Homework Solutions - Lecture 1

1. You are analyzing a company with the expected future cash flows shown below. Based on current market prices, the market value of the firm's equity is $1,962.9. The outstanding debt has both a market and book value of $800. The firm's cost of equity (k_e) is 11.0%, the firm's past and future cost of debt is 10%, and the firm's tax rate is t=50%. Use this information to answer the questions below.

Year	*CF to Firm*	*Int Exp (1-t)*	*CF to Equity*
1	$ 140.0	$ 40	$ 100.0
2	$ 150.0	$ 40	$ 110.0
3	$ 161.0	$ 40	$ 121.0
4	$ 173.1	$ 40	$ 133.1
5	$ 186.4	$ 40	$ 146.4
Terminal Value	$ 3339.6		$2562.2

a. Calculate the value of the firm's equity using a discounted cash flow (DCF) model and the listed cash flows to equity.

$$PV_{Equity} = \frac{100}{1.11} + \frac{110}{1.11^2} + \frac{121}{1.11^3} + \frac{133.1}{1.11^4} + \frac{(146.4 + 2562.2)}{1.11^5} = \$1962.9$$

b. Calculate the value of the overall firm and the value of the firm's equity using a DCF model and the listed cash flows to the firm.

$$\text{WACC} = \left(\frac{1962.9}{2762.9}\right)11.0\% + \left(\frac{800}{2762.9}\right)10\%(1-.5) = 9.26\%$$

$$PV_{Firm} = \frac{140}{1.0926^1} + \frac{150}{1.0926^2} + \frac{161}{1.0926^3} + \frac{173.1}{1.0926^4} + \frac{(186.4 + 3339.6)}{1.0926^5} = \$2762.9$$

$$PV_{Equity} = PV_{Firm} - MV\ of\ Debt = 2762.9 - 800 = \$1962.9$$

c. In this example, the estimated value of equity was the same using the FCFE and FCFF models. In general, this will be the case only if:

i. The values for debt and equity used to calculate the cost of capital are equal to the values obtained in the valuation.

ii. The interest expenses are equal to the pre-tax cost of debt multiplied by the market value of debt (i.e., debt is priced at face value).

iii. There are no extraordinary or nonoperating items that affect net income but not operating income (i.e., the only difference is interest expense).

2. I have attached Nike's financial statements from the most recent fiscal year ending May 31, 2009. The notes to the financial statements and full 10K are available on the class web site. Throughout the course, you will use this information to complete several assignments related to the valuation of Nike.

   a. Using Nike's financial statements and any additional resources required, calculate the liquidity and leverage ratios we discussed in class. Compare these ratios to those we calculated for Home Depot and note any important similarities and differences between the two firms.

$$\text{Current Ratio} = \frac{9734}{3277} = 2.97$$

$$\text{Quick Ratio} = \frac{2291.1 + 1164}{3277} = 1.054$$

$$\text{Debt to Capital} = \frac{437.2 + 32 + 342.9}{(437.2 + 32 + 342.9) + 8693.1} = 8.54\%$$

$$\text{Debt to Equity} = \frac{437.2 + 32 + 342.9}{8693.1} = 9.34\%$$

$$\text{Times Interest Earned} = \frac{2454.8}{59.2} = 41.47$$

Note that the debt used in the leverage ratios includes all short-term and long-term debt.

To calculate Time-Interest-Earned, I must determine EBIT and interest expense. To calculate an EBIT value that will be comparable to other firms, I ignore all of the impairment and restructuring charges. Thus, EBIT = 8604.4 - 6149.6 = 2454.8. The interest expense for Nike is difficult to determine. The income statement shows net interest expense of $9.5 million. However, note 1 to the consolidated financial statements (pg. 58) explains that this net reflects $49.7 million in interest income. Together, this suggests that the total interest expense was 49.7+9.5 = 59.2 million.

