each currency position together with the currency’s variability and the correlations among the currencies.

• The standard deviation statistic on historical data serves as one measure of currency variability. Note that currency variability levels may change over time.

Transaction Exposure

Standard Deviations of Exchange Rate Movements
Based on Monthly Data

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>British pound</td>
<td>0.0309</td>
<td>0.0148</td>
</tr>
<tr>
<td>Canadian dollar</td>
<td>0.0100</td>
<td>0.0110</td>
</tr>
<tr>
<td>Indian rupee</td>
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<tr>
<td>Japanese yen</td>
<td>0.0279</td>
<td>0.0208</td>
</tr>
<tr>
<td>New Zealand dollar</td>
<td>0.0289</td>
<td>0.0190</td>
</tr>
<tr>
<td>Swedish krona</td>
<td>0.0287</td>
<td>0.0195</td>
</tr>
<tr>
<td>Swiss franc</td>
<td>0.0330</td>
<td>0.0246</td>
</tr>
<tr>
<td>Singapore dollar</td>
<td>0.0111</td>
<td>0.0174</td>
</tr>
</tbody>
</table>
The correlations among currency movements can be measured by their correlation coefficients, which indicate the degree to which two currencies move in relation to each other.

- Perfect positive correlation: 1.00
- No correlation: 0.00
- Perfect negative correlation: -1.00

The point in considering correlations is to detect positions that could somewhat offset each other. For example, if currencies X and Y are highly correlated, the exposures of a net X inflow and a net Y outflow will offset each other to a certain degree.

Note that the correlations among currencies may change over time.

A related method, the value-at-risk (VAR) method, incorporates currency volatility and correlations to determine the potential maximum one-day loss. Historical data is used to determine the potential one-day decline in a particular currency. This decline is then applied to the net cash flows in that currency.

Economic exposure refers to the degree to which a firm’s present value of future cash flows can be influenced by exchange rate fluctuations. Cash flows that do not require conversion of currencies do not reflect transaction exposure. Yet, these cash flows may also be influenced significantly by exchange rate movements.
Economic Exposure

Transactions that Influence the Firm's Cash Inflows  Impact on Transactions
Local sales (relative to foreign competition in local markets)  Decrease  Increase
Firm's exports denominated in local currency  Decrease  Increase
◊ Firm's exports denominated in foreign currency  Decrease  Increase
◊ Interest received from foreign investments  Decrease  Increase
◊ Transactions reflecting transaction exposure.

Transactions that Influence the Firm's Cash Outflows  Impact on Transactions
Firm's imported supplies denominated in local currency  No Change  No Change
◊ Firm's imported supplies denominated in foreign currency  Decrease  Increase
◊ Interest owed on foreign funds borrowed  Decrease  Increase
◊ Transactions reflecting transaction exposure.

• Even purely domestic firms may be affected by economic exposure if there is foreign competition within the local markets.
• MNCs are likely to be much more exposed to exchange rate fluctuations. The impact varies across MNCs according to their individual operating characteristics and net currency positions.

• One measure of economic exposure involves classifying the firm's cash flows into income statement items, and then reviewing how the earnings forecast in the income statement changes in response to alternative exchange rate scenarios.
• In general, firms with more foreign costs than revenues will be unfavorably affected by stronger foreign currencies.

• Another method of assessing a firm’s economic exposure involves applying regression analysis to historical cash flow and exchange rate data.

\[ PCF_t = a_0 + a_1 e_t + \mu_t \]
PCF = % change in inflation-adjusted cash flows measured in the firm's home currency over period \( t \)
e = % change in the currency exchange rate over period \( t \)
\( \mu \) = random error term
\( a_0 \) = intercept
\( a_1 \) = slope coefficient
Economic Exposure

- The regression model may be revised to handle multiple currencies by including them as additional independent variables, or by using a currency index (composite).
- By changing the dependent variable, the impact of exchange rates on the firm’s value (as measured by its stock price), earnings, exports, sales, etc. may also be assessed.

Translation Exposure

- The exposure of the MNC’s consolidated financial statements to exchange rate fluctuations is known as translation exposure.
- In particular, subsidiary earnings translated into the reporting currency on the consolidated income statement are subject to changing exchange rates.

Translation Exposure

**Does Translation Exposure Matter?**

- **Cash Flow Perspective** - Translating financial statements for consolidated reporting purposes does not by itself affect an MNC’s cash flows.
- However, a weak foreign currency today may result in a forecast of a weak exchange rate at the time subsidiary earnings are actually remitted.

Translation Exposure

**Does Translation Exposure Matter?**

- **Stock Price Perspective** - Since an MNC’s translation exposure affects its consolidated earnings and many investors tend to use earnings when valuing firms, the MNC’s valuation may be affected.

Translation Exposure

- In general, translation exposure is relevant because
  - some MNC subsidiaries may want to remit their earnings to their parents now,
  - the prevailing exchange rates may be used to forecast the expected cash flows that will result from future remittances, and
  - consolidated earnings are used by many investors to value MNCs.

Translation Exposure

- An MNC’s degree of translation exposure is dependent on:
  - the proportion of its business conducted by its foreign subsidiaries,
  - the locations of its foreign subsidiaries, and
  - the accounting method that it uses.
Translation Exposure

• According to World Research Advisory estimates, the translated earnings of U.S.-based MNCs in aggregate were reduced by $20 billion in the third quarter of 1998 alone simply because of the depreciation of Asian currencies against the dollar.

• In 2000, the weakness of the euro also caused several U.S.-based MNCs to report lower earnings than expected.

Impact of Exchange Rate Exposure on an MNC’s Value

\[
\text{Value} = \sum_{t=1}^{\infty} \left( \frac{\text{E} (\text{CF}_{j,t} \cdot \text{E} (\text{ER}_{j,t}))}{(1 + k)^t} \right)
\]

- \text{E} (\text{CF}_{j,t}) = \text{expected cash flows in currency } j \text{ to be received by the U.S. parent at the end of period } t
- \text{E} (\text{ER}_{j,t}) = \text{expected exchange rate at which currency } j \text{ can be converted to dollars at the end of period } t
- k = \text{weighted average cost of capital of the parent}