VALUATION: TERMINAL VALUE

The tail that wags the valuation dog...
The Investment Decision
Invest in assets that earn a return greater than the minimum acceptable hurdle rate

The Financing Decision
Find the right kind of debt for your firm and the right mix of debt and equity to fund your operations

The Dividend Decision
If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business

Hurdle Rate
4. Define & Measure Risk
5. The Risk free Rate
6. Equity Risk Premiums
7. Country Risk Premiums
8. Regression Betas
9. Beta Fundamentals
10. Bottom-up Betas
11. The "Right" Beta
12. Debt: Measure & Cost
13. Financing Weights

Investment Return
14. Earnings and Cash flows
15. Time Weighting Cash flows
16. Loose Ends

Financing Mix
17. The Trade off
18. Cost of Capital Approach
19. Cost of Capital: Follow up
20. Cost of Capital: Wrap up
21. Alternative Approaches
22. Moving to the optimal

Financing Type
23. The Right Financing

Dividend Policy
24. Trends & Measures
25. The trade off
26. Assessment
27. Action & Follow up
28. The End Game

Valuation
29. First steps
30. Cash flows
31. Growth
32. Terminal Value
33. To value per share
34. The value of control
35. Relative Valuation

36. Closing Thoughts
Getting Closure in Valuation

- A publicly traded firm potentially has an infinite life. The value is therefore the present value of cash flows forever.

\[
\text{Value} = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}
\]

- Since we cannot estimate cash flows forever, we estimate cash flows for a “growth period” and then estimate a terminal value, to capture the value at the end of the period:

\[
\text{Value} = \sum_{t=1}^{N} \frac{CF_t}{(1+r)^t} + \frac{\text{Terminal Value}}{(1+r)^N}
\]
Ways of Estimating Terminal Value

- **Liquidation Value**
  - Most useful when assets are separable and marketable

- **Multiple Approach**
  - Easiest approach but makes the valuation a relative valuation

- **Stable Growth Model**
  - Technically soundest, but requires that you make judgments about when the firm will grow at a stable rate which it can sustain forever, and the excess returns
Getting Terminal Value Right
1. Obey the growth cap

- When a firm’s cash flows grow at a “constant” rate forever, the present value of those cash flows can be written as:
  
  \[
  \text{Value} = \frac{\text{Expected Cash Flow Next Period}}{(r - g)}
  \]

  where,

  - \( r \) = Discount rate (Cost of Equity or Cost of Capital)
  - \( g \) = Expected growth rate

- The stable growth rate cannot exceed the growth rate of the economy but it can be set lower.
  - If you assume that the economy is composed of high growth and stable growth firms, the growth rate of the latter will probably be lower than the growth rate of the economy.
  - The stable growth rate can be negative. The terminal value will be lower and you are assuming that your firm will disappear over time.
  - If you use nominal cashflows and discount rates, the growth rate should be nominal in the currency in which the valuation is denominated.

- One simple proxy for the nominal growth rate of the economy is the riskfree rate.
Getting Terminal Value Right
2. Don’t wait too 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?
  - a. < 5 years
  - b. 5 years
  - c. 10 years
  - d. >10 years

- While analysts routinely assume very long high growth periods (with substantial excess returns during the periods), the evidence suggests that they are much too optimistic. Most growth firms have difficulty sustaining their growth for long periods, especially while earning excess returns.
And the key determinant of growth periods is the company’s competitive advantage...

- Recapping a key lesson about growth, it is not growth per se that creates value but growth with excess returns. For growth firms to continue to generate value creating growth, they have to be able to keep the competition at bay.

- **Proposition 1**: The stronger and more sustainable the competitive advantages, the longer a growth company can sustain “value creating” growth.

