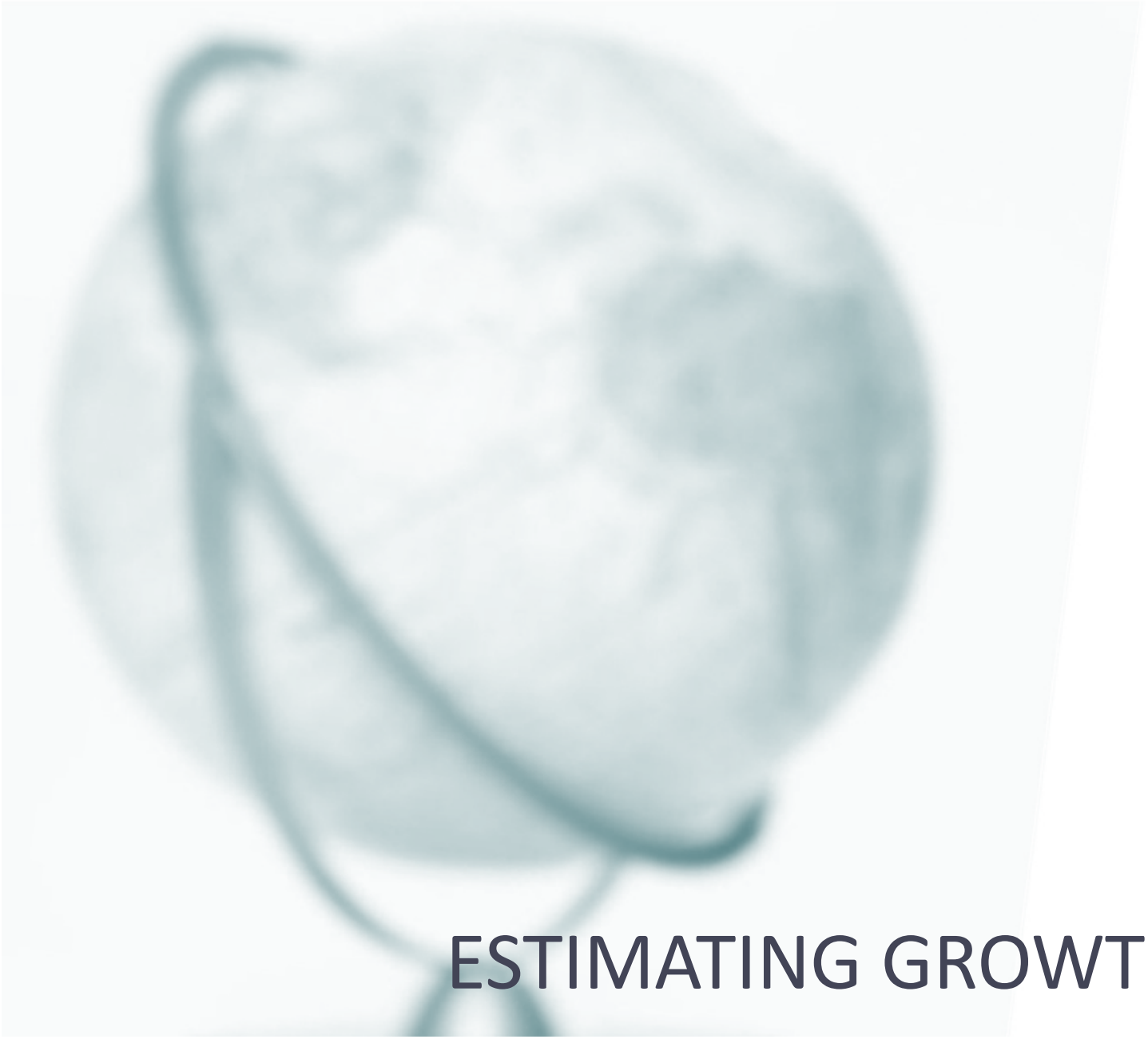


ESTIMATING GROWTH

Growth can be good, bad or neutral…

The Value of Growth

- When valuing a company, it is easy to get caught up in the details of estimating growth and start viewing growth as a "good", i.e., that higher growth translates into higher value.
- Growth, though, is a double-edged sword.
  - The good side of growth is that it pushes up revenues and operating income, perhaps at different rates (depending on how margins evolve over time).
  - The bad side of growth is that you have to set aside money to reinvest to create that growth.
  - The net effect of growth is whether the good outweighs the bad.

Ways of Estimating Growth in Earnings

- Look at the past
  - The historical growth in earnings per share is usually a good starting point for growth estimation
- Look at what others are estimating
  - Analysts estimate growth in earnings per share for many firms. It is useful to know what their estimates are.
- Look at fundamentals
  - Ultimately, all growth in earnings can be traced to two fundamentals - how much the firm is investing in new projects, and what returns these projects are making for the firm.

