Cynic: A person who knows the price of everything but the value of nothing.
Oscar Wilde
Chapter 12: Value and Corporate Decisions

- The hurdle rate should reflect the riskiness of the investment and the mix of debt and equity used to fund it.
- The return should reflect the magnitude and the timing of the cashflows as well as all side effects.
- The optimal mix of debt and equity maximizes firm value.
- The right kind of debt matches the tenor of your assets.
- How much cash you can return depends upon current & potential investment opportunities.
- How you choose to return cash to the owners will depend whether they prefer dividends or buybacks.

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.

Maximize the value of the business (firm)
Three approaches to valuation

- **Intrinsic valuation**: The value of an asset is a function of its fundamentals – cash flows, growth and risk. In general, discounted cash flow models are used to estimate intrinsic value.

- **Relative valuation**: The value of an asset is estimated based upon what investors are paying for similar assets. In general, this takes the form of value or price multiples and comparing firms within the same business.

- **Contingent claim valuation**: When the cash flows on an asset are contingent on an external event, the value can be estimated using option pricing models.
Discounted Cashflow Valuation: Basis for Approach

\[ \text{Value of an asset} = \sum_{t=1}^{n} \frac{\text{Expected Cash flow in period } t}{(1+r)^t} \]

where,

n = Life of the asset

r = Discount rate reflecting the riskiness of the estimated cashflows
The value of equity is obtained by discounting expected cashflows to equity, i.e., the residual cashflows after meeting all expenses, tax obligations and interest and principal payments, at the cost of equity, i.e., the rate of return required by equity investors in the firm.

\[
\text{Value of Equity} = \sum_{t=1}^{t=n} \frac{\text{CF to Equity}_t}{(1+k_e)^t}
\]

where,

- \( \text{CF to Equity}_t \) = Expected Cashflow to Equity in period \( t \)
- \( k_e \) = Cost of Equity

The dividend discount model is a specialized case of equity valuation, and the value of a stock is the present value of expected future dividends.
The value of the firm is obtained by discounting expected cashflows to the firm, i.e., the residual cashflows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital, which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

\[
\text{Value of Firm} = \sum_{t=1}^{t=n} \frac{\text{CF to Firm}_t}{(1 + \text{WACC})^t}
\]

where,
\[
\text{CF to Firm}_t = \text{Expected Cashflow to Firm in period } t
\]
\[
\text{WACC} = \text{Weighted Average Cost of Capital}
\]
Choosing a Cash Flow to Discount

- When you cannot estimate the free cash flows to equity or the firm, the only cash flow that you can discount is dividends. For financial service firms, it is difficult to estimate free cash flows. For Deutsche Bank, we will be discounting dividends.

- If a firm’s debt ratio is not expected to change over time, the free cash flows to equity can be discounted to yield the value of equity. For Aracruz, we will discount free cash flows to equity.

- If a firm’s debt ratio might change over time, free cash flows to equity become cumbersome to estimate. Here, we would discount free cash flows to the firm. For Disney, we will discount the free cash flow to the firm.
The Ingredients that determine value.

Cashflows can be
a. After debt payments to equity
   - Dividends
   - Free Cashflow to Equity
b. Before debt payments to firm
   - Free Cashflow to Firm

Growth rate can be
a. In Equity Earnings
   - Net Income
   - Earnings per share
b. In Operating Earnings

Firm is in stable growth which it can sustain forever

Expected Cashflows during extraordinary growth phase

Discount the cashflows and terminal value to the present

Discount Rate can be
a. Cost of equity, if cashflows are equity cashflows
b. Cost of capital, if cashflows are to the firm

Present value is
a. Value of equity, if cashflows to equity discounted at cost of equity
b. Value of operating assets of the firm, if cashflows to firm discounted at the cost of capital
I. Estimating Cash Flows

