Valuation: Closing Thoughts

Fall 2010
Aswath Damodaran
Back to the very beginning: Approaches to Valuation

- **Discounted cashflow valuation**, where we try (sometimes desperately) to estimate the intrinsic value of an asset by using a mix of theory, guesswork and prayer.

- **Relative valuation**, where we pick a group of assets, attach the name “comparable” to them and tell a story.

- **Contingent claim valuation**, where we take the valuation that we did in the DCF valuation and divvy it up between the potential thieves (equity) and the victims of this crime (lenders)
Intrinsic Valuation: The set up

Cash flows from existing assets
Operating income (1 - tax rate) + Depreciation - Maintenance Cap Ex = Cashflow from existing assets
Function of both quality of past investments and efficiency with which they are managed

Growth Rate during Excess Return Phase
Reinvestment Rate * Return on Capital on new investments
Depends upon competitive advantages & constraints on growth

Value of Operating Assets
+ Cash
+ Holdings of other companies
+ Other non-operating assets
Value of Firm

Length of period of excess returns: Reflects sustainability of competitive advantages

Discount Rate
Weighted average of the cost of equity and cost of debt. Reflects the riskiness of
Dante meets DCF: Nine layers of valuation hell.. And a bonus layer..

- The Wasserstein-Perella bonus layer
- From aggregate to per share value?
- No garnishing allowed!!
- The terminal value: It's not an ATM
- Debt ratios change, don't they?
- Are you paying for growth?
- What's in your discount rate?
- High growth for how long?
- Death and taxes
- Base year and accounting fixation
Layer 1: Base Year fixation….

You are valuing Exxon Mobil, using the financial statements of the firm from 2008. The following provides the key numbers:

- Revenues: $477 billion
- EBIT (1-t): $58 billion
- Net Cap Ex: $3 billion
- Chg WC: $1 billion
- FCFF: $54 billion

The cost of capital for the firm is 8% and you use a very conservative stable growth rate of 2% to value the firm. The market cap for the firm is $373 billion and it has $10 billion in debt outstanding.

a. How under or over valued is the equity in the firm?
b. Would you buy the stock based on this valuation? Why or why not?
Layer 2: Taxes and Value

- Assume that you have been asked to value a company and have been provided with the most recent year’s financial statements:

  - EBITDA: 140
  - DA: 40
  - EBIT: 100
  - Interest exp: 20
  - Taxable income: 80
  - Taxes: 32
  - Net Income: 48

Assume also that cash flows will be constant and that there is no growth in perpetuity. What is the free cash flow to the firm?

a) 88 million (Net income + Depreciation)
b) 108 million (EBIT – taxes + Depreciation)
c) 100 million (EBIT (1-tax rate)+ Depreciation)
d) 60 million (EBIT (1- tax rate))
e) 48 million (Net Income)
f) 68 million (EBIT – Taxes)
Layer 3: High Growth for how long…

Assume that you are valuing a young, high growth firm with great potential, just after its initial public offering. How long would you set your high growth period?

- < 5 years
- 5 years
- 10 years
- >10 years

Typically, the revenue growth rate of a newly public company outpaces its industry average for only about five years.

![Graph showing the relationship between the number of years after coming to market and the margin by which revenue growth rate exceeds industry average.](Image)

Source: Andrew Metrick, The New York Times
Layer 4: The Cost of Capital

The cost of capital for Chippewa Technologies, a US technology firm with 20% of its revenues from Brazil, has been computed using the following inputs:

- **Cost of equity**
  \[
  \text{Cost of equity} = \text{Riskfree Rate} + \text{Beta} \times (\text{ERP}) + \text{Small firm premium}
  \]
  
  \[
  = 5\% + 1.20 \times (5\%) + 3\% = 14\%
  \]
  
  - Replaced current T.Bond rate of 3% with normalized rate of 5%
  - “Adjusted” Beta from Bloomberg
  - Both from Ibbotson data base, derived from 1926-2008 data
  - ERP: Stocks - T.Bonds (Arithmetic average)
  - Small firm: Small stocks - Overall market

- **Cost of capital**
  \[
  \text{Cost of capital} = \frac{\text{Cost of equity}}{\text{(Debt + Equity)}} + \frac{\text{Cost of debt}}{\text{(Debt + Equity)}}
  \]
  
  \[
  = \frac{14\%}{1000/2000} + \frac{3\% \times (1-.30)}{(1000/2000)} = 8.05\%
  \]
  
