Module - 21

Foreign Exchange Exposures:
Transaction Exposure

Developed by: Dr. A.K.Misra
Assistant Professor, Finance
Vinod Gupta School of Management
Indian Institute of Technology
Kharagpur, India

Email: arunmisra@vgsom.iitkgp.ernet.in
Primary objective of this session is to understand the nature of currency exposure. Foreign exchange volatility creates different kinds of risks and these risks have defined in terms of exposure since they affect the balance sheet of a company in different manner. In this session, various kinds of foreign currency exposures are discussed in brief and measurement of transaction exposure is discussed in details.

In this session, the following details about foreign exchange exposure are discussed:

- **Brief review on risk and exposures**
- **A detail distinction of various kinds of exposures with examples**
- **A details analysis of transaction exposure and its measurement**

After going through the session, readers would understand the meaning of foreign exchange exposures and their classification. Readers would appreciate the measurement of transaction exposure.
Liberisation of financial markets has enhanced corporate risk significantly. Corporate treasurers have become increasingly concerned about exchange rate risk. It is primarily due to significant increased in international capital flows and exposure to different currencies.

Foreign exchange exposure is a measure of the potential for firm’s profitability, net cash flow and market value to change because of a change in exchange rates. An importance task of the financial manager is to measure foreign exchange exposure and to manage it so as to maximize the profitability, net cash flow and market value of the firm.

With the liberalization of foreign exchange market, firms all over the world have aware of the fact that fluctuations in exchange rates expose their revenues, costs, operating cash flows and their market value to substantial fluctuations. Firms which have exports and imports of goods and services, foreign currencies borrowings and lendings, foreign investments are directly exposed to currencies fluctuations.

Contractually fixed payments and receipts in foreign currency such as export receivables, imports payables, interest payables on foreign currency loans and so forth do not vary with exchange rate changes. Hence, these are called contractual exposures. On the other hand, an unanticipated change in the foreign exchange rate has an impact on the cash flows of day-today transactions.

The sensitivity of the home currency value of assets and liabilities which are denominated in foreign currencies to unanticipated changes in exchange rate is known as transaction exposures.

The unanticipated changes in the exchange rate also have effect on the future sales volume, prices and costs. These types of exposures are known as operating exposure, economic exposure, or strategic exposure. It measures the change in the present value of the firm resulting from any change in future operating cash flows of the firm caused by an unanticipated change in exchange rates.

Other kind of short-term exposure is known as Translation Exposure or Accounting Exposure. It is the potential for accounting derived changes in owner’s equity to occur because of the need to “translate” foreign currency financial statements of foreign subsidiaries into a single reporting currency to prepare worldwide consolidated financial statements. The key difference between transaction and translation exposure is that the former has impact on cash flows while the latter has no direct effect on cash flows. However, there is board agreement among finance theorists that translation losses and gain are only notional accounting losses and gains.

This session is primarily dealt with measurement of Transaction Exposure.
As discussed, the value of foreign currencies denominated assets and liabilities change their values because of fluctuations in foreign currencies. These changes are primarily unanticipated and it may cause by variations in short-term interest rates, inflation, tax, equity market return, expectation etc.

- Change in the real domestic-currency value of an item: $\Delta V$
- Spot Exchange rate, expressed as number of rupee per US$: $S$
- Unanticipated change (appreciation or depreciation of rupee) in the value of the risk factor: $\Delta S^U$

Any appreciation or depreciation of rupee has its impact on the domestic currency value of the item ($V$). In other words, there is a functional relationship between $\Delta V$ and $\Delta S^U$. Let us estimate a regression equation, considering change in domestic value of the item as dependent variable and change in the rupee-dollar exchange rate as independent variable. The estimated equation may take the following form:

$$\Delta V = \beta_0 + \beta_1 \Delta S^U$$

$\beta_1$ is the slope co-efficient, indicating the sensitivity of change in the value of $V$ to change in $S$. The slope co-efficient measure the exposure with respect to the corresponding exchange rate.