- Cash Flows
- Cash Flow used
  - Free Cash flow to Firm
    - EBIT (1 - tax rate)
    - (Cap Ex - Depreciation)
    - Change in Working Capital
  - Cash Flow to equity
    - Dividends
    - Augmented Dividends
      - Dividends
      - Stock Buybacks
    - Free Cash flow to Equity
      - (Potential Dividend)
      - Net Income
        - (Cap Ex - Depreciation)
        - Change in Working Capital
        - (Debt issued - Debt repaid)
Dividends and Modified Dividends for Deutsche Bank

- In 2007, Deutsche Bank paid out dividends of 2,146 million Euros on net income of 6,510 million Euros. In early 2008, we valued Deutsche Bank using the dividends it paid in 2007. We are assuming the dividends are not only reasonable but sustainable.

- In early 2009, in the aftermath of the crisis, Deutsche Bank’s dividend policy was in flux. The net income had plummeted and capital ratios were being reassessed. To forecast future dividends, we first forecast net income (ROE* Asset Base) and then estimated the investments in regulatory capital:

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Base</td>
<td>312,882 €</td>
<td>325,398 €</td>
<td>338,414 €</td>
<td>351,950 €</td>
<td>366,028 €</td>
<td>380,669 €</td>
</tr>
<tr>
<td>Capital ratio</td>
<td>10.20%</td>
<td>10.16%</td>
<td>10.12%</td>
<td>10.08%</td>
<td>10.04%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Regulatory Capital</td>
<td>31,914 €</td>
<td>33,060 €</td>
<td>34,247 €</td>
<td>35,477 €</td>
<td>36,749 €</td>
<td>38,067 €</td>
</tr>
<tr>
<td>Change in Regulatory Capital</td>
<td>1,146 €</td>
<td>1,187 €</td>
<td>1,229 €</td>
<td>1,273 €</td>
<td>1,318 €</td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>9.40%</td>
<td>9.52%</td>
<td>9.64%</td>
<td>9.76%</td>
<td>9.88%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Net Income</td>
<td>3,000 €</td>
<td>3,147 €</td>
<td>3,302 €</td>
<td>3,463 €</td>
<td>3,631 €</td>
<td>3,807 €</td>
</tr>
<tr>
<td>- Investment in Regulatory Capital</td>
<td>1,146 €</td>
<td>1,187 €</td>
<td>1,229 €</td>
<td>1,273 €</td>
<td>1,318 €</td>
<td></td>
</tr>
<tr>
<td>FCFE (Potential Dividend)</td>
<td>2,001 €</td>
<td>2,114 €</td>
<td>2,233 €</td>
<td>2,358 €</td>
<td>2,489 €</td>
<td></td>
</tr>
</tbody>
</table>

Aswath Damodaran
## Estimating FCFE: Tata Chemicals

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Income</th>
<th>Cap Ex</th>
<th>Depreciation</th>
<th>Change in WC</th>
<th>Change in Debt</th>
<th>Equity Reinvestment</th>
<th>Equity Reinvestment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-04</td>
<td>$3,418</td>
<td>$357</td>
<td>$1,442</td>
<td>-$557</td>
<td>-$2,771</td>
<td>$1,129</td>
<td>33.04%</td>
</tr>
<tr>
<td>2004-05</td>
<td>$4,550</td>
<td>$692</td>
<td>$1,377</td>
<td>-$493</td>
<td>$5,448</td>
<td>-$6,626</td>
<td>-145.64%</td>
</tr>
<tr>
<td>2005-06</td>
<td>$5,156</td>
<td>$11,730</td>
<td>$1,389</td>
<td>$2,823</td>
<td>$867</td>
<td>$12,297</td>
<td>238.51%</td>
</tr>
<tr>
<td>2006-07</td>
<td>$6,338</td>
<td>$1,196</td>
<td>$1,504</td>
<td>-$1,662</td>
<td>-$4,411</td>
<td>$2,442</td>
<td>38.53%</td>
</tr>
<tr>
<td>2007-08</td>
<td>$11,571</td>
<td>$28,956</td>
<td>$1,488</td>
<td>$88</td>
<td>$17,054</td>
<td>$10,502</td>
<td>90.76%</td>
</tr>
<tr>
<td>Aggregate</td>
<td>$31,033</td>
<td>$42,930</td>
<td>$7,199</td>
<td>$200</td>
<td>$16,187</td>
<td>$19,744</td>
<td>63.62%</td>
</tr>
</tbody>
</table>
Estimating FCFF: Disney