Growth I

Historical Growth

Historical Growth

- Historical growth rates can be estimated in a number of different ways
  - Arithmetic versus Geometric Averages
  - Simple versus Regression Models
- Historical growth rates can be sensitive to
  - The period used in the estimation (starting and ending points)
  - The metric that the growth is estimated in..
- In using historical growth rates, you have to wrestle with the following:
  - How to deal with negative earnings
  - The effects of scaling up

Motorola: Arithmetic versus Geometric Growth Rates

	Revenues	% Change	EBITDA	% Change	EBIT	% Change
1994	$ 22,245		$ 4,151		$ 2,604	
1995	$ 27,037	21.54%	$ 4,850	16.84%	$ 2,931	12.56%
1996	$ 27,973	3.46%	$ 4,268	-12.00%	$ 1,960	-33.13%
1997	$ 29,794	6.51%	$ 4,276	0.19%	$ 1,947	-0.66%
1998	$ 29,398	-1.33%	$ 3,019	-29.40%	$ 822	-57.78%
1999	$ 30,931	5.21%	$ 5,398	78.80%	$ 3,216	291.24%
Arithmetic Average		7.08%		10.89%		42.45%
Geometric Average		6.82%		5.39%		4.31%
Standard deviation		8.61%		41.56%		141.78%

A Test

- You are trying to estimate the growth rate in earnings per share at Time Warner from 1996 to 1997. In 1996, the earnings per share was a deficit of $0.05. In 1997, the expected earnings per share is $ 0.25. What is the growth rate?

a. -600%
b. +600%
c. +120%
d. Cannot be estimated

Dealing with Negative Earnings

- When the earnings in the starting period are negative, the growth rate cannot be estimated. (0.30/-0.05 = -600%)
- There are three solutions:
  - Use the higher of the two numbers as the denominator (0.30/0.25 = 120%)
  - Use the absolute value of earnings in the starting period as the denominator (0.30/0.05=600%)
  - Use a linear regression model and divide the coefficient by the average earnings.
- When earnings are negative, the growth rate is meaningless. Thus, while the growth rate can be estimated, it does not tell you much about the future.

The Effect of Size on Growth: Callaway Golf

Year	Net Profit	Growth Rate
1990	1.80	
1991	6.40	255.56%
1992	19.30	201.56%
1993	41.20	113.47%
1994	78.00	89.32%
1995	97.70	25.26%
1996	122.30	25.18%

- Geometric Average Growth Rate = 102%

Extrapolation and its Dangers

Year	Net Profit
1996	$ 122.30
1997	$ 247.05
1998	$ 499.03
1999	$ 1,008.05
2000	$ 2,036.25
2001	$ 4,113.23

- If net profit continues to grow at the same rate as it has in the past 6 years, the expected net income in 5 years will be $ 4.113 billion.

Growth II

Analyst Estimates

Analyst Forecasts of Growth

- While the job of an analyst is to find under and over valued stocks in the sectors that they follow, a significant proportion of an analyst's time (outside of selling) is spent forecasting earnings per share.
  - Most of this time, in turn, is spent forecasting earnings per share in the next earnings report
  - While many analysts forecast expected growth in earnings per share over the next 5 years, the analysis and information (generally) that goes into this estimate is far more limited.
- Analyst forecasts of earnings per share and expected growth are widely disseminated by services such as Zacks and IBES, at least for U.S companies.

How good are analysts at forecasting growth?

- Analysts forecasts of EPS tend to be closer to the actual EPS than simple time series models, but the differences tend to be small

Study	Group tested	Analyst Error	Time Series Model Error
Collins & Hopwood	Value Line Forecasts	31.7%	34.1%
Brown & Rozeff	Value Line Forecasts	28.4%	32.2%
Fried & Givoly	Earnings Forecaster	16.4%	19.8%

- The advantage that analysts have over time series models
  - tends to decrease with the forecast period (next quarter versus 5 years)
  - tends to be greater for larger firms than for smaller firms
  - tends to be greater at the industry level than at the company level
- Forecasts of growth (and revisions thereof) tend to be highly correlated across analysts.

Are some analysts more equal than others?

- A study of All-America Analysts (chosen by Institutional Investor) found that
  - There is no evidence that analysts who are chosen for the All-America Analyst team were chosen because they were better forecasters of earnings. (Their median forecast error in the quarter prior to being chosen was 30%; the median forecast error of other analysts was 28%)
  - However, in the calendar year following being chosen as All-America analysts, these analysts become slightly better forecasters than their less fortunate brethren. (The median forecast error for All-America analysts is 2% lower than the median forecast error for other analysts)
  - Earnings revisions made by All-America analysts tend to have a much greater impact on the stock price than revisions from other analysts
  - The recommendations made by the All America analysts have a greater impact on stock prices (3% on buys; 4.7% on sells). For these recommendations the price changes are sustained, and they continue to rise in the following period (2.4% for buys; 13.8% for the sells).

