

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, as follows:

$$\begin{aligned} \text{Reinvestment Rate} &= \frac{(\text{Capex} - \text{Depr}) + (\text{Advertising} - \text{Amort}) + \text{Acquisition Costs} + \Delta \text{WC}}{\text{Adjusted EBIT}(1-T)} \\ &= \frac{(423.7 - 335.0) + (2351.3 - 1987.0) + 0.0 + 405.9}{2283.0} = \frac{858.9}{2283.0} = 37.62\% \end{aligned}$$

Ideally, we should define ROC as the adjusted after-tax operating income in the current year divided by the adjusted beginning-of-year value of debt plus equity. For simplicity, I will define the ROC using the current year's adjusted debt and equity values. Another simple alternative would be to assume that the beginning of year adjustments to debt and equity are the same as the current adjustments.

$$\text{ROC} = \frac{2283.0}{(2308.6 + 13220.7)} = 14.70\%$$

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

$$g_{\text{EBIT}} = (\text{Reinvestment Rate})(\text{ROC}) = (.3762)(.1470) = 5.53\%$$

Ignoring adjustments to EBIT, the historical growth rate from 2008 to 2009 was 0.45%. However, if we correctly incorporate adjustments to operating income in both years, operating income increases from 2,166 million to 2,283 million, or 5.4%. After incorporating the appropriate adjustments, the fundamental growth rate estimated here closing approximates the actual growth rate.

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

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 firm's 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, as follows:

$$\begin{aligned} \text{Equity Reinvestment Rate} &= \frac{(\text{Capex} - \text{Depr}) + (\text{Advertising} - \text{Amort}) + \text{Acquisition Costs} + \Delta \text{WC} - \text{Net Debt Issues}}{\text{Net Income}} \\ &= \frac{(423.7 - 335.0) + (2351.3 - 1987.0) + 0.0 + 405.9 - 170.3}{2231.4} = \frac{688.6}{2231.4} = 30.86\% \end{aligned}$$

Note that I have used debt issues to offset the total amount of equity reinvestment. As an alternative, we could take the total amount of reinvestment and multiply by one minus the debt-to-capital ratio.

Ideally, we should define ROE as adjusted net income in the current year divided by the adjusted beginning-of-year value of equity. For simplicity, I will define the ROE using the current year's adjusted equity value. Another simple alternative would be to assume that the beginning of year adjustment to equity is the same as the current adjustment.

$$\text{ROE} = \frac{2231.4}{13220.7} = 16.88\%$$

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

$$g_{NI} = (\text{Equity Reinvestment Rate})(\text{ROE}) = (.3086)(.1688) = 5.21\%$$

Ignoring the advertising adjustments to Net Income (but removing one-time charges as in lecture 3), the historical growth rate from 2008 to 2009 was -0.87%. If we correctly incorporate adjustments in both years, Net Income decreases from 2,440.6 million to 2,231.4 million, or -8.57%. After incorporating the appropriate adjustments, the fundamental growth rate estimated here is significantly lower than the actual growth rate (though both were negative). The difference likely reflects a very significant drop in ROE from 2008 to 2009.

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

3. 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.

$$\text{Operating Income} = \$500 - \$400 = \$100 \text{ million}$$

$$\text{ROC} = 100/1000 = 10.0\%$$

- 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.

$$\text{Operating Income} = \$500(1.03) - \$400(1.03) = \$515 - \$412 = \$103 \text{ million}$$

$$\text{ROC} = 103/1000 = 10.3\%$$

- 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).

$$\begin{aligned} g_{EBIT} &= (\text{Reinv Rate})(\text{ROC}) + \Delta\text{ROC} \\ &= (0)(10.3\%) + \left(\frac{10.3 - 10.0}{10.0} \right) = 0 + .03 = 3.0\% \end{aligned}$$

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%.