Propositions about Analyst Growth Rates

- Proposition 1: There if far less private information and far more public information in most analyst forecasts than is generally claimed.
- Proposition 2: The biggest source of private information for analysts remains the company itself which might explain
  - why there are more buy recommendations than sell recommendations (information bias and the need to preserve sources)
  - why there is such a high correlation across analysts forecasts and revisions
  - why All-America analysts become better forecasters than other analysts after they are chosen to be part of the team.
- Proposition 3: There is value to knowing what analysts are forecasting as earnings growth for a firm. There is, however, danger when they agree too much (lemmingitis) and when they agree to little (in which case the information that they have is so noisy as to be useless).

III. Fundamental Growth Rates

Investment in Existing Projects $ 1000	X	Current Return on Investment on Projects 12%	=	Current Earnings $120

Investment in Existing Projects $1000	X	Next Period's Return on Investment 12%	+	Investment in New Projects $100	X	Return on Investment on New Projects 12%	=	Next Period's Earnings 132

Investment in Existing Projects $1000	X	Change in ROI from current to next period: 0%	+	Investment in New Projects $100	X	Return on Investment on New Projects 12%	=	Change in Earnings $ 12

Growth Rate Derivations

In the special case where ROI on existing projects remains unchanged and is equal to the ROI on new projects

$$\frac{\text{Investment in New Projects}}{\text{Current Earnings}} \times \text{Return on Investment} = \frac{\text{Change in Earnings}}{\text{Current Earnings}}$$

$$\frac{100}{120} \times 12\% = \frac{\$12}{\$120}$$

$$\text{Reinvestment Rate} \times \text{Return on Investment} = \text{Growth Rate in Earnings}$$

$$83.33\% \times 12\% = 10\%$$

in the more general case where ROI can change from period to period, this can be expanded as follows:

$$\frac{\text{Investment in Existing Projects}*(\text{Change in ROI}) + \text{New Projects (ROI)}}{\text{Investment in Existing Projects}* \text{ Current ROI}} = \frac{\text{Change in Earnings}}{\text{Current Earnings}}$$

For instance, if the ROI increases from 12% to 13%, the expected growth rate can be written as follows:

$$\frac{\$1{,}000 * (.13 - .12) + 100\ (13\%)}{\$\ 1000 * .12} = \frac{\$23}{\$120} = 19.17\%$$

Estimating Fundamental Growth from new investments: Three variations

Earnings Measure	Reinvestment Measure	Return Measure
Earnings per share	Retention Ratio = % of net income retained by the company = 1 – Payout ratio	Return on Equity = Net Income/ Book Value of Equity
Net Income from non-cash assets	Equity reinvestment Rate = (Net Cap Ex + Change in non-cash WC – Change in Debt)/ (Net Income)	Non-cash ROE = Net Income from non-cash assets/ (Book value of equity – Cash)
Operating Income	Reinvestment Rate = (Net Cap Ex + Change in non-cash WC)/ After-tax Operating Income	Return on Capital or ROIC = After-tax Operating Income/ (Book value of equity + Book value of debt – Cash)

I. Expected Long Term Growth in EPS

- When looking at growth in earnings per share, these inputs can be cast as follows:
  - Reinvestment Rate = Retained Earnings/ Current Earnings = Retention Ratio
  - Return on Investment = ROE = Net Income/Book Value of Equity
- In the special case where the current ROE is expected to remain unchanged

$$g_{EPS} = \text{Retained Earnings}_{t-1} / \text{NI}_{t-1} * \text{ROE}$$
$$= \text{Retention Ratio} * \text{ROE}$$
$$= b * \text{ROE}$$

- Proposition 1: The expected growth rate in earnings for a company cannot exceed its return on equity in the long term.

Estimating Expected Growth in EPS: Wells Fargo in 2008

- Return on equity (based on 2008 earnings)= 17.56%
- Retention Ratio (based on 2008 earnings and dividends) = 45.37%
- Expected growth rate in earnings per share for Wells Fargo, if it can maintain these numbers.

  Expected Growth Rate = 0.4537 (17.56%) = 7.97%

Regulatory Effects on Expected EPS growth

- Assume now that the banking crisis of 2008 will have an impact on the capital ratios and profitability of banks. In particular, you can expect that the book capital (equity) needed by banks to do business will increase 30%, starting now.
- Assuming that Wells continues with its existing businesses, estimate the expected growth rate in earnings per share for the future.

  New Return on Equity =

  Expected growth rate =

One way to pump up ROE: Use more debt

ROE = ROC + D/E (ROC - i (1-t))

where,

ROC = EBITt (1 - tax rate) / Book value of Capitalt-1

D/E = BV of Debt/ BV of Equity

i = Interest Expense on Debt / BV of Debt

t = Tax rate on ordinary income

- Note that Book value of capital = Book Value of Debt + Book value of Equity- Cash.

Decomposing ROE: Brahma in 1998

- Brahma (now Ambev) had an extremely high return on equity, partly because it borrowed money at a rate well below its return on capital
  - Return on Capital = 19.91%
  - Debt/Equity Ratio = 77%
  - After-tax Cost of Debt = 5.61%
  - Return on Equity = ROC + D/E (ROC - i(1-t))

    = 19.91% + 0.77 (19.91% - 5.61%) = 30.92%
- This seems like an easy way to deliver higher growth in earnings per share. What (if any) is the downside?

