

# Chapter 10

## Measuring Exposure To Exchange Rate Fluctuations



# Exchange Rate Exposure

Businesses face exchange rate exposure whenever they deal with currencies that are based on the flexible or floating exchange rate systems.

Exchange rate exposure arises when firms have net cash flows (inflows – outflows) in currencies that fluctuate in value.

Before deciding on exposure management, firms need to first quantify (measure) that exposure.



# Chapter Objectives

- To discuss the **relevance** of exchange rate exposure to MNCs;
- 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.

## ***Investor Hedge Argument***

- . Shareholders can hedge against exchange rate fluctuations on their own

## ***Currency Diversification Argument***

- . A well-diversified MNC should not be affected because of offsetting currency exposures will stabilize corporate cash flows



# Is Exchange Rate Risk Relevant?

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## *Response from MNCs*

- Many MNCs have attempted to stabilize their earnings with hedging strategies because they believe exchange rate risk is real and 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



# Transaction Exposure

- The degree to which the value of future **short-term** cash transactions (e.g., A/P and A/R in foreign currencies) can be affected by exchange rate fluctuations is referred to as **transaction exposure**.
- To measure transaction exposure:
  - ① estimate the net cash inflow or outflow in each currency, and
  - ② measure the potential impact of that exposure to currency value changes.

# Estimating Net Currency Flows

- 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 a point estimate (or range) of a chosen currency.
- The exposure for each currency can then be assessed.



# Measuring the Potential Impact

- An MNC's exposure can be measured by considering the proportion (weight) of each currency together with the currency's variability and correlation with the movements of the other currencies.
- For a two-currency portfolio,

$$\sigma_p = \sqrt{w_x^2 \sigma_x^2 + w_y^2 \sigma_y^2 + 2w_x w_y \sigma_x \sigma_y \mathbf{CORR}_{xy}}$$

# Measuring the Potential Impact

- The **standard deviation** statistic measures currency variability (fluctuation).
- **Correlation coefficients** indicate the degree to which two currencies move in relation to each other.

	<b>Coefficient</b>
<b>Perfect positive correlation</b>	<b>1.00</b>
<b>No correlation</b>	<b>0.00</b>
<b>Perfect negative correlation</b>	<b>-1.00</b>

- **Both variability and correlations vary among currencies and over time.**



# Correlations Among Exchange Rate Movements

	British Pound	Canadian Dollar	Euro	Japanese Yen	Swedish Krona
British Pound	1.00				
Canadian Dollar	.35	1.00			
Euro	.91	.48	1.00		
Japanese Yen	.71	.12	.67	1.00	
Swedish Krona	.83	.57	.92	.64	1.00

## Impact of Cash Flow and Correlation Conditions on an MNC's Exposure

Expected Net Cash Flow Currency $x$	Expected Net Cash Flow Currency $y$	Correlation between Currencies $x$ and $y$	MNC's Exposure
+Q	+Q	Highly positive	High
+Q	+Q	Slightly positive	Moderate
+Q	+Q	Negative	Low
+Q	-Q	Highly positive	Low
+Q	-Q	Slightly positive	Moderate
+Q	-Q	Negative	High



# Economic Exposure

- **Economic exposure** refers to the degree to which a firm's **present value of future long term** cash flows can be influenced by exchange rate fluctuations.
- Some of these affected cash flows do not require currency conversion.
- Even a purely domestic firm like Shiner may be affected by economic exposure if it faces foreign competition in its local markets.

# Economic Exposure to Exchange Rate Fluctuations

Transactions that Influence the Firm's Cash Inflows	Local Currency Appreciates	Local Currency Depreciates
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 that Influence the Firm's Cash Inflows		
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
➤ <i>Transactions that reflect transaction exposure</i>		



# Economic Exposure

- Economic exposure can be measured by assessing the sensitivity of the firm's earnings to exchange rates.
  - This involves reviewing how the earnings forecast in the firm's income statement changes in response to alternative exchange rate scenarios.
- In general, firms with more foreign costs than revenues tend to be unfavorably affected by stronger foreign currencies.

# Economic Exposure

- Economic exposure can also be measured by assessing the sensitivity of the firm's cash flows to exchange rates through regression analysis.
- For a single foreign currency:

$$\mathbf{PCF}_t = \mathbf{a}_0 + \mathbf{a}_1 \mathbf{e}_t + \boldsymbol{\mu}_t$$

**$\mathbf{PCF}_t$  = % $\Delta$  in inflation-adjusted cash flows measured in the firm's home currency over period  $t$**

**$\mathbf{e}_t$  = % $\Delta$  in the exchange rate over period  $t$**



# Economic Exposure

- The model may be revised to handle additional currencies by including them as additional independent variables.
- By replacing the dependent variable (cash flows), 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 an 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.



# Does Translation Exposure Matter?

## *Cash Flow Perspective*

- ✘ The translation of financial statements for consolidated reporting purposes does not by itself affect an MNC's cash flows.
- ✓ However, a weak spot rate today may result in a weak exchange rate forecast (and hence a weak expected cash flow) for the future when subsidiary earnings are to be remitted.

# Does Translation Exposure Matter?

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## *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

- An MNC's degree of translation exposure is dependent on:
  - ① the proportion of its business conducted by foreign subsidiaries,
  - ② the locations of its foreign subsidiaries, and
  - ③ the accounting methods that it uses.