**Transaction Exposure: Meaning**

Transaction exposure measures gains or losses that arise from the settlement of existing financial obligations the term of which are stated in a foreign currency. Transaction exposure arises from:

- Purchasing or selling on credit goods and services when prices are stated in foreign currencies.
- Borrowing or lending funds when repayment is to be made in a foreign currency.
- Acquiring assets or incurring liabilities denominated in foreign currencies.
Foreign currencies denominated receivables or payables are common types of transaction exposures. A transaction exposure is actually created at the first moment the seller quotes a price in foreign currency term to a potential buyer. With the placing of the order, the potential exposure created at the time of the quotation is converted into actual exposure, called “backlog exposure” because the product has not yet been shipped or billed. Backlog exposure lasts until the goods are shipped and billed, at which time it becomes “billing exposure”. Billing exposure remains until actual payment is received by the seller.

**Open Account: Purchasing and Selling**

An Indian firm sells merchandise on open account to a US buyer for US$ 2,85,000/- payment to be made in 30 days. The current exchange rate is Rs.48/- per US$ and the Indian seller expects to exchange the US$ received for Rs.136, 80,000/- when payment is received. In this case, transaction exposure arises because of the risk that the Indian seller will receive something other than the Rs.136,80,000/- expected. If US$ depreciate then the Indian seller would receive less and it may happen that Indian rupee depreciate where the Indian seller get more than the expected. Thus, exposure is the chance of either a loss or gain.
Borrowing and Lending

Transaction exposure can also arise when foreign currency denominated borrowings or lendings are involved. An Indian company has long-term exposure in the form of commercial borrowing in US Debt market. It has taken a commercial loan of US$ 200 million in 2002 denominated in US$ and need to repay also in US$ after 10 years. The interest rate for the same loan is linked to 6-month LIBOR and payment will be made in US$.

In the above case the Company is exposed to transaction exposure both for payment of interest and principal amounts. In case of interest payment the Company would face the risk of LIBOR volatility and also the transaction exposure for exchange rate volatility. When the principal payment due, the long-term exchange rate change can create fundamental transaction exposure for the Company.

<table>
<thead>
<tr>
<th>Principal Payment of US$200 Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Amount</td>
</tr>
<tr>
<td>Transaction Exposure</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

With the change in exchange rate, every year there will be a change in the value of the principal and hence create transaction exposure.

<table>
<thead>
<tr>
<th>Interest Payment for US$200 Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs. Per US$</td>
</tr>
<tr>
<td>6-Month Libor rate</td>
</tr>
<tr>
<td>Interest Amount (US$ Million)</td>
</tr>
<tr>
<td>Interest Amt in Rs Million</td>
</tr>
<tr>
<td>Transaction Exposure (Rs. Million)</td>
</tr>
</tbody>
</table>

Interest payment will be made half yearly basis which is linked to 6-month LIBOR. Hence, the interest amount will be fixed at the end of six month and it need to be paid in US$. Since exchange rate is changing, payment of interest itself creates transaction exposure. In Sept-02 the Company paid interest amount half yearly at the rate of 6.25% amounting to Rs.240.31 million when the exchange rate was Rs.38.45 per US$. In Mar-03 the company paid interest amount half yearly at the rate of 6.85% amounting to Rs.284.62 million when the rupee depreciated to Rs.41.55 per US$. Hence the transaction exposure is Rs.21.24 million \{(Rs.41.55*6.85%-Rs.38.45*6.85%)*(200/2}\).
Treatment of Transaction Exposure

Four key steps involved in the treatment of transaction exposures.

1. Initial recording of the transaction exposures
2. Recording of outstanding foreign currency balances
3. Treatment of Exchange gain or loss
4. Settlement of foreign currency receivable and payables

With the recording of foreign currencies denominated assets and liabilities, the transaction exposures are not over. Till the final completion of cash settlement transaction exposures are continued to be there in the balance sheet of the company.

Example

An Indian garment exporter, as on 20\textsuperscript{th} December 2009, had exported US$ 1,65,000 worth of garments to US on 3 month credit basis when the US$ was equivalent to Rs.48.5500. The payment would be made in 3 installments due on 20\textsuperscript{th} March (25\% payment), 15\textsuperscript{th} April (65\% payment) and rest on 20\textsuperscript{th} May 2010. In the meantime, rupee-dollar exchange rate changed and it was Rs.48.75 on 20\textsuperscript{th} March, Rs.48.4500 on 15\textsuperscript{th} April and Rs.49.05 on 20\textsuperscript{th} May 2010 per US $. Estimate the transaction exposures.

