

## Session 16C: Post class test solutions

1. **a. Young companies with long life R&D.** For a company's return on capital to change a lot, its operating income has to change dramatically more, on a proportional basis, than its invested capital. The operating income change is the difference between the current year's R&D and the amortization of prior year's R&D. That change is likely to be highest for young firms with growing R&D. Since these firms have not been around for long, the change in invested capital is also likely to be small (since you are capitalizing R&D for the company's life).
2. **c. \$1.33 billion.** To estimate this value, you first have to estimate the normalized operating income using the operating margin over the economic cycle and current revenues:
  - Normalized after-tax operating income =  $0.05 * 2000 = \$100$  million
  - Normalized return on invested capital =  $100/1000 = 10\%$
  - Normalized reinvestment rate =  $2\%/10\% = 20\%$
  - Value =  $100 (1 - .20) / (.08 - .02) = \$1.33$  billion
3. **\$1,250 million.** To estimate this value, you first have to adjust the after-tax operating income for lower oil prices:
  - Normalized after-tax operating income =  $150 - (100 - 60) * 1.25 = \$100$  million
  - Since the firm earns its cost of capital (8%), you can estimate its reinvestment rate and value
  - Reinvestment rate =  $2\% / 8\% = 25\%$
  - Value =  $100 (1 - .25) / (.08 - .02) = \$1,250$  million
4. **b. Facebook.** The margin of safety on Facebook is 50% and it is only 20% on 3M.
  - Facebook margin of safety =  $(37.50 - 25) / 25 = 50\%$
  - 3M margin of safety =  $(120 - 100) / 100 = 20\%$

I would be concerned about going with Facebook still for two reasons: (a) I may be (and probably am) more uncertain about my value of Facebook than I of my value of 3M and (b) the price gap may close faster at 3M because their stockholders tend to be more focused on earnings and cash flows than Facebook stockholders.