



# SESSION 18: REVENUE MULTIPLES

# Price Sales Ratio: Definition

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- The price/sales ratio is the ratio of the market value of equity to the sales.

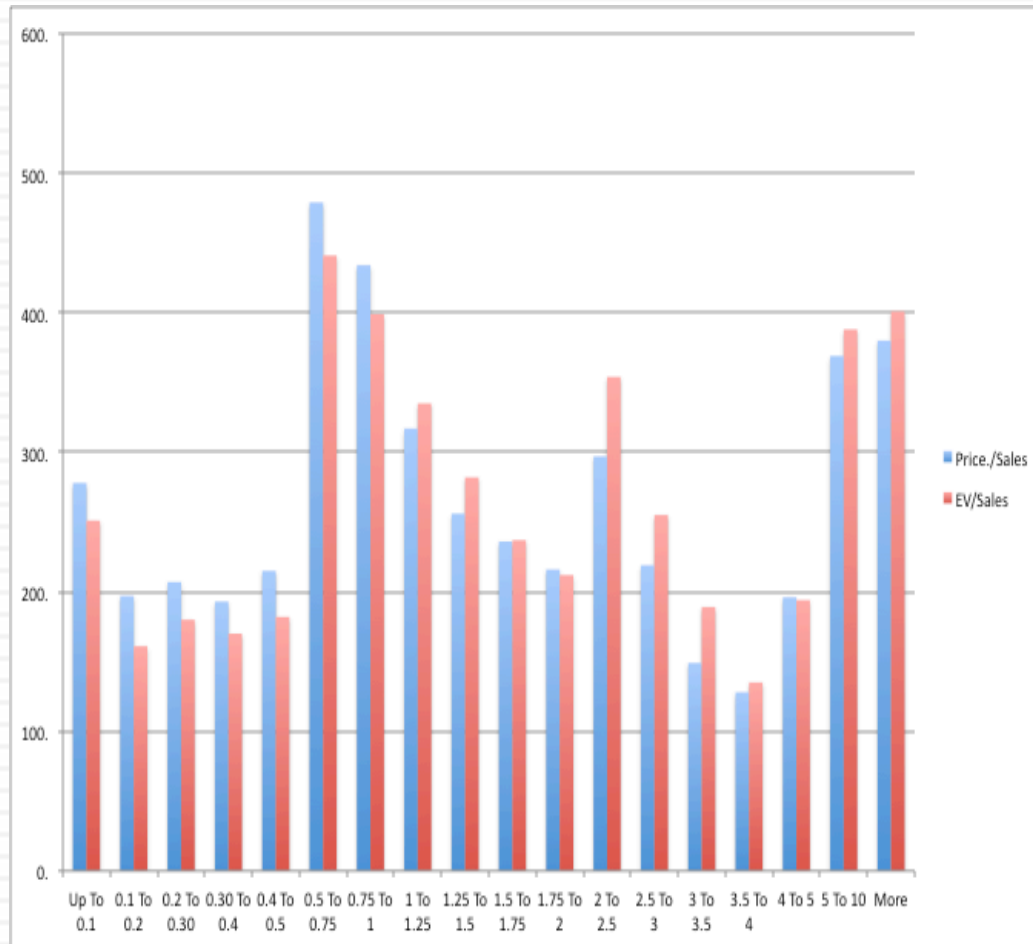
$$\text{Price/ Sales} = \frac{\text{Market value of equity}}{\text{Revenues}}$$

- Consistency Tests

- The price/sales ratio is internally inconsistent, since the market value of equity is divided by the total revenues of the firm.
- Analysts have historically been able to get away with this inconsistency because they have used it in sectors with no debt (technology) or sectors where financial leverage is similar (retail).

# Revenue Multiples: US stocks

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# Price/Sales Ratio: Determinants

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- The price/sales ratio of a stable growth firm can be estimated beginning with a 2-stage equity valuation model:

- Dividing both sides by  $S_0$ ,  $P_0 = \frac{DPS_1}{r - g_n}$  es per share:

$$\frac{P_0}{Sales_0} = PS = \frac{\text{Net Profit Margin} * \text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

# Price Sales Ratios and Profit Margins

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- The key determinant of price-sales ratios is the profit margin.
- A decline in profit margins has a two-fold effect.
  - First, the reduction in profit margins reduces the price-sales ratio directly.
  - Second, the lower profit margin can lead to lower growth and hence lower price-sales ratios.

Expected growth rate

= Retention ratio \* Return on Equity

= Retention Ratio \*(Net Profit / Sales) \* ( Sales / BV of Equity)

= Retention Ratio \* Profit Margin \* Sales/BV of Equity

# EV/Sales Ratios: Analysis of Determinants

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- If pre-tax operating margins are used, the appropriate value estimate is that of the firm. In particular, if one makes the assumption that  
Free Cash Flow to the Firm = EBIT (1 - tax rate) (1 - Reinvestment Rate)
- Then the Value of the Firm can be written as a function of the after-tax operating margin = (EBIT (1-t)/Sales

$$\frac{\text{Value}}{\text{Sales}_0} = \text{After-tax Oper. Margin} * \left[ \frac{(1 - \text{RIR}_{\text{growth}})(1+g)^* \left( 1 - \frac{(1+g)^n}{(1+WACC)^n} \right)}{WACC - g} + \frac{(1 - \text{RIR}_{\text{stable}})(1+g)^n * (1+g_n)}{(WACC - g_n)(1+WACC)^n} \right]$$

$g$  = Growth rate in after-tax operating income for the first  $n$  years  
 $g_n$  = Growth rate in after-tax operating income after  $n$  years forever  
 (Stable growth rate)

