Valuation: Closing Thoughts

Fall 2011

“It ain’t over till its over”
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 factors
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
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: Smal stocks - Overall market

Cost of capital

\[
\text{Cost of capital} = \frac{\text{Cost of equity} \times \text{Equity}}{\text{Debt} + \text{Equity}} + \frac{\text{Cost of debt} \times (1-\text{tax rate})}{\text{Debt} + \text{Equity}}
\]

\[
= \frac{14\% \times 1000}{2000} + \frac{3\% \times (1-.30)}{1000/2000} = 8.05\%
\]

- 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.
<table>
<thead>
<tr>
<th>Input</th>
<th>What was used...</th>
<th>What should have been used...</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} *</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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%</td>
<td>Market ratio: Interest bearing debt = 30%;</td>
</tr>
<tr>
<td></td>
<td>Equity=50%</td>
<td>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>10%</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 riskfree 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?
Layer 9. From equity value to equity value per share

- 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...

### Exhibit B

**Kenneckott Copper Corporation**

**Projected Carbonado Company Financial Data Adjusted to Reflect the Acquisition of Carbonado by Kenneckott at a Price of $66 per Share, 1977-1987**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income statement</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Sales            | $790.1         | $898.5       | $1,123.9 | $1,203.5 | $1,303.1 | $1,310.4 | $1,404.5 | $1,498.2 | $1,585.1 | $1,680.5 | $1,775.3
| Net income (before adjustment) | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 | 18.4 |
| Interest expense | 6.5           | 6.5          | 6.5    | 6.5    | 6.5    | 6.5    | 6.5    | 6.5    | 6.5    | 6.5    | 6.5    |
| Interest adjustment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gain/(loss) adjustment | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Net income (after adjustment) | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 | $11.9 |
| **Balance sheet** |                |              |      |      |      |      |      |      |      |      |      |      |
| **Working capital** | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 | $195.2 |
| **Property, plant, and equipment** | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 | $359.8 |
| **Total assets** | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 | $515.0 |
| **Current liabilities** | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 |
| **Total liabilities** | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 | $169.5 |
| **Shareholders’ equity** | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 |
| **Capital structure** |                |              |      |      |      |      |      |      |      |      |      |      |
| **Common stock** | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 |
| **Preferred stock** | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 | $1.0 |
| **Retained earnings** | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 | $333.5 |
| **Total capital** | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 | $345.5 |

**Cash flow to Kenneckott**

- **Acquisitions of Carbonado:** $146.0
- **Dividends to Kenneckott:** $146.0
- **Utilization of Kenneckott net loss contingency:** $20.0
- **Tax shield from plant writing off:** $20.0
- **Terminal value at 10 times earnings:** $20.0

**Net cash flow:** $184.0

### Notes

1. **Base year and accounting fixes:**
   - **Death and taxes:**
   - **High growth for how long?:**
   - **What’s in your discount rate?:**
   - **From aggregate to per share value?:**
   - **Are you paying for growth?:**
   - **Gearing:**
   - **Death and taxes:**
   - **High growth for how long?:**
   - **What’s in your discount rate?:**

### Comparison of Cost of Equity and Cost of Capital

<table>
<thead>
<tr>
<th>Corporation</th>
<th>Cost of Equity</th>
<th>Cost of Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenneckott Corp (Acquirer)</td>
<td>13.0%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Carbonado (Target)</td>
<td>16.5%</td>
<td>12.5%</td>
</tr>
</tbody>
</table>
The Models You Used in DCF Valuation
What you found…
The most undervalued stocks...

