
 REVENUE MULTIPLES AND SECTOR-SPECIFIC MULTIPLES

Problem 1

- A. Dividend Payout Ratio = $\$1.12/\$2.45 = 0.4571$
 Expected Growth Rate = 6%
 Cost of Equity = $7\% + 0.9(5.5\%) = 11.95\%$
 Profit Margin = $2.45/122 = 2\%$
 P/S Ratio = $.02 * 0.4571 * (1.06)/(.1195 - .06) = 0.16288$
 Price Based on this Multiple = $0.16288 * 122 = \$19.87$
- B. P/S Ratio Needed for a Price of \$34 = $\$34/122 = 0.2787$
 Profit Margin Needed for this P/S Ratio
 $= 0.2787 * (.1195 - .06)/(0.4571 * 1.06)$
 $= 0.0342$ or 3.42%

Problem 2

A. These are the two companies with high expected growth rates. These high growth rates may explain the high P/S ratios. In addition, the Bombay company has the highest profit margin of the group.

B.

Correlation between P/S ratio and profit margin =	0.8840
Correlation between P/S ratio and expected growth =	0.7694
Correlation between P/S ratio and beta =	0.2754
Correlation between P/S ratio and payout =	-0.4390

C. One measure that might work is the ratio of Price/Sales (P/S) ratio to profit margin. On this basis, Bradlee's which has a P/S ratio of 0.09 and a profit margin of 1.04%, Caldor and Sears are most likely to be undervalued, whereas the Bombay company with P/S-Margin ratio of 0.56 is most likely to be overvalued.

<i>Company</i>	<i>Price</i>	<i>Sales</i>	<i>P/S</i>	<i>Profit</i>	<i>Exp.</i>	<i>Beta</i>	<i>P/S-</i>
			<i>Ratio</i>	<i>Margin</i>	<i>Growth</i>		<i>Margin</i>
Bombay Co.	\$38	\$9.70	3.92	7.01%	29.00%	1.45	0.559
Bradlees	15	168.6	0.09	1.04%	12.00%	1.15	0.086
Caldor	32	147.45	0.22	1.83%	12.50%	1.55	0.119

Consol. Store	21	23	0.91	4.13%	26.50%	1.35	0.221
Dayton Hudson	73	272.9	0.27	1.70%	12.50%	1.3	0.157
Federated	22	58.9	0.37	2.38%	10.00%	1.45	0.157
Kmart	23	101.45	0.23	1.72%	11.50%	1.3	0.131
Nordstrom	36	43.85	0.82	3.65%	11.50%	1.45	0.225
Penney	54	81.05	0.67	4.32%	10.50%	1.1	0.154
Sears	57	150	0.38	3.03%	11.00%	1.35	0.125
Tiffany's	32	35.65	0.9	4.21%	10.50%	1.5	0.213
Wal-Mart	30	29.35	1.02	3.58%	18.50%	1.3	0.286
Woolworth	23	74.15	0.31	1.82%	13.00%	1.25	0.17

Alternatively, a regression of P/S ratios against the fundamental variables could have been run and estimated P/S ratios can be obtained.

Problem 3

A.

Profit Margin = 221/8298 = 2.66%

$$PS = 0.0266 * \left[\frac{0.31 * (1.135) * \left(1 - \frac{(1.135)^5}{(1.13325)^5} \right)}{(.13325 - .135)} + \frac{0.60 * (1.135)^5 * (1.06)}{(.13325 - .06) (1.13325)^5} \right]$$

$$= 0.275$$

B. P/S ratio for Stable Growth Firm with Same Margin

= 0.0266 * 0.6 * 1.06 / (.13325 - .06) = 0.231

P/S ratio attributable to High Growth = 0.275 - 0.231 = 0.044

Problem 4

A.

$$PS = 0.1784 * \left[\frac{0.45 * (1.11) * \left(1 - \frac{(1.11)^5}{(1.125)^5} \right)}{(.125 - .11)} + \frac{0.60 * (1.11)^5 * (1.06)}{(.125 - .06) (1.125)^5} \right]$$

$$= 2.02$$

B. New Margin = 100/700 = 14.29%

Old Growth Rate

$$= \text{Old Profit Margin} * \text{Sales/Book Value} * (1 - \text{Payout ratio})$$

$$= .1784 * \text{Sales/Book Value} * (1 - 0.45) = 11\%$$

Sales/Book Value = 1.12

New Growth Rate (for high growth period)

$$= .1429 * 1.12 * (1 - 0.45) = 8.81\%$$

Price / Sales Ratio

$$= 0.1429 * \left[\frac{0.45 * (1.0881) * \left(1 - \frac{(1.0881)^5}{(1.125)^5}\right)}{(.125 - .0881)} + \frac{0.60 * (1.0881)^5 * (1.06)}{(.125 - .06) (1.125)^5} \right]$$

$$= 1.47$$

Problem 5

A.

