Problem Set

PROBLEM SET: Relative Pricing

Exercise 1. *Comparables* [3]

In doing valuation we often have to estimate a number based on similar information from comparable companies. Discuss the tradeoffs in the selection of comparable companies.

Exercise 2. *Comparables* [3]

You have the following information for a company you are valuing and for a comparable company:

Comparable company:

Stock Price	23.45
Number of Shares outstanding	6.23 mill
Value of debt	18.45 mill
Est EBITDA next year	17 mill
Est income next year	5.3 mill

Company you are valuing

Value of debt	3.68 mill
Est EBITDA next year	4.4 mill
Est income next year	1.5 mill

Estimate the enterprise value of the company you are evaluating using the P/E and enterprise value/EBITDA multiples.

Exercise 3. *Chrysler* [3]

It is 4 April 2007, and your company is considering the possibility of purchasing the Chrysler automobile manufacturing business from the German car manufacturer DaimlerChrysler. DaimlerChrysler has hinted that it might be interested in selling Chrysler. Since Chrysler does not have publicly traded shares of its own, you have decided to use Ford Motor Company as a comparable company to help you determine the market value of Chrysler.

This morning, Ford's shares were trading at $8.15 and the company had 1.89 billion shares outstanding. You estimate that the market value of all the company's other outstanding securities (excluding the ordinary shares but including special shares owned by the Ford family) is $100 billion and that its revenues from auto sales were $143.3 billion last year.

Chrysler's revenue in 2006 was $62.2 billion.

Based on the enterprise value/revenue ratio, what is the total value of Chrysler that is implied by the Ford market values?

Exercise 4. *Walgreen (From Damodaran)* [4]

Walgreen, a large retail drugstore chain in the United States, reported net income of $221 million in 1993 on revenues of $ 8298 million. It paid out 31% of its earnings as dividends, a payout ratio that is expected to remain level from 1994 to 1998, during which earnings growth is expected to be 13.5%. After 1998, earnings growth is expected to decline to 6%, and the dividend payout ratio is expected to increase to 60%. The beta is 1.15 and this figure is expected to remain unchanged. The treasury bond rate is 7%.

1. Estimate the price/sales ratio for Walgreens, assuming its profit margin remains unchanged at 1993 levels.

2. How much of this price/sales ratio can be attributed to extraordinary growth?

Exercise 5. *P/E Ratios in a Peer Group (From Damodaran)* [3]

The following were the P/E ratios of firms in the aerospace / defense industry at the end of December, 1993, with additional data on expected growth and risk.

Company	P/E Ratio	Expected Growth	Beta	Payout
Boeing	17.3	3.5%	1.10	28%
General Dynamics	15.5	11.5%	1.25	40%
General Motors - Hughes	16.5	13.0%	0.85	41%
Grumman	11.4	10.5%	0.80	37%
Lockheed Corporation	10.2	9.5%	0.85	37%
Logicaon	12.4	14.0%	0.85	11%
Loral Corporation	13.3	16.5%	0.76	23%
Martin Marietta	11.0	8.0%	0.85	22%
McDonnell Douglas	22.6	13.0%	1.15	37%
Northrop	9.5	9.0%	1.05	47%
Raytheon	12.1	9.5%	0.75	28%
Rockwell	13.9	11.5%	1.00	38%
Thiokol	8.7	5.5%	0.95	15%
United Industrial	10.4	4.5%	0.70	50%

1. Estimate the average and median P/E ratios. What, if anything, would these averages tell you?
2. An analyst concluded that Thiokol is undervalued, because its P/E ratio is lower than the industry average. Under what conditions is this statement true? Would you agree with it here?

Exercise 6. *Google* [30]

Google Inc. of Mountain View, California, operates the most popular and powerful search engine on the Web. The company went public using an unconventional Dutch auction method on August 19, 2004. The resulting IPO was the largest Internet IPO ever, raising $1.67 billion and leaving the firm with 271,219,643 shares of common stock.

Financial Information	Earthlink ELNK	Yahoo YHOO	eBay EBAY	Microsoft MSFT
2003 Shares Outstanding(thousands)	159 399	655 602	646 819	10 800 000
2003 Fiscal Close Stock Price	$ 10.00	$ 45.03	$ 64.61	$ 25.64
Market Capitalization(mill)	$ 1 594	$ 29 521	$ 41 790	$ 276 912
Short Term Debt (thousands)	$ 900	$ 0	$ 2 800	$ 0
Long Term Debt (thousands)	$ 0	$ 750 000	$ 124 500	$ 0
Cash & Equivalents (thousands)	$ 349 740	$ 713 539	$ 1 381 513	$ 6 438 000
Short Term Investments (thousands)	$ 89 088	$ 595 975	$ 340 576	$ 42 610 000
EBITDA (thousands)	$ 218 100	$ 455 300	$ 818 200	$ 14 656 000
Net Income (thousands)	$ (62 200)	$ 237 900	$ 441 800	$ 9 993 000
Calculated EPS	(0.39)	0.36	0.68	0.93

While Google commands a wide lead over its competitors in the search engine market, it is witnessing increased pressure from well-funded rival entities. Yahoo! Inc., with a market cap of approximately $38.43 billion, is generally regarded as following a business model very similar to Google's.