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2008 normalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>$7,030</td>
<td>$7,030</td>
</tr>
<tr>
<td>EBIT (`1-t)</td>
<td>$4,359</td>
<td>$4,359</td>
</tr>
<tr>
<td>+ Depreciation</td>
<td>$1,839</td>
<td>$1,839</td>
</tr>
<tr>
<td>- Cap Ex</td>
<td>$2,752</td>
<td>$3,939</td>
</tr>
<tr>
<td>- Change in WC</td>
<td>$241</td>
<td>$241</td>
</tr>
<tr>
<td>FCFF</td>
<td>$3,205</td>
<td>$2,018</td>
</tr>
<tr>
<td>Reinvestment</td>
<td>$1,154</td>
<td>$2,341</td>
</tr>
<tr>
<td>Reinvestment Rate</td>
<td>26.48%</td>
<td>53.71%</td>
</tr>
</tbody>
</table>
II. Discount Rates

- Critical ingredient in discounted cashflow valuation. Errors in estimating the discount rate or mismatching cashflows and discount rates can lead to serious errors in valuation.

- At an intuitive level, the discount rate used should be consistent with both the riskiness and the type of cashflow being discounted.

- The cost of equity is the rate at which we discount cash flows to equity (dividends or free cash flows to equity). The cost of capital is the rate at which we discount free cash flows to the firm.
Cost of Equity: Deutsche Bank
2008 versus 2009

- In early 2008, we estimated a beta of 1.162 for Deutsche Bank, which used in conjunction with the Euro risk-free rate of 4% (in January 2008) and a risk premium of 4.50% (the mature market risk premium in early 2008), yielded a cost of equity of 9.23%.

  \[
  \text{Cost of Equity}_{\text{Jan 2008}} = \text{Riskfree Rate}_{\text{Jan 2008}} + \text{Beta} \times \text{Mature Market Risk Premium} \\
  = 4.00\% + 1.162 (4.5\%) = 9.23\%
  \]

  (We used the same beta for early 2008 and early 2009. We could have looked at the betas for banks in early 2008 and used that number instead)

- In early 2009, the Euro riskfree rate had dropped to 3.6% and the equity risk premium had risen to 6% for mature markets:

  \[
  \text{Cost of equity}_{\text{Jan 2009}} = \text{Riskfree Rate}_{\text{Jan 2009}} + \text{Beta} (\text{Equity Risk Premium}) \\
  = 3.6\% + 1.162 (6\%) = 10.572\%
  \]
Cost of Equity: Tata Chemicals

- We will be valuing Tata Chemicals in rupee terms. (That is a choice. Any company can be valued in any currency).

- Earlier, we estimated a beta for equity of 0.945 for Tata Chemical’s operating assets. With a nominal rupee risk-free rate of 4 percent and an equity risk premium of 10.51% for India (also estimated in Chapter 4), we arrive at a cost of equity of 13.93%.

\[
\text{Cost of Equity} = 4\% + 0.945 \times (10.51\%) = 13.93\%
\]
Current Cost of Capital: Disney

- The beta for Disney’s stock in May 2009 was 0.9011. The T. bond rate at that time was 3.5%. Using an estimated equity risk premium of 6%, we estimated the cost of equity for Disney to be 8.91%:
  \[
  \text{Cost of Equity} = 3.5\% + 0.9011(6\%) = 8.91\%
  \]

- Disney’s bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 6%. Using a marginal tax rate of 38%, the after-tax cost of debt for Disney is 3.72%.
  \[
  \text{After-Tax Cost of Debt} = 6.00\% (1 - 0.38) = 3.72\%
  \]

- The cost of capital was calculated using these costs and the weights based on market values of equity (45,193) and debt (16,682):
  \[
  \text{Cost of capital} = \frac{8.91\%}{16,682 + 45,193} \times 45,193 + \frac{3.72\%}{16,682 + 45,193} \times 16,682 = 7.51\%
  \]
But costs of equity and capital can and should change over time...

