

EXPOSURE OF FOREIGN EXCHANGE RISK

Foreign Exchange Exposure is the sensitivity of the real domestic currency value of assets, liabilities, or operating incomes to unanticipated changes in exchange rates

EXPOSURE OF FOREIGN EXCHANGE RISK

Foreign Exchange Risk is measured by the variance of the domestic - currency value of assets, liabilities, or operating income that is attributable to unanticipated changes in exchange rates

EXPOSURE OF FOREIGN EXCHANGE RISK

- **Three important Facts:**

- Changes in the nominal exchange rate are not offset by corresponding changes in prices at home and abroad: there is real exchange rate risk

- Neither the forward rate is successful in forecasting the exchange rate nor are other fundamental variables

- Given the various market imperfections in the real world, hedging exchange rate risk can lead to an increase in the value of the firm

EXPOSURE OF FOREIGN EXCHANGE RISK

- **Three types of Exposure:**
 - Translation or Accounting Exposure
 - Transaction or Contractual Exposure
 - Operating or Economic Exposure

EXPOSURE OF FOREIGN EXCHANGE RISK

- Three types of Exposure:

Exchange Rate Shock

1. Translation or Accounting Exposure

Δ in FE rate \longrightarrow Δ in Accounting statements

3. Operating Exposure

Δ in FE rate \longrightarrow Δ in future cash flows

2. Transaction Exposure

Δ in FE rate \longrightarrow Δ in outstanding obligations

EXPOSURE OF FOREIGN EXCHANGE RISK

- **Translation or Accounting Exposure:**

Is the sensitivity of the real domestic currency value of Assets and Liabilities, appearing in the financial statements to unanticipated changes in exchange rates

EXPOSURE OF FOREIGN EXCHANGE RISK

- **Transaction or Contractual Exposure:**

Is the sensitivity of the real domestic currency value of Assets and Liabilities, when assets and liabilities are liquidated with respect to unanticipated changes in exchange rates for exporting, importing, or import-substituting firms

EXPOSURE OF FOREIGN EXCHANGE RISK

- **Economic or Operating Exposure:**

Is the sensitivity of the real domestic currency value of Assets and Liabilities, or future operating incomes to unanticipated changes in exchange rates

TRANSLATION OR ACCOUNTING EXPOSURE

- **Why Accounting Exposure?:**

- Managers, analysts and investors need some idea about the importance of the foreign business. Translated accounting data give an approximate idea of this.
- Performance measurement for bonus plans, hiring, firing, and promotion decisions.
- Accounting value serves as a benchmark to evaluate a discounted-cash flow valuation.
- For income tax purposes.
- Legal requirement to consolidate financial statements.

TRANSLATION OR ACCOUNTING EXPOSURE

- **Four Methods to translate foreign currency to home currency:**

1. Current/Non-Current Method: All current assets and current liabilities are translated at current exchange rate

2. Monetary/ Non-Monetary Method: All monetary assets and liabilities are translated at current exchange rate

3. Temporal Method: Same as Monetary/Non-Monetary method BUT inventory may be translated at current exchange rate IF it is shown at market value

4. Current Rate Method: All balance sheet and income statement items are translated at current exchange rate

TRANSLATION OR ACCOUNTING EXPOSURE

- **Methods used in the US:**

1. **FASB 8 Temporal Method:** Similar to Monetary/Non-Monetary Method except treatment of inventory.

2. **FASB 52 Current Rate Method:** Similar to Current Rate Method. It allows cumulative translation adjustment account, functional currency and reporting currency.

TRANSLATION OR ACCOUNTING EXPOSURE

Unlike the Economic and Transaction exposure,
Accounting exposure cannot be managed

TRANSLATION OR ACCOUNTING EXPOSURE

- **The Current/Non-Current Method**

Logic:

- Consistency with parent's books as far as net worth is concerned (as before)
 - Gains/losses on short-term items are "almost certain", and will be recognized in the translation; but long-term gains/losses are "very uncertain" and will not be recognized.
- ➡ For the purpose of translating long-term assets and debts, we should use the historic exchange rate