The Five Deadly Sins of an Analyst

- Tunnel Vision: Becoming so focused on the sector and valuations within the sector that you lose sight of the bigger picture.
- Lemmingitis: Strong urge felt to change recommendations & revise earnings estimates when other analysts do the same.
- Stockholm Syndrome: Refers to analysts who start identifying with the managers of the firms that they are supposed to follow.
- Factophobia (generally is coupled with delusions of being a famous story teller): Tendency to base a recommendation on a "story" coupled with a refusal to face the facts.
- Dr. Jekyll/Mr.Hyde: Analyst who thinks his primary job is to bring in investment banking business to the firm.

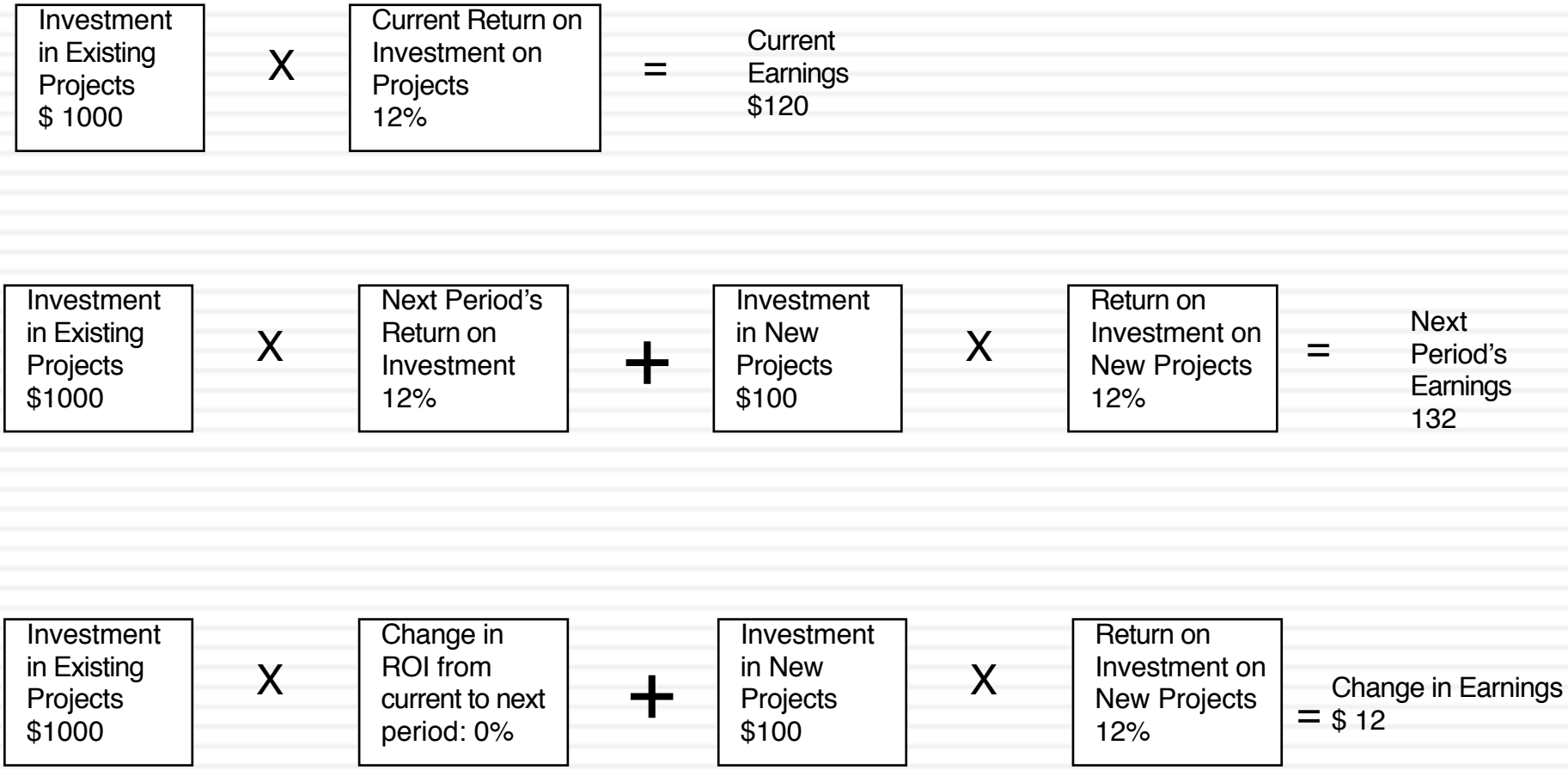
Propositions about Analyst Growth Rates

- 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).

Growth III

It's all in the fundamentals

Fundamental Growth Rates



Growth Rate Derivations

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

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

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

Reinvestment Rate	X	Return on Investment	=	Growth Rate in Earnings
83.33%	X	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 = $EBIT_t$ (1 - tax rate) / Book value of $Capital_{t-1}$

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) in 2000

- 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%