  - From above: Used market value of equity
  - Company is not rated and has no bonds. Used book interest rate = Int exp/ BV of debt
  - Used effective tax rate of 30%
  - To be conservative, counted all liabilities, other than equity, as debt and used book value.
# The Correct Cost of Capital for Chippewa

<table>
<thead>
<tr>
<th><strong>Input</strong></th>
<th><strong>What was used...</strong></th>
<th><strong>What should have been used...</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Riskfree Rate</td>
<td>Corrected treasury bond rate = 5%</td>
<td>Actual treasury bond rate = 3%</td>
</tr>
<tr>
<td>Beta</td>
<td>Bloomberg adjusted beta = 1.20</td>
<td>Sector average adjusted beta = 1.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Based on small cap companies in sector)</td>
</tr>
<tr>
<td>Equity Risk Premium</td>
<td>Ibbotson premium = 5%</td>
<td>Updated implied ERP = 6.5%</td>
</tr>
<tr>
<td>Other adjustments to cost of equity</td>
<td>Small cap premium = 3%</td>
<td>No small cap premium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Country risk adjustment = $\lambda_{Brazil}$ * Brazil CRP = 0.26*6.77% = 2.28%</td>
</tr>
<tr>
<td>Cost of equity</td>
<td>5% + 1.2 (5%) + 3% = 14%</td>
<td>3% + 1.6 (6.5%) + 2.28% = 15.68%</td>
</tr>
<tr>
<td>Cost of debt (pre-tax)</td>
<td>3%</td>
<td>3% + 6% (based on synthetic rating) = 9%</td>
</tr>
<tr>
<td>Tax rate</td>
<td>Effective tax rate = 30%</td>
<td>Marginal tax rate = 40%</td>
</tr>
<tr>
<td>Cost of debt (after-tax)</td>
<td>3% (1-.3) = 2.1%</td>
<td>9% (1-.4) = 5.4%</td>
</tr>
<tr>
<td>Debt ratio</td>
<td>Book ratio: Liabilities=50% Equity=50%</td>
<td>Market ratio: Interest bearing debt = 30%; Equity= 70%</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>14% (.5) + 2.1% (.5) = 8.05%</td>
<td>15.68% (.7) + 5.4% (.3) = 12.60%</td>
</tr>
</tbody>
</table>
Layer 5: The price of growth..

You are looking at the projected cash flows provided by the management of the firm, for use in valuation

<table>
<thead>
<tr>
<th>Year</th>
<th>Current</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth rate</td>
<td></td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Revenues</td>
<td>$100.00</td>
<td>$110.00</td>
<td>$121.00</td>
<td>$133.10</td>
<td>$146.41</td>
</tr>
<tr>
<td>EBIT (1-t)</td>
<td>$30.00</td>
<td>$33.00</td>
<td>$36.30</td>
<td>$39.93</td>
<td>$43.92</td>
</tr>
<tr>
<td>+ Depreciation</td>
<td>$15.00</td>
<td>$16.50</td>
<td>$18.15</td>
<td>$19.97</td>
<td>$21.96</td>
</tr>
<tr>
<td>- Cap Ex</td>
<td>$18.00</td>
<td>$19.80</td>
<td>$21.78</td>
<td>$23.96</td>
<td>$26.35</td>
</tr>
<tr>
<td>- Chg in WC</td>
<td>$3.00</td>
<td>$3.30</td>
<td>$3.63</td>
<td>$3.99</td>
<td>$4.39</td>
</tr>
<tr>
<td>FCFF</td>
<td>$24.00</td>
<td>$26.40</td>
<td>$29.04</td>
<td>$31.94</td>
<td>$35.14</td>
</tr>
</tbody>
</table>

What questions would you raise about the forecasts?
Layer 6: The “fixed debt ratio” assumption

You have been asked to value Hormel Foods, a firm which currently has the following cost of capital:

Cost of capital = 7.31% (.9) + 2.36% (.1) = 6.8%

a. You believe that the target debt ratio for this firm should be 30%. What will the cost of capital be at the target debt ratio?

b. Which debt ratio (and cost of capital) should you use in valuing this company?
Layer 7: The Terminal Value

- The best way to compute terminal value is to
  - Use a stable growth model and assume cash flows grow at a fixed rate forever
  - Use a multiple of EBITDA or revenues in the terminal year
  - Use the estimated liquidation value of the assets

You have been asked to value a business. The business expects to $120 million in after-tax earnings (and cash flow) next year and to continue generating these earnings in perpetuity. The firm is all equity funded and the cost of equity is 10%; the risk-free rate is 3% and the ERP is 7%. What is the value of the business?