Exposure: US$ 1,65,000 as on Dec 20\textsuperscript{th}, 2009
Exchange rate: Rs.48.55 as on Dec 20\textsuperscript{th} 2009
Payment: 3 month credit basis

20\textsuperscript{th} December 2009 (Rs.48.5500)

<table>
<thead>
<tr>
<th>Sales</th>
<th>Rs.80,10,750</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receivables</td>
<td>Rs.80,10750</td>
</tr>
</tbody>
</table>

20\textsuperscript{th} March 2010 (Rs.48.75)

<table>
<thead>
<tr>
<th>Receivables</th>
<th>Rs.20,10,938</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>Rs.20,10,938</td>
</tr>
<tr>
<td>Gain</td>
<td>Rs.8250</td>
</tr>
</tbody>
</table>

(Compared to Rs.48.55/- as on 20\textsuperscript{th} December 2009, rupee was depreciated to Rs.48.75, as on 20\textsuperscript{th} March 2010 and hence the gain of Rs.8250)
15th April 2010 (Rs.48.45)
Receivables Rs.51,96,263
Cash Rs.51,96,263
Loss Rs.10725
(Compared to Rs.48.55/- as on 20th December 2009, rupee was appreciated to Rs.48.45, as on 15th April 2010 and hence the loss of Rs.10725)

20th May 2010 (Rs.49.05)
Receivables Rs.80,9325
Cash Rs.80,9325
Loss Rs.8250
(Compared to Rs.48.55/- as on 20th December 2009, rupee was depreciated to Rs.49.05, as on 20th May 2010 and hence the gain of Rs.8250). Hence, the net loss of Rs.10,725 was recognized as transaction loss as on the final settlement date.

Multilateral Companies generally have exposures in multiple currencies with different time periods. While analyzing the transaction exposures for such a diversified balance sheet it needs to separate receivables, payables and cash settlement as per currency-wise and maturity-wise so as to articulate the net transaction exposures.

Example:
An Indian Textile exporter has following exposures as on March 20, 2010.

<table>
<thead>
<tr>
<th>Receivables/Payables</th>
<th>Value</th>
<th>Maturity Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>USS Import Payable</td>
<td>90000</td>
<td>45</td>
</tr>
<tr>
<td>Euro Export Receivable</td>
<td>25000</td>
<td>55</td>
</tr>
<tr>
<td>USS Interest receivable</td>
<td>11000</td>
<td>45</td>
</tr>
<tr>
<td>USS Interest Payable</td>
<td>9,000</td>
<td>45</td>
</tr>
<tr>
<td>Euro Loan Installment Payable</td>
<td>80,000</td>
<td>55</td>
</tr>
<tr>
<td>USS export Receivable</td>
<td>87500</td>
<td>45</td>
</tr>
<tr>
<td>Euro Export Receivable</td>
<td>70000</td>
<td>55</td>
</tr>
</tbody>
</table>

Estimate the net transaction exposures currency-wise.
Above receivables and payables need to be classified as per currency and maturity so as to estimate the Net Transaction Exposure.

<table>
<thead>
<tr>
<th>Currency</th>
<th>Receivable for 45 days maturity</th>
<th>Payable for 45 days maturity</th>
<th>Net Transaction exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$</td>
<td>98,500</td>
<td>99,000</td>
<td>-500</td>
</tr>
<tr>
<td>Euro</td>
<td>95,000</td>
<td>80,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

As per US$, the Company has to arrange US$500 to be paid after 45 days. Since US$ and Rupee exchange rate is uncertain it creates a transaction exposure amounting to US$ 500.

As per Euro, the Company has positive receivable amounting to Euro 15,000 to be received after 55 days. Since Euro and Rupee exchange rate is uncertain, it creates a transaction exposure amounting to Euro 15,000.

Transaction exposures are inherent in a foreign currencies denominated balance sheet. It is a day-to-day activities of corporate to use various methods to articulate and manage this risk. In the subsequent sessions, candidates would be exposed to various techniques of management of foreign exchange exposures.
1. While defining foreign exchange exposure, in brief, describe various forms of foreign exchange exposures.

2. Explain the life cycle of a transaction exposure.

3. An Indian Tea Company has exported tea worth US$150,000 USA on March 1, 2010. The goods are sold on 2 months credit so that the payment due on April 30, 2010. On March 1, the dollar-rupee exchange rate is 48.5500. By March 31, the US$ depreciated to Rs. 48.2500 while by April 30 it appreciates to Rs.48.7500. Record the transaction exposures and estimate the net gain /loss.

Reference:


Model Questions