Leverage

Operating and Financial Leverage

Operating Leverage ➔ Employment of an asset for which the firm pays a fixed cost

Financial Leverage ➔ Employment of funds which the firm pays a fixed return

Operating Leverage

Firm has fixed operating costs that do not vary with output
Rent, capital equipment, salaries
A change in output or sales produces a proportionally greater change in operating profits
Small ΔQ ➔ bigger ΔOperating Profits
Degree of Operating Leverage

Operating leverage example

Leverage observations

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Fixed vs. variable operating costs

**Fixed:** Own your own fleet of trucks for which you make a fixed monthly payment to local Ford dealer (*high OL*)

**Variable:** Rent trucks on an as-needed basis from local U-Haul Center

What if: sales really take off?
What if: sales really plummet?
Magnified gains and losses with owning

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Financial Leverage

How much of a firm’s assets are financed by borrowed money (debt) vs. how much by stockholders’ money (equity)

Two common ratios measure leverage:

Debt to Asset Ratio

Times Interest Earned Coverage Ratio

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Debt to Asset Ratio

debt ratio = total debt
_________ = total assets

equity ratio = total equity
_________ = total assets

High debt ratio (firm = 70%, ind avg = 55%) chance for magnified gains and losses greater chance of bankruptcy and failure

Low debt ratio (firm = 30%, ind avg = 55%) sacrificing of profits tax deductible of interest payments
Times Interest Earned Ratio

\[
TIE = \frac{\text{Operating Income (EBIT)}}{\text{Interest Charges}}
\]

TIE ability to pay amount coming due
Primary determinant of a firm's bond ratings
high quality AAA, AA TIE > 6
medium quality BBB, BB 3 < TIE < 6
speculative quality B, CCC, CC, C TIE < 3

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Initial Position

**Balance Sheet**

- Total Assets: 1000
- Debt: 0
- Equity: 1000
- Total Claims: 1000

**Income Statement**

- Assume ROA=10%
- Operating income = 10% * 1000 = 100
- Net Income = 100
- ROE = 100 / 1000 = 10%

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Favorable leverage

**Balance Sheet**

- Total Assets: 1500
- Debt (6%): 500
- Equity: 1000
- Total Claims: 1500

**Income Statement**

- Assume ROA=10%
- Operating income = 10% * 1500 = 150
- Net Income = 120
- ROE = 120 / 1000 = 12%
Unfavorable leverage

**Balance Sheet**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Assets</td>
<td>1500</td>
</tr>
<tr>
<td>Debt (6%)</td>
<td>500</td>
</tr>
<tr>
<td>Equity</td>
<td>1000</td>
</tr>
<tr>
<td><strong>Total Claims</strong></td>
<td><strong>1500</strong></td>
</tr>
</tbody>
</table>

**Income Statement**

Assume ROA=10% on old but only 3% on new
Operating income = 10x1000 - 0.03x500 = 115
-interest char = 0.06x500 = 30

Net income = 85
ROE = 85/1000 = 8.5%

Degree of Financial Leverage

Elasticity coefficient that measures the responsiveness of net income to changes in operating income

\[ FL = \frac{\% \Delta \text{Net Income}}{\% \Delta \text{Operating Income}} \geq 1 \]

\[ FL = \frac{\text{EBIT}}{\text{EBIT} - \text{int charges}} \]

Degree of Total Leverage

Elasticity coefficient that measures the responsiveness of net income to changes in output or sales

Borrowing money by issuing debt and using the funds to automate the plant or to buy a fleet of trucks and then having to make fixed monthly payments to Ford dealer

\[ TL = \text{OL} \times FL \]

\[ TL = \frac{\% \Delta \text{Net Income}}{\% \Delta \text{Output or sales}} \geq 1 \]