- **Proposition 2**: Growth companies with strong and sustainable competitive advantages are rare.
Choosing a Growth Period: Examples

<table>
<thead>
<tr>
<th>Firm size/market size</th>
<th>Disney</th>
<th>Vale</th>
<th>Tata Motors</th>
<th>Baidu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm is one of the largest players in the entertainment and theme park business, but the businesses are being redefined and are expanding.</td>
<td>The company is one of the largest mining companies in the world, and the overall market is constrained by limits on resource availability.</td>
<td>Firm has a large market share of Indian (domestic) market, but it is small by global standards. Growth is coming from Jaguar division in emerging markets.</td>
<td>Company is in a growing sector (online search) in a growing market (China).</td>
<td></td>
</tr>
<tr>
<td>Current excess returns</td>
<td>Firm is earning more than its cost of capital.</td>
<td>Returns on capital are largely a function of commodity prices. Have generally exceeded the cost of capital.</td>
<td>Firm has a return on capital that is higher than the cost of capital.</td>
<td>Firm earns significant excess returns.</td>
</tr>
<tr>
<td>Competitive advantages</td>
<td>Has some of the most recognized brand names in the world. Its movie business now houses Marvel superheros, Pixar animated characters &amp; Star Wars.</td>
<td>Cost advantages because of access to low-cost iron ore reserves in Brazil.</td>
<td>Has wide distribution/service network in India but competitive advantages are fading there. Competitive advantages in India are fading but Landrover/Jaguar has strong brand name value, giving Tata pricing power and growth potential.</td>
<td>Early entry into &amp; knowledge of the Chinese market, coupled with government-imposed barriers to entry on outsiders.</td>
</tr>
<tr>
<td>Length of high-growth period</td>
<td>Ten years, entirely because of its strong competitive advantages/</td>
<td>None, though with normalized earnings and moderate excess returns.</td>
<td>Five years, with much of the growth coming from outside India.</td>
<td>Ten years, with strong excess returns.</td>
</tr>
</tbody>
</table>
Valuing Vale in November 2013 (in US dollars)

Let's start with some history & estimate what a normalized year will look like

Assume that the company is in stable growth, growing 2% a year in perpetuity

Estimate the costs of equity & capital for Vale

<table>
<thead>
<tr>
<th>Year</th>
<th>Operating Income ($)</th>
<th>Effective tax rate</th>
<th>BV of Debt</th>
<th>BV of Equity</th>
<th>Cash</th>
<th>Invested capital</th>
<th>Return on capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$6,057</td>
<td>27.79%</td>
<td>$18,168</td>
<td>$42,556</td>
<td>$12,639</td>
<td>$48,085</td>
<td>9.10%</td>
</tr>
<tr>
<td>2010</td>
<td>$23,033</td>
<td>18.67%</td>
<td>$23,613</td>
<td>$59,766</td>
<td>$11,040</td>
<td>$72,339</td>
<td>25.90%</td>
</tr>
<tr>
<td>2011</td>
<td>$30,206</td>
<td>18.54%</td>
<td>$27,668</td>
<td>$70,076</td>
<td>$9,913</td>
<td>$87,831</td>
<td>28.01%</td>
</tr>
<tr>
<td>2012</td>
<td>$13,346</td>
<td>18.96%</td>
<td>$23,116</td>
<td>$78,721</td>
<td>$3,538</td>
<td>$98,299</td>
<td>11.00%</td>
</tr>
<tr>
<td>2013 (TTM)</td>
<td>$15,487</td>
<td>20.65%</td>
<td>$30,196</td>
<td>$75,974</td>
<td>$5,818</td>
<td>$100,352</td>
<td>12.25%</td>
</tr>
<tr>
<td>Normalized</td>
<td>$17,626</td>
<td>20.92%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17.25%</td>
</tr>
</tbody>
</table>

Market D/E = 54.99%
Marginal tax rate = 34.00% (Brazil)
Levered Beta = 0.844 (1+(1-.34)(.5499)) = 1.15
Cost of equity = 2.75% + 1.15 (7.38%) = 10.87%