Thus: unexposed = net worth + LT liabilities – LT assets
= net working capital

TRANSLATION OR ACCOUNTING EXPOSURE

<i>Example:</i>	<i>SEK</i>	<i>DEM value</i>	
ASSETS		(at .333)	(at .3)
cash, securities	1,000	333	300
A/R	1,000	333	300
inventory	1,000	333	300
<u>plant & equipment</u>	<u>5,000</u>	<u>1,625</u>	<u>1,625</u>
TOTAL ASSETS	8,000	2,624	2,525 => Δ assets = -99
LIABILITIES			
A/P	500	166.5	150
Short-term debt	2,000	666	600
<u>Long-term debt</u>	<u>2,400</u>	<u>780</u>	<u>780</u>
TOTAL DEBTS	4,900	1,612.5	1,530 => Δ debts = -82.5
			=> net Δ = -16.5
Retained Earnings	0	0	0
Equity	3,100	1002	1002
Equity Adjustment	<u>none</u>	<u>9.5</u>	<u>- 7</u> => net Δ = -16.5
TOTAL LIABILITIES	8,000	2,634	2,525

Note: NWC = LT liabilities + net worth – LT assets
 = 2,400 + 3,100 – 5,000 = SEK 500

TRANSLATION OR ACCOUNTING EXPOSURE

Example (cont.): Current/Non-Current Method

Exposure?

Translate at each of the two possible current rates (at historic rate for Net Worth and LT items), compute the Adjustments as the residuals.

$$\text{Exposure} = \frac{9.5 - -7}{0.333 - 0.3} = \text{SEK } 500 = \text{NWC}$$

TRANSLATION OR ACCOUNTING EXPOSURE

- **The Monetary/Non-Monetary Method:**

Logic:

- Consistency with parent's books as far as net worth is concerned (as before)
- PPP: the value of real assets is not affected by a de/revaluation, so these items are translated at the historic rate
- Thus: exposure = net foreign currency monetary position
= financial assets minus debt

TRANSLATION OR ACCOUNTING EXPOSURE

<i>Example</i>	<i>SEK</i>	<i>DEM value</i>	
ASSETS		(at .333)	(at .3)
cash, securities	1,000	333	300
A/R	1,000	333	300
inventory	1,000	325	325
<u>plant & equipment</u>	<u>5,000</u>	<u>1,625</u>	<u>1,625</u>
TOTAL ASSETS	8,000	2,616	2,550 => Δ assets = -66
LIABILITIES			
A/P	500	166.5	150
Short-term debt	2,000	666	600
<u>Long-term debt</u>	<u>2,400</u>	<u>799.2</u>	<u>720</u>
TOTAL DEBTS	4,900	1,631.7	1,470 => Δ debts = -161.7
			=> net Δ = + 95.7
Retained Earnings	0	0	0
Equity	3,100	1002	1002
Equity Adjustment	<u>none</u>	<u>-17.7</u>	<u>78</u> => net Δ = + 95.7
TOTAL LIABILITIES	8,000	2,616	2,550

Note: net monetary position = (assets 2,000) – (debt 4,900)
= -2,900

TRANSLATION OR ACCOUNTING EXPOSURE

Example (cont.): Monetary/Non-Monetary Method

Exposure?

Translate at each of the two possible current rates (at historic rate for Net Worth and Monetary items), compute the residuals.

$$\text{Exposure} = \frac{-17.7 - 78}{0.333 - 0.3} = \text{SEK } 2,900 = \text{net monetary position}$$

TRANSLATION OR ACCOUNTING EXPOSURE

- ***The Current Rate Method:***

Logic: maximal consistency with conventional accounting, and maximum consistency of the consolidated balance sheet with the parent's and subsidiary's accounts:

- (subsidiary's accounts): any company's value corresponds to its net worth (assets minus debts). And if net worth in the subsidiary's books is SEK 3,100, it must be worth DEM1.032.3 if the current rate is DEM/SEK 0.333.
- Changes of the translated net worth are divided in two classes:
 - » changes due to fresh capital or retained earnings: remain valued the way they are in the parent's records
 - » any residual must reflect exchange rate changes, and is booked as an 'equity adjustment'