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>DCF model used</th>
<th>DCf Value</th>
<th>% Under valued</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprint</td>
<td>$ 2.61</td>
<td>FCFFGen</td>
<td>$ 53.48</td>
<td>95.12%</td>
<td>Buy</td>
</tr>
<tr>
<td>Ener 1, Inc.</td>
<td>0.07</td>
<td>HiGrowth</td>
<td>0.98</td>
<td>92.86%</td>
<td>Buy</td>
</tr>
<tr>
<td>American Airlines</td>
<td>$ 1.03</td>
<td>FCFFGen</td>
<td>$ 6.73</td>
<td>84.70%</td>
<td>Buy</td>
</tr>
<tr>
<td>Li &amp; Fund Ltd.</td>
<td>$ 2.02</td>
<td>FCFE2</td>
<td>$ 10.45</td>
<td>80.67%</td>
<td>Buy</td>
</tr>
<tr>
<td>Luby's Inc.</td>
<td>$ 4.55</td>
<td>FCF2</td>
<td>$ 21.09</td>
<td>78.43%</td>
<td>Buy</td>
</tr>
<tr>
<td>Ista Pharmaceuticals</td>
<td>$ 3.94</td>
<td>HiGrowth</td>
<td>$ 16.68</td>
<td>76.38%</td>
<td>Buy</td>
</tr>
<tr>
<td>Chiquita Brands Intl</td>
<td>$ 8.47</td>
<td>FCF2</td>
<td>$ 34.42</td>
<td>75.39%</td>
<td>Buy</td>
</tr>
<tr>
<td>AK Steel</td>
<td>$ 8.39</td>
<td>FCF2</td>
<td>$ 33.02</td>
<td>74.59%</td>
<td>Buy</td>
</tr>
<tr>
<td>Aeroflot Russian Airlines</td>
<td>$ 1.50</td>
<td>FCF2</td>
<td>$ 5.76</td>
<td>73.96%</td>
<td>Hold</td>
</tr>
<tr>
<td>Veeco Instruments Inc.</td>
<td>$23.17</td>
<td>FCF2</td>
<td>$ 76.81</td>
<td>69.83%</td>
<td>Buy</td>
</tr>
<tr>
<td>Freeport-McMoRan Copper &amp; Gold Inc</td>
<td>$39.73</td>
<td>FCF2</td>
<td>$109.03</td>
<td>63.56%</td>
<td>Buy</td>
</tr>
<tr>
<td>Sprint</td>
<td>$ 2.44</td>
<td>FCF2</td>
<td>$ 6.47</td>
<td>62.29%</td>
<td>Buy</td>
</tr>
<tr>
<td>Bank of America</td>
<td>$ 5.64</td>
<td>FCFE2</td>
<td>$ 14.90</td>
<td>62.15%</td>
<td>Sell</td>
</tr>
<tr>
<td>Perry Ellis</td>
<td>$14.19</td>
<td>FCF2</td>
<td>$35.38</td>
<td>59.89%</td>
<td>Buy</td>
</tr>
<tr>
<td>CVR Energy</td>
<td>$19.01</td>
<td>FCFFGen</td>
<td>$ 46.04</td>
<td>58.71%</td>
<td>Buy</td>
</tr>
</tbody>
</table>
The Most Overvalued stocks are...

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Price</th>
<th>DCF model used</th>
<th>DCF Value</th>
<th>% Under valued</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lululemon</td>
<td>$46.12</td>
<td>FCFFGen</td>
<td>$22.67</td>
<td>103.44%</td>
<td>Sell</td>
</tr>
<tr>
<td>Electronic Arts</td>
<td>$21.85</td>
<td>FCFFE3</td>
<td>$10.4</td>
<td>110.10%</td>
<td>Buy</td>
</tr>
<tr>
<td>Pantaloons Retail India Ltd.</td>
<td>₹183.00</td>
<td>FCFFSt</td>
<td>₹84.83</td>
<td>115.73%</td>
<td>Sell</td>
</tr>
<tr>
<td>LVS</td>
<td>$43.97</td>
<td>FCFF2</td>
<td>$20.31</td>
<td>116.49%</td>
<td>Sell</td>
</tr>
<tr>
<td>Teva Pharmaceuticals Industry Ltd.</td>
<td>$40.20</td>
<td>FCFF2</td>
<td>$18.34</td>
<td>119.19%</td>
<td>Buy</td>
</tr>
<tr>
<td>Netflix Inc.</td>
<td>$70.89</td>
<td>FCFF2</td>
<td>$32.33</td>
<td>119.27%</td>
<td>Sell</td>
</tr>
<tr>
<td>Sears Holdings Corp.</td>
<td>$56.96</td>
<td>HiGrowth</td>
<td>$22.90</td>
<td>148.73%</td>
<td>Sell</td>
</tr>
<tr>
<td>Lionsgate</td>
<td>$8.62</td>
<td>FCFF2</td>
<td>$3.14</td>
<td>174.52%</td>
<td>Sell</td>
</tr>
<tr>
<td>Agnico-Eagle Mines</td>
<td>$42.33</td>
<td>FCFFGinzu</td>
<td>$15.16</td>
<td>179.22%</td>
<td>Sell</td>
</tr>
<tr>
<td>Concur Technologies Inc.</td>
<td>$52.18</td>
<td>FCFF2</td>
<td>$18.22</td>
<td>186.39%</td>
<td>Sell</td>
</tr>
<tr>
<td>Chipotle Mexican Grill</td>
<td>$338.60</td>
<td>FCFF2</td>
<td>$117.37</td>
<td>188.49%</td>
<td>Sell</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>$71.89</td>
<td>HiGrowth</td>
<td>$23.44</td>
<td>206.70%</td>
<td>Sell</td>
</tr>
<tr>
<td>Groupon Inc.</td>
<td>$23.48</td>
<td>FCFF3</td>
<td>$7.54</td>
<td>211.41%</td>
<td>Sell</td>
</tr>
<tr>
<td>Advisory Board Company</td>
<td>$72.30</td>
<td>FCFF2</td>
<td>$17.25</td>
<td>319.13%</td>
<td>Sell</td>
</tr>
<tr>
<td>Salesforce</td>
<td>$123.88</td>
<td>HiGrowth</td>
<td>$25.58</td>
<td>384.28%</td>
<td>Sell</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.
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 = \( \frac{DPS}{k_e - g} \)

