Homework Solutions - Lecture 4

1. Estimate fundamental growth in EBIT for Nike based on the firm's reinvestment rate and ROC in the most recent year. Be sure to incorporate any necessary adjustments made in prior assignments (for example, adjustments for one-time charges, operating leases, capitalization of advertising, etc.). How does your estimate of fundamental growth compare to the firm's actual growth in EBIT over the past year?

The inputs necessary for calculating fundamental growth, come directly from the lecture 3 homework solutions. The reinvestment rate in the current year is defined based on adjusted measures of reinvestment and after-tax operating income. From problem 4 in the Lecture 3 homework, we have:

Adjusted EBIT(1–T)	2238.22	
– (Capex – Depr)	– (431.0 – 351.00)	Reinvestment
– Acquisition Costs	– 0.00	
– (Advertising – Amort)	– (2448.00 – 2338.67)	
– Increase in Oper. Lease Assets	– 201.90	
– Increase in WC	– 530.00	
= FCFF	$1,316.99	

Given this information, the reinvestment rate is defined as follows:

$$Reinvestment\ Rate = \frac{(Capex - Depr) + (Advertising - Amort) + Acquisition\ Costs + \Delta OperLeaseAsset + \Delta WC}{Adjusted\ EBIT(1-T)}$$

$$= \frac{(431.0 - 351.0) + 0.0 + (2448.0 - 2338.67) + 0 + 201.9 + 530.0}{2238.22} = \frac{921.23}{2238.22} = 41.16\%$$

The reinvestment rate here results primarily from the increase in working capital. One alternative that we might consider would be to look at a smoothed measure of working capital change, rather than looking at the raw working capital numbers. For example, we could estimate working capital as a % of revenues. Damodaran finds that working capital in the specialty retail industry averages 14.63% of revenues. In the most recent year, Nike's revenues increased from 19,014 to 20,862, an increase of 1,848. Using this change in revenue, we could estimates a smoothed measure of the change in working capital as 14.63% times 1,848, or 270.36. Substituting this change in working capital in the formula above would give reinvestment of 661.59 and a reinvestment rate of 29.56%. Similarly, we could forecast the change in working capital next year, by taking 14.63% times our forecast of the change in revenue in the next year.

Ideally, we should define ROC as the adjusted after-tax operating income in the current year divided by the adjusted value of debt plus equity, either at the beginning-of-year or averaged across the beginning and end of the year. For simplicity, I will use the average of beginning and ending debt plus equity, and will assume that the adjustments discussed in questions (1) and (2) of the lecture 3 homework can be applied to this average. (The alternative would be to calculate the advertising and operating lease adjustments separately for the prior year.) The average book value of equity equals (9843+9754)/2=9798.5. Adjusting this using the advertising adjustment in question (2) of the lecture 3 homework gives an adjusted equity value of 9798.5+4802.7=14601.2. The average book value of debt equals (663+592)/2=627.5. Adjusting this using the operating lease adjustment in question (1) of the lecture 3 homework gives an adjusted debt value of 627.5+1584.5=2212.0. Using these adjusted values for debt and equity along with the adjusted value of after-tax operating income from the lecture 3 homework, gives:

$$ROC = \frac{2238.22}{(2212.0 + 14601.2)} = 13.31\%$$

Assuming ROC does not change over time, fundamental growth in operating income is defined as:

$$g_{EBIT} = (Reinvestment\ Rate)(ROC) = (0.4116)(0.1331) = 5.48\%$$

**Note that the analysis above ignores any changes in ROC. To correctly forecast future income based on fundamental growth, we would need to incorporate any future changes in ROC based on our ROC forecasts.

2. Estimate fundamental growth in Net Income for Nike based on the firm's equity reinvestment rate and ROE. Be sure to incorporate any necessary adjustments made in prior assignments (for example, adjustments for one-time charges, capitalization of advertising, etc.). How does your estimate of fundamental growth compare to the firms actual growth in Net Income over the past year?