TRANSLATION OR ACCOUNTING EXPOSURE

<i>Example</i>	<i>SEK</i>	<i>DEM value</i>		
ASSETS		(at .333)	(at .3)	
cash, securities	1,000	333	300	
A/R	1,000	333	300	
inventory	1,000	333	300	
<u>plant & equipment</u>	<u>5,000</u>	<u>1,665</u>	<u>1,500</u>	
TOTAL ASSETS	8,000	2,664	2,400	=> Δ assets = -264
LIABILITIES				
A/P	500	166.5	150	
Short-term debt	2,000	666	600	
<u>Long-term debt</u>	<u>2,400</u>	<u>799.2</u>	<u>720</u>	
TOTAL DEBTS	4,900	1,631.7	1,470	=> Δ debts = -161.7
				=> net Δ = 102.3
Retained Earnings	0	0	0	
Equity	3,100	1002	1002	
Equity Adjustment	<u>none</u>	<u>30.3</u>	<u>- 70</u>	=> net Δ = 102.3
TOTAL LIABILITIES	8,000	2,664.6	2,402.4	

TRANSLATION OR ACCOUNTING EXPOSURE

Example (cont.): Current Rate Method

Exposure?

Translate at each of the two possible current rates (at historic rate for Net Worth items), and compute the Adjustments as the residuals

$$\text{Exposure} = \frac{30.2 - -70}{0.333 - 0.3} = \text{SEK } 3,100 = \text{SEK net worth}$$

TRANSLATION OR ACCOUNTING EXPOSURE

Overview:

(US.)	Current Rate Method (FASB 52)	Non-Monetary (FASB 8)	Non-Current
Balance sheet			
<u>ASSETS</u>			
cash, securities	C	C	C
A/R	C	C	C
inventory	C	H*	C
plant, equipment	C	H	H
<u>LIABILITIES</u>			
A/P	C	C	C
S-T debt	C	C	C
L-T debt	C	C	H
equity	H	H	H
retained	mixed H	mixed H	mixed H
translation effect	mixed H	mixed H	mixed H
<u>EXPOSURE</u>	net worth	financial assets minus debt	net working capital

TRANSLATION OR ACCOUNTING EXPOSURE

Overview: (cont.)

Income statement

dividends				
interests	}	actual	average	average
royalties				
sales revenue		C or average	average	average
costs		C or average	H	average
depreciation		C or average	H	average

Notes: "H" means translation at the historic rate (prevailing when the position is first created), "C" means translation at the current rate (prevailing on the date of consolidation). "Mixed H" refers to sums of terms added at various moments in time, at the then prevailing rate. "Average" means an average of daily or end-of-the-week or end-of-the-month rates over the accounting year.

*: under US FASB 8, inventory could be translated at C if, on the balance sheet, domestic inventories were shown at market value.

TRANSLATION OR ACCOUNTING EXPOSURE

In Practice:

Many regulating bodies favor the Current Rate method:

- US Financial Accounting Standards Board: FASB #52, 1982
- Similar rules were issued soon thereafter in the UK and Canada
- International Accounting Standards Committee: IASC #21, 1983

TRANSLATION OR ACCOUNTING EXPOSURE

In Practice: (cont.)

No such consensus in continental Europe:

- in many countries (including, until the early 90s, Italy and Belgium), consolidation was not mandatory and, therefore, not regulated
- in other countries (including Germany), the obligation to consolidate was not extended to foreign subsidiaries
- EC 7th Directive, passed in 1983 and implemented in most member states by the early 90s, imposes consolidation but does not prescribe any particular translation method. The only requirement is that the notes to the accounts should disclose the method that was used

TRANSLATION OR ACCOUNTING EXPOSURE

Relevance of Accounting Exposure:

- Managers, analysts and investors need some idea about the importance of the foreign business. Translated accounting data give an approximate idea of this
- Performance measurement for bonus plans, hiring, firing, and promotion decisions
- Accounting value serves as a benchmark to evaluate a discounted-cash flow valuation
- for income tax purposes
- legal requirement to consolidate financial statements

TRANSLATION OR ACCOUNTING EXPOSURE

Relevance of Accounting Exposure: (cont.)

- **Should we worry about translation exposure at all? If so, should we worry what the best translation method is?**
 - Choice of valuation method is as (ir)relevant as choice between, say, LIFO/FIFO or straight-line/accelerated depreciation:
 - » the choice doesn't affect any real cash flow except for taxes
 - » the only correct method is economic value anyway
 - Simplicity/consistency: Current rate method.

TRANSLATION OR ACCOUNTING EXPOSURE

Relevance of Accounting Exposure: (cont.)