- Assume now that you were told that the firm can grow earnings at 2% a year forever. Estimate the value of the business.
Layer 8. From firm value to equity value: The Garnishing Effect…

- For a firm with consolidated financial statements, you have discounted free cashflows to the firm at the cost of capital to arrive at a firm value of $100 million. The firm has
  - A cash balance of $15 million
  - Debt outstanding of $20 million
  - A 5% holding in another company: the book value of this holding is $5 million. (Market value of equity in this company is $200 million)
  - Minority interests of $10 million on the balance sheet

- What is the value of equity in this firm?

- How would your answer change if you knew that the firm was the target of a lawsuit it is likely to win but where the potential payout could be $100 million if it loses?
You have valued the equity in a firm at $200 million. Estimate the value of equity per share if there are 10 million shares outstanding.

How would your answer change if you were told that there are 2 million employee options outstanding, with a strike price of $20 a share and 5 years left to expiration?
Layer 10. The final circle of hell…

<table>
<thead>
<tr>
<th>Layer 8: KENNOCOTT COPPER CORPORATION</th>
<th>Cost of Equity</th>
<th>Cost of Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kennecott Corp (Acquirer)</td>
<td>13.0%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Carborandum (Target)</td>
<td>16.5%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>

Aswath Damodaran
The Models You Used in DCF Valuation

![Bar chart showing the models used in DCF valuation, with categories including DDMSt, DDM3, FCFE2, FCFFSt, FCFF3, and HiGrowth, and different colors representing Spring 2009, Fall 2009, and Fall 2010.]
What you found…

DCF Value vs Market Price

Axis Title

- Undervalued more than 50%
- Undervalued 33-50%
- Undervalued 10-33%
- Undervalued 0-10%
- Overvalued 0-10%
- Overvalued 10-50%
- Overvalued 50-100%
- Overvalued more than 100%
The most undervalued stocks…

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>DCF Value</th>
<th>Recommendation</th>
<th>% Under or over</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;D Technologies</td>
<td>$0.08</td>
<td>$4.32</td>
<td>Buy</td>
<td>-98.15%</td>
</tr>
<tr>
<td>Evergreen Solar</td>
<td>$0.70</td>
<td>$3.44</td>
<td>Buy</td>
<td>-79.65%</td>
</tr>
<tr>
<td>True Religion</td>
<td>21.56</td>
<td>$72.41</td>
<td>Buy</td>
<td>-70.23%</td>
</tr>
<tr>
<td>Suzlon</td>
<td>48.45</td>
<td>152.16</td>
<td>Buy</td>
<td>-68.16%</td>
</tr>
<tr>
<td>Eastman Kodak</td>
<td>$5.12</td>
<td>$14.08</td>
<td>Buy</td>
<td>-63.64%</td>
</tr>
<tr>
<td>Amylin Pharmaceutical</td>
<td>$13.79</td>
<td>$33.34</td>
<td>Buy</td>
<td>-58.64%</td>
</tr>
<tr>
<td>CA Technologies, Inc.</td>
<td>$24.14</td>
<td>$52.91</td>
<td>Buy</td>
<td>-54.38%</td>
</tr>
<tr>
<td><strong>AU Optronics</strong></td>
<td>30.1</td>
<td>63.8</td>
<td>Sell</td>
<td>-52.79%</td>
</tr>
<tr>
<td>Whole Foods Market</td>
<td>$49.49</td>
<td>$103.38</td>
<td>Hold</td>
<td>-52.13%</td>
</tr>
<tr>
<td>Jones Soda</td>
<td>$1.22</td>
<td>$2.49</td>
<td>Hold</td>
<td>-51.00%</td>
</tr>
<tr>
<td>Research In Motion Ltd</td>
<td>$61.29</td>
<td>$124.93</td>
<td>Buy</td>
<td>-50.94%</td>
</tr>
<tr>
<td>Lottomatica</td>
<td>9.39</td>
<td>18.35</td>
<td>Buy</td>
<td>-48.83%</td>
</tr>
<tr>
<td>Steinway Musical Instruments</td>
<td>$19.20</td>
<td>$36.51</td>
<td>Buy</td>
<td>-47.41%</td>
</tr>
<tr>
<td>Square Enix Holding Co.</td>
<td>¥1,600.00</td>
<td>¥3,040.00</td>
<td>Buy</td>
<td>-47.37%</td>
</tr>
<tr>
<td>Accenture PLC</td>
<td>$45.66</td>
<td>$83.50</td>
<td>Buy</td>
<td>-45.32%</td>
</tr>
<tr>
<td>BMW AG</td>
<td>$62.52</td>
<td>$113.53</td>
<td>Buy</td>
<td>-44.93%</td>
</tr>
<tr>
<td>Goldman Sachs</td>
<td>$168.47</td>
<td>$297.37</td>
<td>Buy</td>
<td>-43.35%</td>
</tr>
<tr>
<td>TESLA</td>
<td>$31.52</td>
<td>$55.60</td>
<td>BUY</td>
<td>-43.31%</td>
</tr>
<tr>
<td>Comcast</td>
<td>$21.30</td>
<td>$37.35</td>
<td>Buy</td>
<td>-42.97%</td>
</tr>
</tbody>
</table>
The Most Overvalued stocks are...

