Operating exposure measures any change in the present value of a firm resulting from changes in future operating cash flows caused by any unexpected change in exchange rates.

This exposure deals with the firm’s operations over the coming months and years, and its competitive position vis-à-vis other firms.
Attributes of Operating Exposure

A firm like Eastman Kodak, for example, has sales in the U.S., Japan and Europe.

Sales and expenses already contracted are traditional transaction exposures.

Sales and expenses that are highly probable are anticipated transaction exposures.

This analysis can be extended even further in the future.

Operating and Financing Cash Flows

Operating cash flows arise from intercompany and intracompany receivables and payables, rent and lease payments, royalties and license fees, and assorted management fees.

Financing cash flows involve loan payments, equity investments and dividends.
Operating exposure is about unexpected changes in the value of future cash flows.

Expected changes should have already been factored into management’s evaluation of future cash flows.

Expected changes in exchange rates, interest rates and inflation rates are not a problem.

Illustration of Operating Exposure: Carlton, Inc.

Carlton, Inc., is a MNE based in California, USA.

Carlton has 100%-owned manufacturing, sales and service subsidiaries in Germany and Brazil.

Unexpected changes in the value of the euro or the Brazilian real will affect the value of the firm’s subsidiaries in these countries, and thus the value of Carlton as a whole.
Base Case

Carlton Germany manufactures in Germany from European material and labour.

Half the production is sold in Europe and half is exported outside of Europe.

All sales are invoiced in euros.

A/R are equal to 1/4 of annual sales (average collection period is 90 days).

Base Case

Inventory is equal to 1/4 of annual direct costs.

Carlton Germany can expand or contract production volume without significant change in per-unit direct cost or in overall general and administrative expenses.

Depreciation ($D$) is €600,000 per year and the corporate tax rate ($t$) is 34%.
Illustration of Operating Exposure: Carlton, Inc.

**Base Case**

<table>
<thead>
<tr>
<th>Carlton Germany Balance Sheet, December 31, 2002 (in 000s of euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
</tr>
<tr>
<td>Cash 1,600</td>
</tr>
<tr>
<td>Accounts receivable 3,200</td>
</tr>
<tr>
<td>Inventory 2,400</td>
</tr>
<tr>
<td>Net PP&amp;E 4,800</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total assets 12,000</td>
</tr>
</tbody>
</table>

**Base Case**

*Exchange rate: $1.2000/€*

*Sales volume (Q):* 1,000,000 units

*Sales price (p):* €12.80 per unit

*Direct cost (c):* €9.60 per unit

*Operating expenses (F):* €890,000
Illustration of Operating Exposure: Carlton, Inc.

Base Case

Carlton Germany’s expected cash flow from operations (CFO) in 2003 (in 000s) is

\[
CFO = (1 - t)(pQ - cQ - F - D) + D \\
= (1 - t)((p - c)Q - F - D) + D \\
= (1 - .34)((12.80 - 9.60) \times 1,000 - 890 - 600) + 600 \\
= \€1,728.60 \\
= $2,074.32.
\]

Illustration of Operating Exposure: Carlton, Inc.

Base Case

If there is no change in the parameters, Carlton Germany’s level of NWC is not expected to change and thus the annual cash flow from 2003 to 2007 is \€1,728,600.

Discounted at the firm’s cost of capital of 20%, this gives

\[
PV = \sum_{t=2003}^{2007} \frac{1,728,600}{(1.20)^{t-2002}} = 1,728,600 \times \frac{1 - \left(\frac{1}{1.20}\right)^5}{0.20} = \€5,169,572 \\
= $6,203,487.
\]
We are going to look at three variations of the base case:

**Case 1:** Depreciation of the euro, everything else constant.

**Case 2:** Depreciation of the euro and increase in sales volume, everything else constant.

**Case 3:** Depreciation of the euro and increase in sales price, everything else constant.

**Case 1: Euro Depreciation**

Suppose costs, sales volume and unit price remain constant over the next five years but the value of the euro falls from $1.2000/€ to $1.0000/€ on January 1, 2003, and is expected to remain at this level over the next five years.

The present value of the firm’s cash flows over the next five years then falls to $5,169,572, for a decrease of $1,033,915.
Case 2: Increase in Sales Volume

Suppose sales double following the euro depreciation since German-made components are now more competitive than imports in Europe and and are also cheaper in countries outside of Europe.

Cash flow from operations would then be (in 000s)

\[
\text{CFO} = (1 - .34)((12.80 - 9.60) \times 2,000 - 890 - 600) + 600 \\
= \€3,840.60 \\
= \$3,840.60.
\]

Case 2: Increase in Sales Volume

The increase in sales volume, however, requires a change in NWC:

Cash: No change.