- **Should the exchange rate effect be shown as part of the reporting period's P&L, or should it just be mentioned on the balance sheet, as an unrealized gain or loss?**
 - Marking-to-market sounds great, but none of the three methods produces the true economic value
 - Most of the gains are not realized
 - Keep gains/losses out of income statement

MANAGEMENT OF EXPOSURE

Goal: To eliminate or reduce the variability of the consolidated earnings of MNC which is attributable to “unexpected” currency fluctuation

Background:

Fixed Rate

FASB 8

FASB 52

Floating Rate (1973)

Accounting Exposure

Economic Exposure

MANAGEMENT OF EXPOSURE

How to manage Transaction/Translation Exposures? “Hedge”

Hedging Means: Substitution of an open future exchange risk with a presently known exchange rate (Fixed cost of hedging operation)

Alternatives:

1. Forward/Future Market Hedge
2. Money Market Hedge

MANAGEMENT OF EXPOSURE

How to manage Transaction/Translation Exposures?

1. Forward Market Hedge:

Long in FC = A/C Receivable = Sell FC Forward

Short in FC = A/C Payable = Buy FC Forward

Spot Price: \$0.40/DM

1Year Forward: \$0.3828/DM

Amount: DM 25M

MANAGEMENT OF EXPOSURE

How to manage Transaction/Translation Exposures?

2. Money Market Hedge:

Do not use Forward market

Use Spot market and borrow money in one country and deposit in other

Example:

Transaction Exposure of DM 5M (payable)

Spot	DM 2.6600/\$	DM Forward Premium	6.18%
6-Months	DM 2.5802/\$		
Interest	DM=8%	US=13%	

MANAGEMENT OF EXPOSURE

How to manage Transaction/Translation Exposures?

Example: (cont.)

A. forward market: $DM5,000,000/2.5802 = \$ 1,937,839$

B. money market:

day0: borrow in U.S. \longrightarrow convert \$ to DM \longrightarrow invest in DM
 $5,000,000 = X * (1+.08/2)$

$X = DM 4,807,692$

$\$ = DM4,807,692/2.66 = \$1,807,403$

day 180: get DM proceeds \longrightarrow pay DM payable \longrightarrow Pay back
\$ loan

$\$1,807,403*(1+0.13/2) = \$1,924,884$

cost of money market < cost of forward market

MANAGEMENT OF EXPOSURE

How to manage Transaction/Translation Exposures?

Example: (cont.)

- Risk shifting : price all products in home currency
- Pricing Decisions: must use only forward rate NOT spot rate
- Currency Risk Sharing

MANAGEMENT OF EXPOSURE

Other Methods of Hedging:

- 1. Exposure Netting:** It is not worthwhile to hedge every exposure individually
 - Offset a long position with a short position in the same currency.
 - If currency rates move together: +correlation Long vs. Short
 - If currencies are negatively correlated. Then Long vs. Long

MANAGEMENT OF EXPOSURE

Other Methods of Hedging:

2. Foreign Currency Options:

A. Long position buy Put

B. Short position buy Call

MANAGEMENT OF EXPOSURE

Defensive Strategy:

1. Leading & Lagging / W.C. Adjustment
2. Exposure Netting / Currency Selection
3. Currency & Credit Swaps
4. Transfer Pricing Adjustment

MANAGEMENT OF EXPOSURE

Managing Transaction/Transaction Exposure:

1. Leading & Lagging / W.C. Adjustment

Concept: Decrease Net Exposure in soft currency
Increase Net Exposure in hard currency

Example: affiliate with soft currency (devaluation)

A. Reduce net w.c. in local currency / tightening credit policy

lead: accelerate collection of receivables

lag: pay slowly to creditors

Revaluation:

lag: delay collection of receivables in L.C.

lead: pay to the creditors in F.C.