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>DCf Value</th>
<th>Recommendation</th>
<th>% Under or over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vonage: VG</td>
<td>$2.26</td>
<td>$0.13</td>
<td>Sell</td>
<td>1638.46%</td>
</tr>
<tr>
<td>FX Energy Energy Inc.: FXEN</td>
<td>$6.61</td>
<td>$1.16</td>
<td>Hold</td>
<td>469.83%</td>
</tr>
<tr>
<td>Chipotle</td>
<td>$238.22</td>
<td>$45.26</td>
<td>Sell</td>
<td>426.34%</td>
</tr>
<tr>
<td>LG Electronics</td>
<td>$100.43</td>
<td>$21.10</td>
<td>Hold</td>
<td>375.97%</td>
</tr>
<tr>
<td>Human Genome Sciences Inc.</td>
<td>$24.01</td>
<td>$6.06</td>
<td>Sell</td>
<td>296.20%</td>
</tr>
<tr>
<td>Dick's Sporting Goods</td>
<td>$36.08</td>
<td>$11.70</td>
<td>Sell</td>
<td>208.38%</td>
</tr>
<tr>
<td>Naukri</td>
<td>595.00</td>
<td>207.10</td>
<td>Sell</td>
<td>187.30%</td>
</tr>
<tr>
<td>Baidu, Inc.</td>
<td>$108.07</td>
<td>$40.86</td>
<td>Sell</td>
<td>164.49%</td>
</tr>
<tr>
<td>Potash Corp. of Saskatchewan, Inc.</td>
<td>$139.87</td>
<td>$54.13</td>
<td>Sell</td>
<td>158.40%</td>
</tr>
<tr>
<td>Netflix</td>
<td>$194.63</td>
<td>$92.85</td>
<td>Sell</td>
<td>109.62%</td>
</tr>
<tr>
<td>Amazon.com</td>
<td>175.62</td>
<td>85.53</td>
<td>Sell</td>
<td>105.33%</td>
</tr>
<tr>
<td>Tesla Motors</td>
<td>$29.92</td>
<td>$14.95</td>
<td>Sell</td>
<td>100.13%</td>
</tr>
<tr>
<td>Chipotle Mexican Grill</td>
<td>$241.54</td>
<td>$125.28</td>
<td>Sell</td>
<td>92.80%</td>
</tr>
<tr>
<td>Ryland Group</td>
<td>$16.20</td>
<td>$8.42</td>
<td>Sell</td>
<td>92.40%</td>
</tr>
<tr>
<td>Align Technology</td>
<td>$18.10</td>
<td>$9.65</td>
<td>Sell</td>
<td>87.56%</td>
</tr>
<tr>
<td>Lululemon Athletica, Inc.</td>
<td>$68.50</td>
<td>$37.00</td>
<td>Sell</td>
<td>85.14%</td>
</tr>
<tr>
<td>Ramsay Health Care</td>
<td>16.00</td>
<td>8.98</td>
<td>Sell</td>
<td>78.17%</td>
</tr>
<tr>
<td>Stericycle</td>
<td>$78.59</td>
<td>$44.76</td>
<td>Sell</td>
<td>75.58%</td>
</tr>
<tr>
<td>Peet's Coffee &amp; Tea Inc</td>
<td>$41.65</td>
<td>$24.23</td>
<td>Sell</td>
<td>71.89%</td>
</tr>
</tbody>
</table>
The ultimate test… Did undervalued stocks make money?
More on the winners...

- About 60% of all buy recommendations make money; about 45% of sell recommendations beat the market.
- There are two or three big winners in each period, but the payoff was not immediate. Buying Apple in 1999 would have led to negative returns for a year or more, before the turnaround occurred.
- Stocks on which there is disagreement among different people tend to do worse than stocks on which there is no disagreement
- Stocks that are under valued on both a DCF and relative valuation basis do better than stocks that are under valued on only one approach.
Relative Valuation: The Four Steps to Understanding Multiples

- Anna Kournikova knows PE…. Or does she?
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated.