<table>
<thead>
<tr>
<th>Year</th>
<th>Beta</th>
<th>Cost of equity</th>
<th>Cost of debt</th>
<th>Debt Ratio</th>
<th>Cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.90</td>
<td>8.91%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.52%</td>
</tr>
<tr>
<td>2</td>
<td>0.90</td>
<td>8.91%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.52%</td>
</tr>
<tr>
<td>3</td>
<td>0.90</td>
<td>8.91%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.52%</td>
</tr>
<tr>
<td>4</td>
<td>0.90</td>
<td>8.91%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.52%</td>
</tr>
<tr>
<td>5</td>
<td>0.90</td>
<td>8.91%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.52%</td>
</tr>
<tr>
<td>6</td>
<td>0.92</td>
<td>9.03%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.61%</td>
</tr>
<tr>
<td>7</td>
<td>0.94</td>
<td>9.14%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.69%</td>
</tr>
<tr>
<td>8</td>
<td>0.96</td>
<td>9.26%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.78%</td>
</tr>
<tr>
<td>9</td>
<td>0.98</td>
<td>9.38%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.87%</td>
</tr>
<tr>
<td>10</td>
<td>1.00</td>
<td>9.50%</td>
<td>3.72%</td>
<td>26.73%</td>
<td>7.95%</td>
</tr>
</tbody>
</table>
III. Expected Growth

Retention Ratio = 1 - Dividends/Net Income

Return on Equity = Net Income/Book Value of Equity

Reinvestment Rate = (Net Cap Ex + Chg in WC)/EBIT(1-t)

Return on Capital = EBIT(1-t)/Book Value of Capital

- In 2007, Deutsche Bank reported net income of 6.51 billion Euros on a book value of equity of 33.475 billion Euros at the start of the year (end of 2006), and paid out 2.146 billion Euros as dividends.

\[
\text{Return on Equity} = \frac{\text{Net Income}_{2007}}{\text{Book Value of Equity}_{2006}} = \frac{6,510}{33,475} = 19.45\%
\]

\[
\text{Retention Ratio} = 1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2,146}{6,510} = 67.03\%
\]

- If Deutsche Bank maintains the return on equity (ROE) and retention ratio that it delivered in 2007 for the long run:

  \[
  \text{Expected Growth Rate} = 0.6703 \times 0.1945 = 13.04\%
  \]

- If we replace the net income in 2007 with average net income of $3,954 million, from 2003 to 2007:

  \[
  \text{Normalized Return on Equity} = \frac{\text{Average Net Income}_{2003-07}}{\text{Book Value of Equity}_{2006}} = \frac{3,954}{33,475} = 11.81\%
  \]

  \[
  \text{Normalized Retention Ratio} = 1 - \frac{\text{Dividends}}{\text{Net Income}} = 1 - \frac{2,146}{3,954} = 45.72\%
  \]

  \[
  \text{Expected Growth Rate} = 0.4572 \times 0.1181 = 5.40\%
  \]