MANAGEMENT OF EXPOSURE

Managing Transaction/Transaction Exposure:

3. Currency Swap

Credit Swap

same with currency swap but Banks will be involved

Interest Rate Swap

Basis Swap

Cross Currency Swaps

MANAGEMENT OF EXPOSURE

Hedging Techniques:

- Buy/Sell Currency Forward
- Currency Forward
- Reduce/Increase W.C.
- Tighten Credit
- Borrow Locally
- Delay Payment
- Speed Up Div. Fees

MANAGEMENT OF EXPOSURE

Costs:

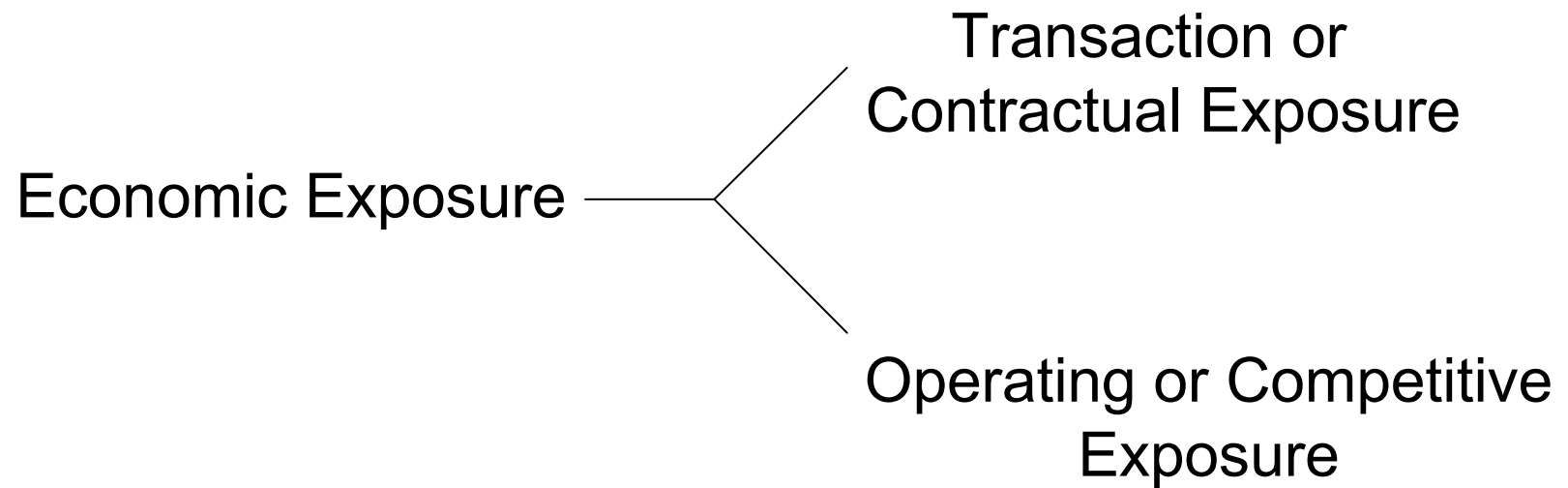
- Transaction Costs
- Dif. Forward. Rate & Future Spot Rate
- Operational Problem
- Lost Sales / Competitive Position
- Higher Interest
- Credit Reputation
- Government Regulation
- Borrowing Cost

ECONOMIC EXPOSURE

Economic Exposures are based on the extent to which the value of the firm - as measured by the present value of its expected cash flows - will change when exchange rate changes

Exchange Risk: Variability of firm value caused by uncertain exchange rate change

ECONOMIC EXPOSURE



OPERATING OR ECONOMIC EXPOSURE

Scenario 1: Perfectly Closed Economy

Internal costs and prices are unaffected by exchange rate changes. No exports or imports. Then:

- DKK cash flows are clearly unaffected
- DKK value of Dansk AS does not change: exposure, in DKK, to DKK/CAD exchange rate is zero
- CAD value of cash flows and of Dansk AS decreases by 25%: exposure, in DKK, to DKK/CAD exchange rate is the current value of Dansk AS

OPERATING OR ECONOMIC EXPOSURE

Scenario 2: Perfectly Open Economy

Small, open economy and an international price taker
➡ *DKK prices for all goods and factors increase by 33.33%. Then, except for contractual exposure effects (including depreciation tax shields):*

- DKK sales, costs increase by 33.33%; thus, all future DKK cash flows increase by 33.33%
- the CAD value of the cashflows is unaffected
- the CAD value of Dansk AS is essentially unaltered: exposure is 0

OPERATING OR ECONOMIC EXPOSURE

Intermediate Cases:

- The economy is neither perfectly open or perfectly closed;
- Half of the current output of Dansk AS is exported while the other half is sold in Denmark.