- 8 times EBITDA is not always cheap…
  - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.

- You cannot get away without making assumptions
  - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.

- There are no perfect comparables
  - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.
Value of Stock = \( \frac{\text{DPS}}{k_e - g} \)

**Firm Multiples**

\[
\frac{\text{V}}{\text{FCFF}} = f(g, \text{WACC})
\]

\[
\text{Value/FCFF} = \frac{(1+g)}{(\text{WACC}-g)}
\]

Value of Firm = FCFF \( \frac{1}{(\text{WACC}-g)} \)

**Equity Multiples**

\[
\text{PE} = \frac{\text{Payout Ratio}}{(1+g)/(r-g)}
\]

\[
\text{PEG} = \frac{\text{Payout ratio}}{(1+g)/g(r-g)}
\]

\[
\text{PBV} = \frac{\text{ROE} (\text{Payout ratio})}{(1+g)/(r-g)}
\]

\[
\text{PS} = \frac{\text{Net Margin} (\text{Payout ratio})}{(1+g)/(r-g)}
\]

\[
\text{V/FCFF} = f(g, \text{WACC})
\]

\[
\text{Value/FCFF} = \frac{(1+g)}{(\text{WACC}-g)}
\]

\[
\frac{\text{V}}{\text{EBIT}(1-t)} = f(g, RIR, WACC, t)
\]

\[
\text{Value/EBIT(1-t)} = \frac{(1+g)}{(1-RIR)/(\text{WACC}-g)}
\]

\[
\text{VS} = \text{Oper Margin (1-RIR) (1+g)/(WACC-g)}
\]

\[
\text{Value/EBIT} = f(g, RIR, WACC, t)
\]

\[
\text{Value/EBIT} = \frac{(1+g)(1-RIR)/(1-t)(\text{WACC}-g)}
\]

\[
\text{VS} = f(\text{Oper Mgn, RIR, g, WACC})
\]
The Multiples you used were ...

![Bar chart showing the number of firms for different multiples]

- PBV
- EV/BV
- PE
- EV/EBITDA
- Other
- PEG
- PS
- EV/Sales

Number of Firms
DCF vs Relative Valuation

DCF as % of Relative Value

Relative value was higher than DCF valuation in 55% of cases

DCF as fraction of Relative Value

<50% 50-67% 67-90% 90%-100% 100-110% 110%-150% 150-200% >200%
## Most undervalued on a relative basis...