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

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

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

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

Equity Multiples

\[ \text{Value/A} = f(g, \text{payout, risk}) \]

\[ \text{PE} = f(g, \text{payout, risk}) \]

\[ \text{PEG} = f(g, \text{payout, risk}) \]

\[ \text{PBV} = f(\text{ROE, payout, g, risk}) \]

\[ \text{PS} = f(\text{Net Mgn, payout, g, risk}) \]

Firm Multiples

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

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

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

\[ VS = f(\text{Oper Mgn, RIR, g, WACC}) \]

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

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

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

\[ VS = \text{Oper Margin} \frac{(1-RIR)}{(1+g)/(WACC-g)} \]
The Multiples you used were ...

![Bar chart showing the number of firms using different multiples: FBV, EV/DV, PE, EV/EBITDA, Other, PEG, PS, EV/Sales. The chart indicates that EV/EBITDA is the most widely used multiple, followed by PE and then FBV, while EV/DV, Other, PEG, PS, and EV/Sales are used less frequently.]
DCF vs Relative Valuation

DCF as % of Relative Value

DCF as fraction of Relative Value
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>% under valued</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Airlines</td>
<td>$1.03</td>
<td>PE</td>
<td>$8.09</td>
<td>87.27%</td>
<td>Buy</td>
</tr>
<tr>
<td>Ener 1, Inc.</td>
<td>0.07</td>
<td>PS</td>
<td>0.44</td>
<td>84.09%</td>
<td>Buy</td>
</tr>
<tr>
<td>Vical Inc.</td>
<td>$4.58</td>
<td>EV/SALES</td>
<td>$26.53</td>
<td>82.74%</td>
<td>Buy</td>
</tr>
<tr>
<td>Pacific Sunwear of California</td>
<td>$1.68</td>
<td>VS</td>
<td>$8.54</td>
<td>80.33%</td>
<td>Buy</td>
</tr>
<tr>
<td>Istà Pharmaceuticals</td>
<td>$3.94</td>
<td>VS</td>
<td>$18.99</td>
<td>79.25%</td>
<td>Buy</td>
</tr>
<tr>
<td>Hudson Pacific Properties</td>
<td>$13.35</td>
<td>VS</td>
<td>$50.91</td>
<td>73.78%</td>
<td>Buy</td>
</tr>
<tr>
<td>B2W</td>
<td>$9.81</td>
<td>PS</td>
<td>$35.85</td>
<td>72.64%</td>
<td>Buy</td>
</tr>
<tr>
<td>Sprint</td>
<td>$2.44</td>
<td>PS</td>
<td>$8.42</td>
<td>71.02%</td>
<td>Buy</td>
</tr>
<tr>
<td>Sprint Nextel</td>
<td>$2.47</td>
<td>VS</td>
<td>$7.68</td>
<td>67.84%</td>
<td>Buy</td>
</tr>
<tr>
<td>Netflix</td>
<td>$70.89</td>
<td>P/E</td>
<td>$206.80</td>
<td>65.72%</td>
<td>Buy</td>
</tr>
<tr>
<td>Aeroflot Russian Airlines</td>
<td>$1.50</td>
<td>VS</td>
<td>$4.23</td>
<td>64.54%</td>
<td>Hold</td>
</tr>
<tr>
<td>Chiquita Brands Intl</td>
<td>$8.47</td>
<td>Current PE</td>
<td>$21.79</td>
<td>61.13%</td>
<td>Buy</td>
</tr>
<tr>
<td>Perry Ellis</td>
<td>$14.19</td>
<td>EV/SALES</td>
<td>$35.75</td>
<td>60.31%</td>
<td>Buy</td>
</tr>
<tr>
<td>Pantaloone Retail India Ltd.</td>
<td>₹183.00</td>
<td>EV/S</td>
<td>₹438.76</td>
<td>58.29%</td>
<td>Sell</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>% under valued</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six Flags</td>
<td>$38.35</td>
<td>VS</td>
<td>$14.61</td>
<td>162.49%</td>
<td>Sell</td>
</tr>
<tr>