$\text{RIR}_{\text{Growth, Stable}}$  = Reinvestment rate in high growth and stable periods

WACC = Weighted average cost of capital

# EV/Sales Ratio: An Example with Coca Cola

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- Consider, for example, the Value/Sales ratio of Coca Cola. The company had the following characteristics:

- After-tax Operating Margin = 18.56%      Sales/BV of Capital = 1.67

- Return on Capital = 1.67 \* 18.56% = 31.02%

- Reinvestment Rate = 65.00% in high growth; 20% in stable growth;

- Expected Growth = 31.02% \* 0.65 = 20.16%      (Stable Growth Rate = 6%)

- Length of High Growth Period = 10 years

- Cost of Equity = 12.33%      E/(D+E) = 97.65%

- After-tax Cost of Debt = 4.16%      D/(D+E) = 2.35%

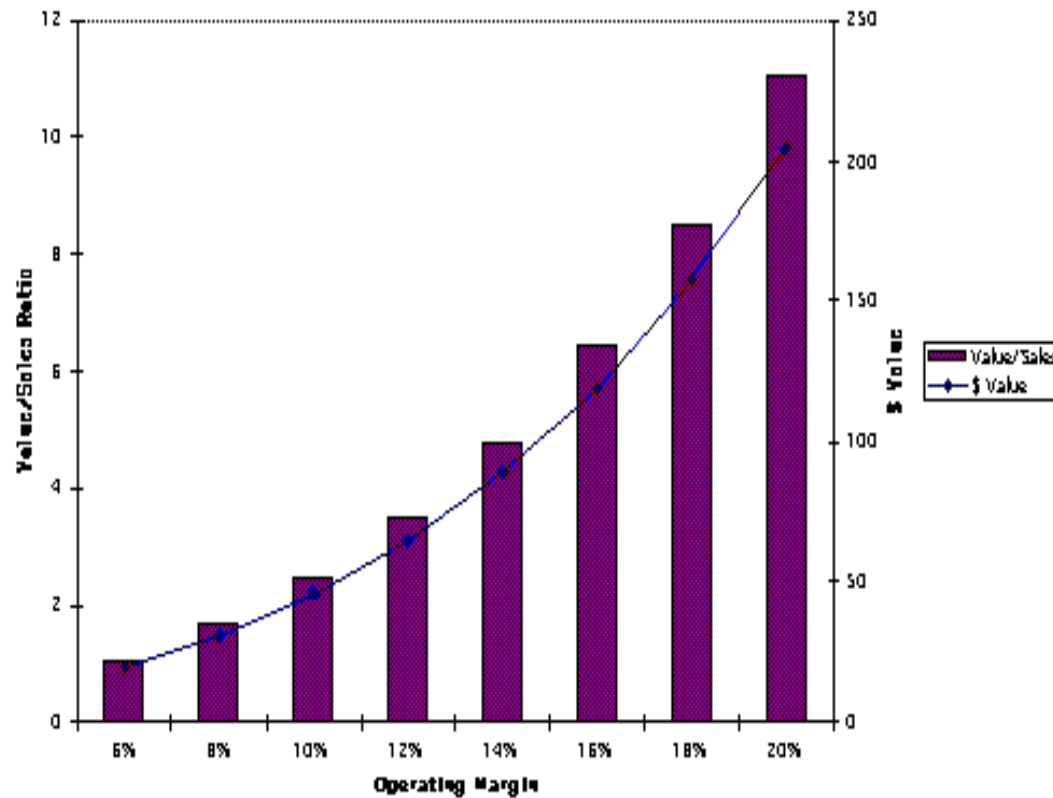
- Cost of Capital

$$\frac{\text{Value of Firm}_0}{\text{Sales}_0} = .1856 * \left[ \frac{(1 - .65)(1.2016)^* \left( 1 - \frac{(1.2016)^{10}}{(1.1213)^{10}} \right)}{.1213 - .2016} + \frac{(1 - .20)(1.2016)^{10} * (1.06)}{(.1213 - .06)(1.1213)^{10}} \right] = 6.10$$

# EV/Sales Ratios and Operating Margins

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Coca Cola: The Operating Margin Effect





# Brand Name Premiums in Valuation

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- You have been hired to value Coca Cola for an analyst reports and you have valued the firm at 6.10 times revenues, using the model described in the last few pages. Another analyst is arguing that there should be a premium added on to reflect the value of the brand name. Do you agree?
  - a. Yes
  - b. No
- Explain.

# Valuing Brand Name

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|  | Coca Cola   | With Cott Margins |
|--|-------------|-------------------|
| Current Revenues =   | \$21,962.00 | \$21,962.00       |
| Length of high-growth period                                 | 10          | 10                |
| Reinvestment Rate =  | 50%         | 50%               |
| Operating Margin (after-tax)                                 | 15.57%      | 5.28%             |
| Sales/Capital (Turnover ratio)                               | 1.34        | 1.34              |
| Return on capital (after-tax)                                | 20.84%      | 7.06%             |
| Growth rate during period (g) =                              | 10.42%      | 3.53%             |
| Cost of Capital during period =                              | 7.65%       | 7.65%             |
| <i>Stable Growth Period</i>                                  |             |                   |
| Growth rate in steady state =                                | 4.00%       | 4.00%             |
| Return on capital =  | 7.65%       | 7.65%             |
| Reinvestment Rate =  | 52.28%      | 52.28%            |
| Cost of Capital =  | 7.65%       | 7.65%             |
| Value of Firm =  | \$79,611.25 | \$15,371.24       |
| Value of brand name = \$79,611 - \$15,371 = \$64,240 million |             |                   |