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>Multiple used</th>
<th>Relative Value</th>
<th>Recommendation</th>
<th>% Under or Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;D Technologies</td>
<td>$0.08</td>
<td>EV/EBITDA</td>
<td>$8.25</td>
<td>Buy</td>
<td>-99.03%</td>
</tr>
<tr>
<td>Eastman Kodak</td>
<td>$5.12</td>
<td>EV/EBITDA</td>
<td>$31.90</td>
<td>Buy</td>
<td>-83.95%</td>
</tr>
<tr>
<td>LodgeNet Interactive</td>
<td>$3.95</td>
<td>VEBITDA</td>
<td>$15.80</td>
<td>Sell</td>
<td>-75.00%</td>
</tr>
<tr>
<td>Lottomatica</td>
<td>9.39</td>
<td>PS</td>
<td>31.75</td>
<td>Buy</td>
<td>-70.43%</td>
</tr>
<tr>
<td>Folli Follie (Euros)</td>
<td>$17.99</td>
<td>PE</td>
<td>$54.35</td>
<td>Buy</td>
<td>-66.90%</td>
</tr>
<tr>
<td>Suzlon</td>
<td>48.45</td>
<td>EV/EBITDA</td>
<td>125</td>
<td>Buy</td>
<td>-61.24%</td>
</tr>
<tr>
<td>THQ, Inc.</td>
<td>5.81</td>
<td>VS</td>
<td>14.26</td>
<td>Sell</td>
<td>-59.26%</td>
</tr>
<tr>
<td>Google</td>
<td>$592.21</td>
<td>EV/Sales</td>
<td>$1,376.21</td>
<td>Sell</td>
<td>-56.97%</td>
</tr>
<tr>
<td>Sasken Communication</td>
<td>165.95</td>
<td>EV/EBITDA</td>
<td>316.93</td>
<td>Hold</td>
<td>-47.64%</td>
</tr>
<tr>
<td>Dun and Bradstreet</td>
<td>$79.06</td>
<td>PE</td>
<td>$147.79</td>
<td>Buy</td>
<td>-46.51%</td>
</tr>
<tr>
<td>Aeropostale</td>
<td>23.48</td>
<td>EV/SALES</td>
<td>43.70</td>
<td>BUY</td>
<td>-46.27%</td>
</tr>
<tr>
<td>Alcatel-Lucent</td>
<td>$2.30</td>
<td>VEBITDA</td>
<td>$4.28</td>
<td>Buy</td>
<td>-46.26%</td>
</tr>
<tr>
<td>True Religion</td>
<td>21.56</td>
<td>VS</td>
<td>$39.12</td>
<td>Buy</td>
<td>-44.89%</td>
</tr>
<tr>
<td>Align Technologies: ALGN</td>
<td>$18.67</td>
<td>EV/EBITDA</td>
<td>$33.42</td>
<td>Buy</td>
<td>-44.14%</td>
</tr>
<tr>
<td>Accenture</td>
<td>$45.66</td>
<td>EV/EBITDA</td>
<td>$77.68</td>
<td>Buy</td>
<td>-41.22%</td>
</tr>
<tr>
<td>Brooklyn Winery</td>
<td>$1,050,000</td>
<td>PBV</td>
<td>$1,760,000</td>
<td>Sell</td>
<td>-40.34%</td>
</tr>
<tr>
<td>EnerNOC</td>
<td>24.85</td>
<td>VS</td>
<td>41.60</td>
<td>Buy</td>
<td>-40.26%</td>
</tr>
<tr>
<td>Wockhardt</td>
<td>329.20</td>
<td>VEBITDA</td>
<td>550.17</td>
<td>Sell</td>
<td>-40.16%</td>
</tr>
<tr>
<td>Trina Solar</td>
<td>$24.28</td>
<td>PS</td>
<td>$39.26</td>
<td>Sell</td>
<td>-38.16%</td>
</tr>
<tr>
<td>IB HI FI</td>
<td>18.34</td>
<td>PS</td>
<td>28.63</td>
<td>Buy</td>
<td>-35.94%</td>
</tr>
</tbody>
</table>
## Most overvalued on a relative basis…

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>Multiple used</th>
<th>Relative Value</th>
<th>Recommendation</th>
<th>% Under or Over</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athenahealth</td>
<td>$45.10</td>
<td>EV/EBITDA</td>
<td>$9.68</td>
<td>Sell</td>
<td>365.91%</td>
</tr>
<tr>
<td>Netflix</td>
<td>$194.63</td>
<td>PE</td>
<td>$57.29</td>
<td>Sell</td>
<td>239.73%</td>
</tr>
<tr>
<td>Whole Foods</td>
<td>$48.77</td>
<td>PS</td>
<td>$15.13</td>
<td>Sell</td>
<td>222.34%</td>
</tr>
<tr>
<td>Chipotle Mexican Grill</td>
<td>$241.54</td>
<td>VS</td>
<td>$89.04</td>
<td>Sell</td>
<td>171.27%</td>
</tr>
<tr>
<td>Netflix, Inc.</td>
<td>$191.05</td>
<td>PE</td>
<td>$71.52</td>
<td>Sell</td>
<td>167.13%</td>
</tr>
<tr>
<td>V onage: VG</td>
<td>$2.26</td>
<td>EV/Sales</td>
<td>$0.88</td>
<td>Sell</td>
<td>156.82%</td>
</tr>
<tr>
<td>Tesla Motors</td>
<td>$29.92</td>
<td>EV/Sales</td>
<td>$11.81</td>
<td>Sell</td>
<td>153.34%</td>
</tr>
<tr>
<td>Baidu, Inc.</td>
<td>$108.07</td>
<td>VEBITDA</td>
<td>$44.97</td>
<td>Sell</td>
<td>140.32%</td>
</tr>
<tr>
<td>Chipotle</td>
<td>$238.22</td>
<td>EV/Sales</td>
<td>$99.41</td>
<td>Sell</td>
<td>139.63%</td>
</tr>
<tr>
<td>Evergreen Solar</td>
<td>$0.70</td>
<td>EV/Sales</td>
<td>$0.30</td>
<td>Buy</td>
<td>133.33%</td>
</tr>
<tr>
<td>Human Genome Sciences Inc.</td>
<td>$24.01</td>
<td>PS</td>
<td>$10.51</td>
<td>Sell</td>
<td>128.45%</td>
</tr>
<tr>
<td>Naukri</td>
<td>595.00</td>
<td>PEG</td>
<td>270.06</td>
<td>Sell</td>
<td>120.32%</td>
</tr>
<tr>
<td>Stericycle</td>
<td>$78.59</td>
<td>VEBITDA</td>
<td>$36.00</td>
<td>Sell</td>
<td>118.31%</td>
</tr>
<tr>
<td>Accenture</td>
<td>$45.66</td>
<td>EV/BV of Capital</td>
<td>$21.10</td>
<td>Buy</td>
<td>116.40%</td>
</tr>
<tr>
<td>Salesforce.com</td>
<td>$145.24</td>
<td>VS</td>
<td>$67.43</td>
<td>Sell</td>
<td>115.39%</td>
</tr>
<tr>
<td>Whole Foods Market</td>
<td>$49.49</td>
<td>VS</td>
<td>$23.69</td>
<td>Hold</td>
<td>108.91%</td>
</tr>
<tr>
<td>Netflix</td>
<td>$194.63</td>
<td>VEBITDA</td>
<td>$93.53</td>
<td>Hold</td>
<td>108.09%</td>
</tr>
<tr>
<td>Green Mountain Coffee Roasters</td>
<td>$33.81</td>
<td>EV/Sales</td>
<td>$17.53</td>
<td>Sell</td>
<td>92.87%</td>
</tr>
<tr>
<td>The St. Joe Company</td>
<td>18.3</td>
<td>VS</td>
<td>$9.91</td>
<td>Sell</td>
<td>84.66%</td>
</tr>
<tr>
<td>EnerNOC</td>
<td>$24.85</td>
<td>EV/EBITDA</td>
<td>$13.51</td>
<td>Buy</td>
<td>83.94%</td>
</tr>
</tbody>
</table>
Contingent Claim (Option) Valuation