OPERATING OR ECONOMIC EXPOSURE

Scenario 3: Sticky Prices and Price Discrimination

Assume that:

- Dansk AS faces little competition either in Denmark or internationally
- The Danish Government freezes prices: costs are constant, home sales price remains at DKK 20.
- Markets are segmented internationally, so that Dansk AS can maintain its export price at CAD 4

From exhibit:

the (one-year) cash flow of Dansk AS rises dramatically *both* in terms of DKK as well as CAD when compared to the initial situation: Dansk AS has a positive exposure to the exchange rate in both CAD and DKK terms

OPERATING OR ECONOMIC EXPOSURE

Scenario 4: Pass-through Pricing

Assume:

- Many producers inside Denmark, but hardly any outside
- Price freeze in Denmark
- Intense competition leads to a drop of 25% in FC export prices (CAD 3—DKK 20), and exports rise by 50%
- Overtime, night shift; unit variable cost jumps to DKK 13

From Exhibit:

- Increase in the cash flows of Dansk AS, when measured in terms of DKK, but less than in previous case
- In terms of CAD, there is a *decrease* in the cash flows of Dansk AS compared to the CAD cash flows in the initial situation.

OPERATING OR ECONOMIC EXPOSURE

Scenario 5: International price-takership, sticky CAD prices

Assume:

- $P^* = \text{CAD } 4$, $P = \text{DKK } 26.67$ (+33%)
- Low demand elasticity

Danks's Cash Flow Forecast at Current FE Rate

Total Sales	2* DKK 20	DKK 40 m
Direct Costs	2m * DKK 12	24 m
	Gross Profit	16 m
Overhead Expense		5.1 m
Depreciation		0.9 m
Profit before Taxes		10 m
Taxes		5 m
Addback Depreciation		0.9 m
		5.9 m
(CAD/DKK)*0.2	CAD	1.18 m
Old F.E. Rate	C\$ / DKK 0.20	
New F.E. Rate	C\$ / DKK 0.15	
	Devaluation of DKK = 25%	

1. Perfectly Closed Economy - 25% Decrease
2. Perfectly Open Economy - CAD prices remains same ; DKK prices increases

OPERATING OR ECONOMIC EXPOSURE

	Scenario 3 Sticky prices and price discrim.		Scenario 4 Pass-through pricing		Scenario 5 International price-takership	
(in 000's)						
<u>SALES</u>						
Denmark	1m x 20 =	20,000	1.5m x 20 =	30,000	1m x 26.67 =	26,667
Exports	1m x 26.67 =	26,667	1.5m x 20 =	30,000	1m x 26.67 =	26,667
Total Sales		<u>46,667</u>		<u>60,000</u>		<u>53,334</u>
<u>COSTS</u>						
Direct	2m x 12 =	24,000	3m x 13 =	39,000	2m x 12 =	24,000
Overhead		5,100		5,100		5,100
Depreciation		900		900		900
Total Cost		<u>30,000</u>		<u>45,000</u>		<u>30,000</u>
<u>INCOME</u>						
before tax		16,667		15,000		23,334
after tax		8,333		7,500		11,667
<u>CASH FLOW</u>						
add back depreciation		900		900		900
change in Work. Cap.(*)		(666)		(2,000)		(1,333)
		<u>8,567</u>		<u>6,400</u>		<u>11,234</u>
change (in DKK)		2,667		500		5,334
change (in CAD)		105		(220)		505

(*)(crudely) approximated as 10% of change in sales

OPERATING OR ECONOMIC EXPOSURE

The Sources of Operating Exposure:

Two misconceptions:

"Only firms that have foreign operations are exposed to the exchange rate"

"If a firm denominates all its sales and purchases in terms of its own currency, there is no exposure"

But competition, or potential competition, from foreign firms and potential later exports or imports prices of local purchases may depend on future exchange rates.

OPERATING OR ECONOMIC EXPOSURE

Conclusion:

- Even a monopolist/exporter cannot simultaneously have both stable FC-prices and stable HC revenues
- If there are competitors located in different countries, then a change in the exchange rate affects their relative competitive position, and therefore, the cash flows of the firms
- The magnitude of the effect depends on magnitude of PPP-deviations; demand and supply elasticities; degree of competition; operating leverage; sourcing of inputs; taxes, etc