	<i>Next 10 Years</i>	<i>After Year 10</i>
Payout Ratio	33.00%	60.00%
Sales/Book Value	2.50	2.50
Expected Growth Rate	16.75%	6.00%
Cost of Equity	14.15%	12.50%
Profit Margin	10.00%	10.00%
P/S Ratio =	1.59991143	
Price per share =	\$39.00	

B.

	<i>Next 10 Years</i>	<i>After Year 10</i>
Payout Ratio	33.00%	60.00%
Sales/Book Value	3.00	3.00
Expected Growth Rate	16.08%	6.00%
Cost of Equity	14.15%	12.50%

Profit Margin 8.00% 8.00%

P/S Ratio = 1.21549194

Price Per Share = \$35.55

C. The status quo strategy is best, since it leads to a higher price per share.

D. Sales would have to drop 20%. (Sales/book value ratio would have to be 2.40 for the two strategies to be equivalent.)

Problem 6

A. The coefficients on this regression measure both the direction and the magnitude of the relationship between P/S ratios and independent variables. My concerns would be the same as for the peer group regression.

B.

<i>Company</i>	<i>P/S Ratio</i>	<i>Profit Margin</i>	<i>Payout</i>	<i>Exp. Growth</i>	<i>Beta</i>	<i>Predicted P/S</i>
Arbor Drugs	0.42	3.40%	18%	14.00%	1.05	0.39904
Big B Inc.	0.30	1.90%	14%	23.50%	0.70	0.48704
Drug Emporium	0.10	0.60%	0%	27.50%	0.90	0.28121
Fay's Inc.	0.15	1.30%	37%	11.50%	0.90	0.34188
Genovese	0.18	1.70%	26%	10.50%	0.80	0.37292
Longs Drug	0.30	2.00%	46%	6.00%	0.90	0.38680
Perry Drugs	0.12	1.30%	0%	12.50%	1.10	0.14108
Rite Aid	0.33	3.20%	37%	10.50%	0.90	0.48487
Walgreen	0.60	2.70%	31%	13.50%	1.15	0.33992

These predictions use the information in the entire cross-section, and should be more reliable.

$$C. P/S = 0.42 + 0.33 * 0 + 0.73 * 0.20 - 0.43 * 0.93 + 7.91 * 0.06 = 0.64$$

The values in this regression are the values of the private firm being valued.

$$\begin{aligned} \text{Market Value of Equity} &= \text{Revenues} * \text{Price/Sales Ratio} \\ &= 250 * 0.64 = \$160 \text{ million} \end{aligned}$$

Problem 7

a. After-tax operating margin = $1.5/15 = 10\%$

Return on capital = After-tax Operating Margin * Turnover ratio = $10\% * 1.5 = 15\%$

Reinvestment rate = $5\%/15\% = 33.33\%$

Value to sales ratio = After-tax Margin * (1- Reinvestment rate) (1+g)/ (Cost of capital – g)

$$= .10 (1-.3333) (1.05)/(.10-.05) = 1.40$$

b. Reinvestment rate in first 5 years = $g/ \text{ROC} = 10/15 = 66.67\%$

Value/Sales Ratio

$$= 0.10 * \left[\frac{(1 - .6667) * (1.10) * \left(1 - \frac{(1.10)^5}{(1.10)^5}\right)}{(.10 - .10)} + \frac{(1 - .3333) * (1.10)^5 * (1.05)}{(.10 - .05) (1.10)^5} \right]$$

$$= 0.10 * \left[(1 - .6667) * 5 + \frac{(1 - .3333) * (1.10)^5 * (1.05)}{(.10 - .05) (1.10)^5} \right] = 1.57$$

Problem 8

Value to sales ratio for Estee Lauder = $0.45 + 8.5 (.16) = 1.81$

Value to sales ratio for GenCosmetics = $0.45 + 8.5 (.05) = 0.875$

Value of brand name = $(1.81 - 0.875) (500) = \$467.5 \text{ million}$

Problem 9

a. Return on capital = Operating Margin * Sales/ Book
 $= (18/ 100) * (100/90) = 20\%$

Reinvestment rate = $g/ \text{ROC} = 5/20 = 25\%$

Value to Sales ratio = $.18 (1-.25)(1.05)/(.10-.05) = 2.835$

b. Return on capital for generic firms = 10%

Reinvestment rate = $5/10 = 50\%$

Value to Sales ratio = $.09 (1-.5)(1.05)/(.10-.05) = 0.945$

Brand name value = $(2.835 - 0.945) (100) = \$ 189 \text{ million}$