1. Use the data found in the Exhibit for the following companies as comparables in your analysis: Earthlink, Yahoo!, eBay and Microsoft. Compute the IPO value of Google shares using each of the comparable firms separately, and then use an average "multiple" of the comparable firms to do the analysis. Assume that Google's forecasted values at the time of the IPO are as follows: Net income is $400 million, EBITDA is approximately $800 million, cash and equivalents are $430 million, and interest-bearing debt (total short-term and long-term) equals only $10 million.

2. Which of the four comparable firms do you think is the best comparison firm for Google? Why?

Empirical
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PROBLEM SET: Relative Pricing

Exercise 1. *Comparables* [3]
Ask how similar should the firms be?
Narrow definition:
Pro – presumable close to the firm we want to analyze
Con – few firms, averages unduly affected by one comparable.
Wide definition (opposite)
Exercise 2. *Comparables* [3]

$$\left(\frac{P}{E}\right)_{comparable} = \left(\frac{\text{Share price}}{\text{Earnings per share}}\right)_{comparable}$$
$$= \frac{23.45}{5.3/6.23\text{shares}} = 27.6$$
$$\left(\frac{\text{Enterprise value}}{EBITDA}\right)_{comparable} = \left(\frac{V_D + V_E}{EBITDA}\right)_{comp}$$
$$= \frac{€18.45 + (€23.45 \times 6.23 \text{ shares})}{€17.0} = 9.68$$

Using the P/E multiple, we can calculate the value of the equity as

$$E = \left(\frac{P}{E}\right)_{comparable} \times \text{ Net Income} = 27.6 \times €1.5 \text{ mill} = €41.4 \text{ mill}$$

This suggests an enterprise value of (mill)

$$V = E + D = 41.4 + 3.68 = 45.08$$

Using the enterprise/EBITDA multiple, we obtain

$$\left(\frac{\text{Enterprise value}}{EBITDA}\right)_{comparable} \times EBITDA = 9.68 \times €4.4 \text{ mill} = €52.59 \text{ mill.}$$

Exercise 3. *Chrysler* [3]
Need to calculate this as a ratio.
From Ford, Enterprise Value/Revenue:
Equity mkt value = 8.15 × 1.89 bill = 15.4 bill.
Enterprise Value = Equity mkt value + $ 100 bill = 115.4 bill
Revenue 143.3 bill
Enterprise Value / Revenue = 115.4/143.3 = 0.805.
Assume Chrysler has same Enterprise Value / Revenue Ratio:
0.805 = Enterprise Value Chrysler / Revenue Chrysler:
0.805 = Enterprise Value Chrysler / 62.2
Enterprise Value Chrysler = 0.805 × 62.2 = 50 bill.
Exercise 4. *Walgreen (From Damodaran)* [4]

1. Profit margin $= \frac{221}{8298} = 2.66\%$

$$PS = 0.0266 \left[\frac{0.31 \times 1.135 \times \left(1 - \frac{1.135^5}{1.13325^5}\right)}{0.13325 - 0.135} + \frac{0.60 \times 1.135^5 \times 1.06}{0.13325 - 0.6 \times 1.13325^5} \right]$$
$$= 0.275$$

2. P/S ratio for Stable Growth Firms with Same Margin

$$= 0.0266 \times 0.6 \times \frac{1.06}{0.13325 - 0.06} = 0.231$$

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

Exercise 5. *P/E Ratios in a Peer Group (From Damodaran)* [3]

1. Average P/E ratio for the industry is 13.2
   Median P/E ratio for the industry is 12.25
   If the firms in this group are homogeneous, the average P/E ratio provides an estimate of how much the market values earnings in this sector, given the expected growth potential and the risk in the sector.

   The average P/E ratio can be skewed by extreme values (usually high, since P/E ratios can not be less than zero). The median corrects for this by looking at the median firm in the sector.

2. This statement is likely to be true only if

   - Thiokol has the same growth prospects and risk profile of the typical firm in industry. It also generates cash flows for disbursement as dividends which are similar to the typical firm in the industry.
   - Thiokol has higher growth potential and/or lower risk than the typical firm in the industry.

Exercise 6. *Google* [30]

1. Estimating the IPO price

					Average
Price to Earnings	(25.63)	124.09	94.59	27.71	55.19
Enterprise Value (mill)	\$1 245	\$29 558	\$40 536	\$270 474	
EBITDA multiple	5.71	64.92	49.54	18.45	34.66

EBITDA	\$ 800 000 000
Cash	\$ 430 000 000
Debt	\$ 10 000 000
Net income	\$ 400 000 000
Shares	271 219 643
EPS	\$ 1.47
IPO proceeds	\$ 1 670 000 000

	Earthlink	Yahoo	eBay	Microsoft	Average
Imputed IPO price per share from PE ratio	(\$38)	\$183.01	\$139.51	\$40.87	\$81.40
Impute EV from EBITDA multiples (mill)	\$4 567	\$51 936	\$39 635	\$14 763	\$27 725
Owner's equity (mill)	\$4 987	\$52 356	\$40 055	\$15 183	\$28 145
Impute IPO price per share	\$18.39	\$193.04	\$147.68	\$55.98	\$103.77

2. Best comparison?

   Yahoo seems to be the closest in terms of leverage, and it is. And fairly close in terms of EBITDA, NI. Microsoft and Earthlink have little debt. Microsoft seems to be much bigger in size. e-Bay has huge amounts of debt. It does not seem comparable. The choice is between Earthlink and Yahoo. Yahoo may be the best. Its debt is comparable to Google, its EBITDA and NI are closer to Google, and it has a similar businesses.