Cost of capital = 11.23% (.6452) + 4.05% (1-.34) (.3548) = 8.20%

Assume that the company is in stable growth, growing 2% a year in perpetuity

\[
Reinvestment Rate = \frac{g}{ROC} = \frac{2\%}{17.25\%} = 11.59\%
\]

\[
Value of Operating Assets = \frac{17,626 (1 - .2092)(1 - .1159)}{(.082 - .02)} = $202,832
\]

Value of operating assets = $202,832
+ Cash & Marketable Securities = $ 7,133
- Debt = $ 42,879
Value of equity = $167,086
Value per share =$ 32.44
Stock price (11/2013) = $ 13.57
Don’t forget that growth has to be earned.
3. Think about what your firm will earn as returns forever.

- In the section on expected growth, we laid out the fundamental equation for growth:
  
  \[
  \text{Growth rate} = \text{Reinvestment Rate} \times \text{Return on invested capital} \\
  \quad + \text{Growth rate from improved efficiency}
  \]

- In stable growth, you cannot count on efficiency delivering growth (why?) and you have to reinvest to deliver the growth rate that you have forecast. Consequently, your reinvestment rate in stable growth will be a function of your stable growth rate and what you believe the firm will earn as a return on capital in perpetuity:
  
  - Reinvestment Rate = Stable growth rate / Stable period Return on capital

- A key issue in valuation is whether it okay to assume that firms can earn more than their cost of capital in perpetuity. There are some (McKinsey, for instance) who argue that the return on capital = cost of capital in stable growth...
There are some firms that earn excess returns

- While growth rates seem to fade quickly as firms become larger, well managed firms seem to do much better at sustaining excess returns for longer periods.
Getting Terminal Value Right

4. Be internally consistent..

- Risk and costs of equity and capital: Stable growth firms tend to
  - Have betas closer to one
  - Have debt ratios closer to industry averages (or mature company averages)
  - Country risk premiums (especially in emerging markets should evolve over time)

- The excess returns at stable growth firms should approach (or become) zero. ROC -> Cost of capital and ROE -> Cost of equity

- The reinvestment needs and dividend payout ratios should reflect the lower growth and excess returns:
  - Stable period payout ratio = 1 - g/ ROE
  - Stable period reinvestment rate = g/ ROC
And don’t fall for sleight of hand...

- A typical assumption in many DCF valuations, when it comes to stable growth, is that capital expenditures offset depreciation and there are no working capital needs. Stable growth firms, we are told, just have to make maintenance cap ex (replacing existing assets) to deliver growth. If you make this assumption, what expected growth rate can you use in your terminal value computation?

- What if the stable growth rate = inflation rate? Is it okay to make this assumption then?
Estimating Stable Period Inputs after a high growth period: Disney

- **Respect the cap**: The growth rate forever is assumed to be 2.5. This is set lower than the riskfree rate (2.75%).
- **Stable period excess returns**: The return on capital for Disney will drop from its high growth period level of 12.61% to a stable growth return of 10%. This is still higher than the cost of capital of 7.29% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.
- **Reinvest to grow**: Based on the expected growth rate in perpetuity (2.5%) and expected return on capital forever after year 10 of 10%, we compute a stable period reinvestment rate of 25%:
  - Reinvestment Rate = Growth Rate / Return on Capital = 2.5% / 10% = 25%
- **Adjust risk and cost of capital**: The beta for the stock will drop to one, reflecting Disney’s status as a mature company.
  - Cost of Equity = Riskfree Rate + Beta * Risk Premium = 2.75% + 5.76% = 8.51%
  - The debt ratio for Disney will rise to 20%. Since we assume that the cost of debt remains unchanged at 3.75%, this will result in a cost of capital of 7.29%
  - Cost of capital = 8.51% (.80) + 3.75% (1-.361) (.20) = 7.29%
Task
Evaluate your firm’s expected characteristics when it reaches stable growth