- Options have several features
  - They derive their value from an underlying asset, which has value
  - The payoff on a call (put) option occurs only if the value of the underlying asset is greater (lesser) than an exercise price that is specified at the time the option is created. If this contingency does not occur, the option is worthless.
  - They have a fixed life
- Any security that shares these features can be valued as an option.

- Number of firms valued using option models = 15
- Median Percent increase in value over DCF value = 25%
Value Enhancement… You too can do it!

Are you investing optimally for future growth?

How well do you manage your existing investments/assets?

Cashflows from existing assets
Cashflows before debt payments, but after taxes and reinvestment to maintain existing assets

Are you building on your competitive advantages?

Growth from new investments
Growth created by making new investments; function of amount and quality of investments

Expected Growth during high growth period

Length of the high growth period
Since value creating growth requires excess returns, this is a function of
- Magnitude of competitive advantages
- Sustainability of competitive advantages

Are you using the right amount and kind of debt for your firm?

Cost of capital to apply to discounting cashflows
Determined by
- Operating risk of the company
- Default risk of the company
- Mix of debt and equity used in financing

Is there scope for more efficient utilization of existing assets?

Stable growth firm, with no or very limited excess returns
Value this company..

- Assume that you have a firm with a book value value of capital of $100 million, on which it expects to generate a return on capital of 15% in perpetuity with a cost of capital of 10%.
- This firm is expected to make additional investments of $10 million at the beginning of each year for the next 5 years. These investments are also expected to generate 15% as return on capital in perpetuity, with a cost of capital of 10%.
- After year 5, assume that
  - The earnings will grow 5% a year in perpetuity.
  - The firm will keep reinvesting back into the business but the return on capital on these new investments will be equal to the cost of capital (10%).
An EVA valuation..

Capital Invested in Assets in Place = $100
EVA from Assets in Place = $(0.15 - 0.10) (100)/.10 = $50
+ PV of EVA from New Investments in Year 1 = [$(0.15 - 0.10)(10)/.10] = $5
+ PV of EVA from New Investments in Year 2 = [$(0.15 - 0.10)(10)/.10]/1.1 = $4.55
+ PV of EVA from New Investments in Year 3 = [$(0.15 - 0.10)(10)/.10]/1.1^2 = $4.13
+ PV of EVA from New Investments in Year 4 = [$(0.15 - 0.10)(10)/.10]/1.1^3 = $3.76
+ PV of EVA from New Investments in Year 5 = [$(0.15 - 0.10)(10)/.10]/1.1^4 = $3.42

