CHAPTER 20

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.

Company	*Price*	*Sales*	*P/S Ratio*	*Profit Margin*	*Exp. Growth*	*Beta*	*P/S-Margin*
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

= Old Profit Margin * Sales/Book Value * (1 - Payout ratio)

= .1784 * 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.

	Next 10 Years	*After Year 10*
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.

	Next 10 Years	*After Year 10*
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.

Company	*P/S Ratio*	*Profit Margin*	*Payout*	*Exp. Growth*	*Beta*	*Predicted P/S*
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.

Market Value of Equity = Revenues * Price/Sales Ratio
= 250 * 0.64 = $160 million

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/ 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 million

Problem 9

a. Return on capital = Operating Margin * Sales/ Book

=(18/ 100)*(100/90) = 20%

Reinvestment rate = g/ 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 million