In comparing Nike to Home Depot, it is clear that Nike is much more liquid and has significantly lower debt obligations than Home Depot. This could reflect industry differences, but more likely suggests that Nike is in a better financial condition that Home Depot.

b. Using Nike's financial statements and any additional resources required, calculate the efficiency ratios we discussed in class. Compare these ratios to those we calculated for Home Depot and note any important similarities and differences between the two firms.

$$\text{Inventory Turnover} = \frac{10571.7}{2438.4} = 4.336 \qquad \text{Days in Inventory} = \frac{365}{4.336} = 84.2$$

$$\text{Accts Rec Turnover} = \frac{19176.1}{2795.3} = 6.860 \qquad \text{Avg Collection Period} = \frac{365}{6.86} = 53.2$$

$$\text{Accts Payable Turnover} = \frac{10571.1}{1287.6} = 8.210 \qquad \text{Avg Payable Days Outst} = \frac{365}{8.210} = 44.5$$

$$\text{Total Asset Turnover} = \frac{19176.1}{12442.7} = 1.541$$

$$\text{LT Operating Asset Turnover} = \frac{19176.1}{1891.1} = 10.140$$

For turnover ratios where we compare an income statement number to a balance sheet number, I use the beginning of period balance sheet value (prior fiscal year). It would also be acceptable to use the average of the beginning and ending period balance sheet values.

Inventory turnover, accounts payable turnover, and total asset turnover are comparable between the two firms. Nike's accounts receivable turnover is significant lower than that of HD, giving it a longer average collection period. In contrast, Nike has significantly higher operating asset turnover. These differences may reflect differences in performance, but may also reflect differences in the use of accounts receivable and fixed assets in the two industries.

Note that the required financing period for Nike (84.2+53.2-44.5=92.9 days) is longer than that of Home Depot (90.53+6.45-44.2=52.8 days), due primarily to the large difference in average collection period.

c. Using Nike's financial statements and any additional resources required, calculate the profitability ratios we discussed in class. Compare these ratios to those we calculated for Home Depot and note any important similarities and differences between the two firms.

$$\text{Effective Tax Rate} = \frac{469.8}{1956.5} = 24.01\%$$

$$\text{Gross Profit Margin} = \frac{8604.4}{19176.1} = 44.87\%$$

$$\text{Aftertax Operating Profit Margin} = \frac{(8604.4 - 6149.6)(1 - .2401)}{19176.1} = 9.73\%$$

$$\text{Net Profit Margin} = \frac{1486.7}{19176.1} = 7.75\%$$

$$\text{Return on Capital} = \frac{(8604.4 - 6149.6)(1 - .2401)}{(441.1 + 6.3 + 177.7) + 7825.3} = 22.08\%$$

$$\text{Return on Equity} = \frac{1486.7}{7825.3} = 19.00\%$$

Again, to calculate EBIT for the operating profit margin and ROC, I ignore all impairment and restructuring charges. Thus, EBIT = 8604.4 - 6149.6 = 2454.8. The debt used for the ROC calculation includes all short-term and long-term debt. In addition, for the ROE and ROC where we compare an income statement number to a balance sheet number, I am using the beginning of period balance sheet value. It would also be acceptable to use the average of the beginning and ending period balance sheet values.

All of Nike's margins are significantly higher than those for Home Depot. In addition, both the ROC and ROE are higher for Nike than for Home Depot. By these measures, Nike is more profitable and has lower costs than Home Depot.

d. As shown in part (c), the ROC for Nike is 22.08%. This can be decomposed into an after-tax operating margin and capital turnover ratio as follows:

$$\text{Return on Capital (ROC)} = \frac{(8604.4 - 6149.6)(1 - .2401)}{(441.1 + 6.3 + 177.7) + 7825.3} = \left(\frac{1865.40}{19176.1}\right) \times \left(\frac{19176.1}{8450.4}\right)$$

$$= 22.08\% = 9.73\% \times 2.27$$

Based on this breakdown, the higher ROC for Nike appears to be driven almost exclusively by Nike's higher operating margins, rather than by Nike's ability to generate sales (capital turnover).

As shown in part (c), the ROE for Nike is 19.00%. This can be decomposed into net profit margin, asset turnover ratio, and financial leverage, as follows:

$$\text{Return on Equity (ROE)} = \frac{1486.7}{7825.3} = \left(\frac{1486.7}{19176.1}\right) \times \left(\frac{19176.1}{12442.7}\right) \times \left(\frac{12442.7}{7825.3}\right)$$

$$= 19.00\% = 7.75\% \times 1.541 \times 1.59$$

As with the ROC, the higher ROE for Nike appears to be driven by higher margins, while Nike's asset turnover ratio (1.54) is comparable to that for Home Depot (1.61). In addition, Home Depot's ROE is driven up by its use of leverage, which is much higher than that of Nike. Without this leverage, Home Depot's ROE would look even worse relative to that of Nike.