Again, the inputs necessary for calculating fundamental growth come directly from the lecture 3 homework solutions. The equity reinvestment rate in the current year is defined based on adjusted measures of reinvestment and net income: From problem 4 in the Lecture 3 homework, we have:

Adjusted Net Income	2242.33	
– (Capex – Depr)	– (431.0 – 351.00)	Equity Reinvestment
– Acquisition Costs	– 0.00	
– (Advertising – Amort)	– (2448.00 – 2338.67)	
– Increase in Oper. Lease Assets	– 201.90	
– Increase in WC	– 530.00	
– Net Debt Repayments (+ Net Debt Issues)	+ 33.00	
= FCFE	$1,354.10	

Given this information, the equity reinvestment rate is defined as follows:

$$Equity\ Reinvestment\ Rate =$$

$$= \frac{[(Capex - Depr) + (Advertising - Amort) + Acquisition\ Costs + \Delta OperLeaseAsset + \Delta WC] - Net\ Debt\ Issues}{Net\ Income}$$

$$= \frac{[(431.0 - 351.0) + 0.0 + (2448.0 - 2338.67) + 0 + 201.9 + 530.0] - 33.0}{22242.33} = \frac{888.23}{2243.33} = 39.61\%$$

Note that I have incorporated net debt issues (i.e., debt repayments) in my calculation of equity reinvestment. As an alternative, we could take the total amount of reinvestment and multiply by one minus the debt-to-capital ratio. Although I do not show it here, we could again use a smoothed measure of change in working capital, where working capital is defined as a % of revenues.

Ideally, we should define ROE as <u>adjusted</u> net income in the current year divided by the <u>adjusted</u> value of equity, either at the beginning of the year or averaged across the beginning and end of the year. For simplicity, I will use the average of beginning and ending equity, and will assume that the adjustment discussed in question (2) of the lecture 3 homework can be applied to this average. (The alternative would be to calculate the advertising adjustment separately for the prior year.) Again, the average book value of equity equals (9843+9754)/2=9798.5. Adjusting this using the advertising adjustment in question (2) of the lecture 3 homework gives an adjusted equity value of 9798.5+4802.7=14601.2. Using this adjusted equity value and the adjusted net income from question (2) of the lecture 3 homework gives:

$$ROE = \frac{2242.33}{14601.2} = 15.36\%$$

Assuming ROE does not change over time, fundamental growth in operating income is defined as:

$$g_{NI} = (Equity\ Reinvestment\ Rate)(ROE) = (0.3961)(0.1536) = 6.08\%$$

**Note that the analysis above ignores any changes in ROE. To correctly forecast future income based on fundamental growth, we would need to incorporate any future changes in ROE based on our ROE forecasts.

2. Consider a simple firm that pays no taxes and pays out all of its earnings as dividends. In the current year, the firm has total revenues of $500 million and total expenses of $400 million. The firm's book value of capital at the beginning of the year was $1 billion.

a) Calculate the firm's operating income and its return on capital (ROC) in the current year.

Operating Income = $500 - $400 = $100 million

ROC = 100/1000 = 10.0%

b) The current inflation rate is 3% and the firm expects this inflation rate to affect revenues and expenses equally (i.e., both will increase by 3% in the second year). Given these assumptions, calculate the firm's operating income and its return on capital (ROC) in the second year.

Operating Income = $500(1.03) - $400(1.03) = $515 - $412 = $103 million

ROC = 103/1000 = 10.3%

c) Calculate the percentage change (growth rate) in operating income for this firm from the first year to the second. Using the fundamental growth equation we discussed in class, write the firm's growth rate as a function of reinvestment and return on capital (ROC).

$$g_{EBIT,Actual} = \frac{103-100}{100} = 3.0\%$$

$$g_{EBIT,Fundametal} = (Reinv\ Rate)(ROC) + \Delta ROC$$
$$= (0)(10.3\%) + \left(\frac{10.3-10.0}{10.0}\right) = 0 + .03 = 3.0\%$$

Note that inflation leads to a 3% increase in ROC, because earnings are affected by inflation while the book value of capital is not. As a result, even though the firm does no reinvestment, inflation leads to a fundamental growth rate of 3%.