<td>Nike Inc.</td>
<td>$97.62</td>
<td>P/E</td>
<td>$33.08</td>
<td>195.10%</td>
<td>Sell</td>
</tr>
<tr>
<td>Advisory Board Company</td>
<td>$72.30</td>
<td>PE</td>
<td>$24.09</td>
<td>200.11%</td>
<td>Sell</td>
</tr>
<tr>
<td>Dunkin' Brands Inc</td>
<td>25.28</td>
<td>EV/Sales</td>
<td>$7.38</td>
<td>242.55%</td>
<td>Sell</td>
</tr>
<tr>
<td>Lionsgate</td>
<td>$8.62</td>
<td>VEBITDA</td>
<td>$2.42</td>
<td>256.20%</td>
<td>Sell</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>$71.89</td>
<td>EV/EBITDA</td>
<td>$19.75</td>
<td>264.00%</td>
<td>Sell</td>
</tr>
<tr>
<td>Kodiak Oil &amp; Gas</td>
<td>$9.18</td>
<td>EV/EBITDA</td>
<td>$2.44</td>
<td>276.23%</td>
<td>Sell</td>
</tr>
<tr>
<td>I.T. Ltd</td>
<td>$4.64</td>
<td>VS</td>
<td>$1.07</td>
<td>333.64%</td>
<td>Buy</td>
</tr>
<tr>
<td>Netflix Inc.</td>
<td>$70.89</td>
<td>PEG</td>
<td>$12.60</td>
<td>462.62%</td>
<td>Sell</td>
</tr>
<tr>
<td>Tesla Motors</td>
<td>$30.50</td>
<td>PBV</td>
<td>$5.00</td>
<td>510.00%</td>
<td>Buy</td>
</tr>
<tr>
<td>Pandora Media</td>
<td>$10.47</td>
<td>EV/SALES</td>
<td>$1.44</td>
<td>627.08%</td>
<td>Buy</td>
</tr>
<tr>
<td>MAKO Surgical</td>
<td>$26.68</td>
<td>VS</td>
<td>$3.21</td>
<td>731.15%</td>
<td>Sell</td>
</tr>
<tr>
<td>Tesla</td>
<td>31.04</td>
<td>VS</td>
<td>2.97</td>
<td>945.12%</td>
<td>Buy</td>
</tr>
<tr>
<td>Rite Aid</td>
<td>$1.19</td>
<td>EV/EBITDA</td>
<td>$0.07</td>
<td>1600.00%</td>
<td>Sell</td>
</tr>
<tr>
<td>LinkedIn</td>
<td>73.19</td>
<td>PE</td>
<td>2.31</td>
<td>3068.40%</td>
<td>Sell</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 = 99.45%
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
- Efficiency Growth
  - Growth generated by using existing assets better
- Is there scope for more efficient utilization of existing assets?
- 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
- Stable growth firm, with no or very limited excess returns
- 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
1. Hostile Acquisition: Example

- In a hostile acquisition, you can ensure management change after you take over the firm. Consequently, you would be willing to pay up to the optimal value.

- As an example, Blockbuster was trading at $9.50 per share in July 2005. The optimal value per share that we estimated as $ 12.47 per share. Assuming that this is a reasonable estimate, you would be willing to pay up to $2.97 as a premium in acquiring the shares.

- Issues to ponder:
  - Would you automatically pay $2.97 as a premium per share? Why or why not?
  - What would your premium per share be if change will take three years to implement?
2. Market prices of Publicly Traded Companies: An example

- The market price per share at the time of the valuation (May 2005) was roughly $9.50.
  
  Expected value per share = Status Quo Value + Probability of control changing * (Optimal Value – Status Quo Value)
  
  $9.50 = $5.13 + Probability of control changing ($12.47 - $5.13)

- The market is attaching a probability of 59.5% that management policies can be changed. This was after Icahn’s successful challenge of management. Prior to his arriving, the market price per share was $8.20, yielding a probability of only 41.8% of management changing.