Value of Firm = $170.85
## Firm Value using DCF Valuation: Estimating FCFF

<table>
<thead>
<tr>
<th></th>
<th>Base Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Term. Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT (1-t) : Assets in Place</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$15.00</td>
<td>$15.00</td>
<td></td>
</tr>
<tr>
<td>EBIT(1-t) :Investments- Yr 1</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td></td>
</tr>
<tr>
<td>EBIT(1-t) :Investments- Yr 2</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td></td>
</tr>
<tr>
<td>EBIT(1-t): Investments -Yr 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1.50</td>
<td>$1.50</td>
<td></td>
</tr>
<tr>
<td>EBIT(1-t): Investments -Yr 4</td>
<td></td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBIT(1-t): Investments- Yr 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1.50</td>
</tr>
<tr>
<td>Total EBIT(1-t)</td>
<td>$16.50</td>
<td>$18.00</td>
<td>$19.50</td>
<td>$21.00</td>
<td>$22.50</td>
<td>$23.63</td>
<td></td>
</tr>
<tr>
<td>- Net Capital Expenditures</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$10.00</td>
<td>$11.25</td>
<td>$11.81</td>
</tr>
<tr>
<td>FCFF</td>
<td>$6.50</td>
<td>$8.00</td>
<td>$9.50</td>
<td>$11.00</td>
<td>$11.25</td>
<td>$11.81</td>
<td></td>
</tr>
<tr>
<td>PV of FCFF</td>
<td>($10)</td>
<td>$5.91</td>
<td>$6.61</td>
<td>$7.14</td>
<td>$7.51</td>
<td>$6.99</td>
<td></td>
</tr>
<tr>
<td>Terminal Value</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$236.25</td>
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<td>PV of Terminal Value</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$146.69</td>
</tr>
<tr>
<td>Value of Firm</td>
<td><strong>$170.85</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After year 5, the reinvestment rate is 50% = g/ ROC
The bottom line

- **Old wine in a new bottle**: All discounted cash flow models (cost of capital, APV, EVA, Excess return models) are all variants of the same model and, done right, should yield the same value.

- **No magic bullets**: Value enhancement is hard work. There are no “short cuts” and adopting EVA, CFROI or any other measure will not increase value.

- Tying compensation systems to a measure is a recipe for game playing: If you tie management compensation to EVA, for instance, can lead to:
  - **The Growth trade off game**: Managers may give up valuable growth opportunities in the future to deliver higher EVA in the current year.
  - **The Risk game**: Managers may be able to deliver a higher dollar EVA but in riskier businesses. The value of the business is the present value of EVA over time and the risk effect may dominate the increased EVA.
  - **The capital invested game**: The key to delivering positive EVA is to make investments that do not show up as part of capital invested. That way, your operating income will increase while capital invested will decrease.
Acting on valuation: It is not just an academic exercise

- *I am not sure yet*: Uncertainty is not a shield against action: If you wait until you feel “certain” about your valuation, you will never act.
- *All believers now?* Ultimately, you have to believe in some modicum of market efficiency. Markets have to correct their mistakes for your valuations to pay off.
- *The law of large numbers*: Assuming your valuations carry heft, you are far more likely to be right across many companies than on any individual one.
Your recommendations were to..
Choices…Choices…Choices…

Valuation Models

- Asset Based Valuation
  - Liquidation Value
  - Replacement Cost

- Discounted Cashflow Models
  - Stable
  - Two-stage
  - Three-stage or n-stage

- Relative Valuation
  - Current
  - Normalized

- Contingent Claim Models
  - Option to delay
  - Option to expand
  - Option to liquidate

- Equity Valuation Models
- Firm Valuation Models

- Equity in troubled firm
- Young firms
- Undeveloped land
- Undeveloped Reserves

- Patent

- Dividends
- Free Cashflow to Equity

- Cost of capital approach
- APV approach
- Excess Return Models
- Sector specific
Picking your approach

- Asset characteristics
  - Marketability
  - Cash flow generating capacity
  - Uniqueness

- Your characteristics
  - Time horizon
  - Reasons for doing the valuation
  - Beliefs about markets
What approach would work for you?

- As an investor, given your investment philosophy, time horizon and beliefs about markets (that you will be investing in), which of the the approaches to valuation would you choose?
  - Discounted Cash Flow Valuation
  - Relative Valuation
  - Neither. I believe that markets are efficient.
Some Not Very Profound Advice

- Its all in the fundamentals. The more things change, the more they stay the same.…
- Focus on the big picture. Don’t let the details trip you up.
- Experience does not equal knowledge…
- Keep your perspective. It is only a valuation.
- In investing, luck dominates skill and knowledge.
Or maybe you can fly ....