Decomposing ROE: Titan Watches (India)

- Return on Capital = 9.54%
- Debt/Equity Ratio = 191% (book value terms)
- After-tax Cost of Debt = 10.125%
- Return on Equity = ROC + D/E (ROC - i(1-t))

  = 9.54% + 1.91 (9.54% - 10.125%) = 8.42%

II. Expected Growth in Net Income from non-cash assets

- The limitation of the EPS fundamental growth equation is that it focuses on per share earnings and assumes that reinvested earnings are invested in projects earning the return on equity. To the extent that companies retain money in cash balances, the effect on net income can be muted.
- A more general version of expected growth in earnings can be obtained by substituting in the equity reinvestment into real investments (net capital expenditures and working capital) and modifying the return on equity definition to exclude cash:
  - Net Income from non-cash assets = Net income – Interest income from cash (1- t)
  - Equity Reinvestment Rate = (Net Capital Expenditures + Change in Working Capital) (1 - Debt Ratio)/ Net Income from non-cash assets
  - Non-cash ROE = Net Income from non-cash assets/ (BV of Equity – Cash)
  - Expected $\text{Growth}_{\text{Net Income}}$ = Equity Reinvestment Rate * Non-cash ROE

Estimating expected growth in net income from non-cash assets: Coca Cola in 2010

- In 2010, Coca Cola reported net income of $11,809 million. It had a total book value of equity of $25,346 million at the end of 2009.
- Coca Cola had a cash balance of $7,021 million at the end of 2009, on which it earned income of $105 million in 2010.
- Coca Cola had capital expenditures of $2,215 million, depreciation of $1,443 million and reported an increase in working capital of $335 million. Coca Cola's total debt increased by $150 million during 2010.
  - Equity Reinvestment = 2215- 1443 + 335-150 = $957 million
  - Non-cash Net Income = $11,809 - $105 = $ 11,704 million
  - Non-cash book equity = $25,346 - $7021 = $18,325 million
  - Reinvestment Rate = $957 million/ $11,704 million= 8.18%
  - Non-cash ROE = $11,704 million/ $18,325 million = 63.87%
  - Expected growth rate = 8.18% * 63.87% = 5.22%

III. Expected Growth in EBIT And Fundamentals: Stable ROC and Reinvestment Rate

- When looking at growth in operating income, the definitions are
  - Reinvestment Rate = (Net Capital Expenditures + Change in WC)/EBIT(1-t)
  - Return on Investment = ROC = EBIT(1-t)/(BV of Debt + BV of Equity-Cash)
- Reinvestment Rate and Return on Capital

  Expected Growth rate in Operating Income

  = (Net Capital Expenditures + Change in WC)/EBIT(1-t) * ROC

  = Reinvestment Rate * ROC
- Proposition: The net capital expenditure needs of a firm, for a given growth rate, should be inversely proportional to the quality of its investments.

Estimating Growth in Operating Income

- Cisco's Fundamentals
  - Reinvestment Rate = 106.81%
  - Return on Capital =34.07%
  - Expected Growth in EBIT =(1.0681)(.3407) = 36.39%
- Motorola's Fundamentals
  - Reinvestment Rate = 52.99%
  - Return on Capital = 12.18%
  - Expected Growth in EBIT = (.5299)(.1218) = 6.45%

IV. Operating Income Growth when Return on Capital is Changing

- When the return on capital is changing, there will be a second component to growth, positive if the return on capital is increasing and negative if the return on capital is decreasing.
- If ROC_t is the return on capital in period t and ROC_{t+1} is the return on capital in period t+1, the expected growth rate in operating income will be:

$$\text{Expected Growth Rate} = ROC_{t+1} * \text{Reinvestment rate} + (ROC_{t+1} - ROC_t) / ROC_t$$

- If the change is over multiple periods, the second component should be spread out over each period.

Motorola's Growth Rate

- Motorola's current return on capital is 12.18% and its reinvestment rate is 52.99%.
- We expect Motorola's return on capital to rise to 17.22% over the next 5 years (which is half way towards the industry average)

  Expected Growth Rate

  = $ROC_{\text{New Investments}}$ * Reinvestment Rate $_{\text{Current}}$ + {[1+($ROC_{\text{In 5 years}}$ - ROC_{Current})/ROC_{Current}]$^{1/5}$ -1}

  = .1722*.5299 +{ [1+(.1722-.1218)/.1218]1/5-1}

  = .1629 or 16.29%
- One way to think about this is to decompose Motorola's expected growth into
  - Growth from new investments: .1722*5299= 9.12%
  - Growth from more efficiently using existing investments: 16.29%-9.12%= 7.17%

Note that I am assuming that the new investments start making 17.22% immediately, while allowing for existing assets to improve returns gradually

The Value of Growth

	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
Reinvestment Rate	20.00%	100.00%	200.00%	20.00%	0.00%
ROIC on new investment	50.00%	10.00%	5.00%	10.00%	10.00%
ROIC on existing investments before	10.00%	10.00%	10.00%	10.00%	10.00%
ROIC on existing investments after	10.00%	10.00%	10.00%	10.80%	11.00%
Expected growth rate	**10.00%**	**10.00%**	**10.00%**	**10.00%**	**10.00%**

Expected growth = Growth from new investments + Efficiency growth

= Reinv Rate * ROC + $(ROC_t - ROC_{t-1})/ROC_{t-1}$

Assume that your cost of capital is 10%. As an investor, rank these firms in the order of most value growth to least value growth.