<table>
<thead>
<tr>
<th></th>
<th>Value of Equity</th>
<th>Value per share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status Quo</td>
<td>$955 million</td>
<td>$5.13 per share</td>
</tr>
<tr>
<td>Optimally managed</td>
<td>$2,323 million</td>
<td>$12.47 per share</td>
</tr>
</tbody>
</table>
Value of stock in a publicly traded firm

- When a firm is badly managed, the market still assesses the probability that it will be run better in the future and attaches a value of control to the stock price today:

  \[
  \text{Value per share} = \frac{\text{Status Quo Value} + \text{Probability of control change (Optimal - Status Quo Value)}}{\text{Number of shares outstanding}}
  \]

- With voting shares and non-voting shares, a disproportionate share of the value of control will go to the voting shares. In the extreme scenario where non-voting shares are completely unprotected:

  \[
  \text{Value per non-voting share} = \frac{\text{Status Quo Value}}{\# \text{Voting Shares} + \# \text{Non-voting shares}}
  \]

  \[
  \text{Value per voting share} = \text{Value of non-voting share} + \frac{\text{Probability of control change (Optimal - Status Quo Value)}}{\# \text{Voting Shares}}
  \]
3. Voting and Non-voting Shares: An Example

To value voting and non-voting shares, we will consider Embraer, the Brazilian aerospace company. As is typical of most Brazilian companies, the company has common (voting) shares and preferred (non-voting shares).

- Status Quo Value = 12.5 billion $R for the equity;
- Optimal Value = 14.7 billion $R, assuming that the firm would be more aggressive both in its use of debt and in its reinvestment policy.

There are 242.5 million voting shares and 476.7 non-voting shares in the company and the probability of management change is relatively low. Assuming a probability of 20% that management will change, we estimated the value per non-voting and voting share:

- Value per non-voting share = Status Quo Value/ (# voting shares + # non-voting shares) = 12,500/(242.5+476.7) = 17.38 $R/ share
- Value per voting share = Status Quo value/sh + Probability of management change * (Optimal value – Status Quo Value) = 17.38 + 0.2* (14,700-12,500)/242.5 = 19.19 $R/share

With our assumptions, the voting shares should trade at a premium of 10.4% over the non-voting shares.
4. Minority Discount: An example

Assume that you are valuing Kristin Kandy, a privately owned candy business for sale in a private transaction. You have estimated a value of $1.6 million for the equity in this firm, assuming that the existing management of the firm continues into the future and a value of $2 million for the equity with new and more creative management in place.

- Value of 51% of the firm = 51% of optimal value = 0.51 * $2 million = $1.02 million
- Value of 49% of the firm = 49% of status quo value = 0.49 * $1.6 million = $784,000

Note that a 2% difference in ownership translates into a large difference in value because one stake ensures control and the other does not.
Alternative Approaches to Value Enhancement

- Maximize a variable that is correlated with the value of the firm. There are several choices for such a variable. It could be
  - an accounting variable, such as earnings or return on investment
  - a marketing variable, such as market share
  - a cash flow variable, such as cash flow return on investment (CFROI)
  - a risk-adjusted cash flow variable, such as Economic Value Added (EVA)

- **The advantages of using these variables are that they**
  - Are often simpler and easier to use than DCF value.

- **The disadvantage is that the**
  - Simplicity comes at a cost; these variables are not perfectly correlated with DCF value.
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 = (.15 – .10) (100)/.10  = $50
+ PV of EVA from New Investments in Year 1 = [(.15 – .10)(10)/.10]  = $5
+ PV of EVA from New Investments in Year 2 = [(.15 – .10)(10)/.10]/1.1  = $4.55
+ PV of EVA from New Investments in Year 3 = [(.15 – .10)(10)/.10]/1.1^2  = $4.13
+ PV of EVA from New Investments in Year 4 = [(.15 – .10)(10)/.10]/1.1^3  = $3.76
+ PV of EVA from New Investments in Year 5 = [(.15 – .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></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>$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 4</td>
<td></td>
<td></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 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$1.50</td>
<td></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>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$236.25</td>
</tr>
<tr>
<td>PV of Terminal Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$146.69</td>
</tr>
<tr>
<td>Value of Firm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$170.85</strong></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
- Equity Firm
- Current
- Normalized
- Earnings Book Value
- Revenues

Firm Valuation Models
- Stable
- Two-stage
- Three-stage or n-stage

Equity Valuation Models
- Dividends
- Free Cashflow to Equity

Contingent Claim Models
- Option to delay
- Option to expand
- Option to liquidate
- Young firms
- Equity in troubled firm
- Undeveloped land
- Patent
- Undeveloped Reserves

Excess Return Models
- Cost of capital approach
- APV approach
- Excess Return Models

Sector specific
- Sector
- Market
- Revenues
- Book Value
- Earnings

Stable

Three-stage or n-stage

Two-stage

Equity in troubled firm

 Undoveloped land

Patent

Option to delay

Option to expand

Option to liquidate

Liquidation Value

Replacement Cost

Equity Valuation Models

Firm Valuation Models

Contingent Claim Models
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 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….