Accounts receivable: \( = 12.8 \times 2,000,000/4 = \€6,400,000.\)

Inventory: \( = 9.6 \times 2,000,000/4 = \€4,800,000.\)

Accounts payable: no change.
Case 2: Increase in Sales Volume

Previous A/R: €3,200,000.

Previous Inventory: €2,400,000.

NWC thus increases by

\[ 3,200,000 + 2,400,000 = €5,600,000. \]

Case 2: Increase in Sales Volume

Year-end cash flows are then

2003: $3,840,600 - 5,600,000 = -€1,759,400.$


2007: $3,840,600 + 5,600,000 = €9,440,600.$
Case 2: Increase in Sales Volume

Discounted at the firm’s cost of capital (20%), this gives

\[
PV = 3,840,600 \times \frac{1 - \left(\frac{1.20}{0.20}\right)^5}{0.20} - 5,600,000 \times \left(\frac{1}{1.20} - \frac{1}{(1.20)^5}\right)
\]

\[
= €9,069,593
\]

\[
= $9,069,593.
\]

This is $2,866,106 more than the base case.

Case 3: Increase in Sales Price

Suppose the sales price increases to 1.2 \times 12.80 = €15.36 to maintain the same U.S. dollar-equivalent price.

If sales volume does not change, CFO becomes (in 000s)

\[
CFO = (1 - .34)((15.36 - 9.60) \times 1,000 - 890 - 600) + 600
\]

\[
= €3,418.20
\]

\[
= $3,418.20.
\]
Case 3: Increase in Sales Price

With respect to NWC, inventory remains constant since there is no change in costs but accounts receivable increase by 20% since sales increase by 20%.

Additions to NWC are then

\[0.2 \times 3,200,000 = 640,000 \text{ in 2003},\]
\[0.2 \times (-3,200,000) = -640,000 \text{ in 2007},\]

Discounted at the firm’s cost of capital (20%), this gives

\[
PV = 3,418,200 \times \frac{1 - \left(\frac{1}{1.20}\right)^5}{0.20} - 640,000 \times \left(\frac{1}{1.20} - \frac{1}{(1.20)^5}\right) \\
= \€9,946,379 \\
= \$9,946,379.
\]

This is $3,742,892 more than the base case.
Final Remarks

The story would be different if:

- Some of Carlton Germany’s sales were invoiced in other currencies;
- Some of Carlton Germany’s costs were incurred in other currencies;
- If Carlton Germany’s competitors were to leave their euro prices constant.

Strategic Management of Operating Exposure

Operating exposure can be dealt with by diversifying the firm’s operating and financing cash flows.

Diversifying operations means diversifying sales, location of production facilities and raw material sources.

Diversifying financing means raising funds in more than one capital market and in more than one currency.
Proactive Management of Operating Exposure

Four of the most commonly employed proactive policies are:

1. Matching currency cash flows
2. Risk-sharing agreements
3. Back-to-back or parallel loans
4. Currency swaps

Matching Currency Cash Flows

Offset continuous exposure to a particular currency from exports, say,

- by acquiring debt denominated in that currency;
- by buying raw materials from a country using that currency;
- by paying foreign suppliers with that currency.
Currency Clauses: Risk Sharing

Risk sharing is a contractual arrangement in which the buyer and seller agree to “share” or split currency movement impacts on payments between them.

Ford, for example, imports automotive parts from Mazda. Major swings in exchange rates can benefit one party at the expense of the other.

One way to circumvent this problem is to have the parties share the cost of the expensive currency when the exchange rate reaches a certain level.

In the Ford and Mazda example, purchases could be made at the spot rate when the latter is between ¥110/$ and ¥120/$, say, and at the rate

\[
S = \begin{cases} 
\frac{S_0 + 120}{2} & \text{when } S_0 > 120, \\
\frac{S_0 + 110}{2} & \text{when } S_0 < 110.
\end{cases}
\]
Back-to-Back Loans

A back-to-back loan occurs when two firms in separate countries arrange to borrow each other’s currency for a specific period of time.

The operation is conducted outside the foreign exchange market.

A British firm, for example, could be lending money to the British subsidiary of a Dutch company as long as the latter’s parent agrees to lend money to a Dutch subsidiary of the British firm.

Currency Swaps

A currency swap is similar to a back-to-back loan except that it operates through a dealer, the swap dealer or swap bank.

A Japanese firm, for example, may wish to have dollar-denominated debt but may face a lower rate of interest in Japan than in the U.S..

The Japanese firm can borrow yen and enter a swap contract “to pay dollars” and “receive yen” with a swap dealer.