Aswath Damodaran
Estimating growth in Net Income: Tata Chemicals

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Income</th>
<th>Cap Ex</th>
<th>Depreciation</th>
<th>Change in WC</th>
<th>Change in Debt</th>
<th>Equity Reinvestment</th>
<th>Equity Reinvestment Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-04</td>
<td>INR 3,418</td>
<td>INR 357</td>
<td>INR 1,442</td>
<td>-INR 557</td>
<td>-INR 2,771</td>
<td>INR 1,129</td>
<td>33.04%</td>
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<td>INR 4,550</td>
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<td>INR 1,377</td>
<td>-INR 493</td>
<td>INR 5,448</td>
<td>-INR 6,626</td>
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<td>INR 5,156</td>
<td>INR 11,730</td>
<td>INR 1,389</td>
<td>INR 2,823</td>
<td>INR 867</td>
<td>INR 12,297</td>
<td>238.51%</td>
</tr>
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<td>2006-07</td>
<td>INR 6,338</td>
<td>INR 1,196</td>
<td>INR 1,504</td>
<td>-INR 1,662</td>
<td>-INR 4,411</td>
<td>INR 2,442</td>
<td>38.53%</td>
</tr>
<tr>
<td>2007-08</td>
<td>INR 11,571</td>
<td>INR 28,956</td>
<td>INR 1,488</td>
<td>INR 88</td>
<td>INR 17,054</td>
<td>INR 10,502</td>
<td>90.76%</td>
</tr>
<tr>
<td>Aggregate</td>
<td>INR 31,033</td>
<td>INR 42,930</td>
<td>INR 7,199</td>
<td>INR 200</td>
<td>INR 16,187</td>
<td>INR 19,744</td>
<td>63.62%</td>
</tr>
</tbody>
</table>

Normalized Equity Reinvestment Rate = \[
\frac{\text{Equity Reinvestment}_{\text{Total 2004-08}}}{\text{Net Income}_{\text{Total 2004-08}}} = \frac{19,744}{31,033} = 63.62% \]

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Income</th>
<th>BV of Equity</th>
<th>ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-04</td>
<td>INR 3,418</td>
<td>INR 20,353</td>
<td>16.80%</td>
</tr>
<tr>
<td>2004-05</td>
<td>INR 4,550</td>
<td>INR 19,978</td>
<td>22.78%</td>
</tr>
<tr>
<td>2005-06</td>
<td>INR 5,156</td>
<td>INR 39,451</td>
<td>13.07%</td>
</tr>
<tr>
<td>2006-07</td>
<td>INR 6,338</td>
<td>INR 37,258</td>
<td>17.01%</td>
</tr>
<tr>
<td>2007-08</td>
<td>INR 11,571</td>
<td>INR 61,952</td>
<td>18.68%</td>
</tr>
<tr>
<td>Aggregate</td>
<td>INR 31,033</td>
<td>INR 178,992</td>
<td>17.34%</td>
</tr>
</tbody>
</table>

Normalized Return on Equity = \[
\frac{\text{Net Income}_{\text{Total 2004-08}}}{\text{Book Value of Equity}_{\text{Total 2004-08}}} = \frac{31,033}{178,992} = 17.34% \]

Expected Growth in Net Income = 63.62% * 17.34% = 11.03%
ROE and Leverage

- A high ROE, other things remaining equal, should yield a higher expected growth rate in equity earnings.
- The ROE for a firm is a function of both the quality of its investments and how much debt it uses in funding these investments. In particular

\[
\text{ROE} = \text{ROC} + \frac{\text{D}/\text{E}}{(\text{ROC} - i (1-t))}
\]

where,

- \(\text{ROC} = \frac{(\text{EBIT} (1 - \text{tax rate}))}{(\text{Book Value of Capital})}\)
- \(\text{BV of Capital} = \text{BV of Debt} + \text{BV of Equity} - \text{Cash}\)
- \(\text{D}/\text{E} = \frac{\text{Debt}}{\text{Equity}}\)
- \(i = \text{Interest rate on debt}\)
- \(t = \text{Tax rate on ordinary income}\).
Decomposing ROE

- Assume that you are analyzing a company with a 15% return on capital, an after-tax cost of debt of 5% and a book debt to equity ratio of 100%. Estimate the ROE for this company.

- Now assume that another company in the same sector has the same ROE as the company that you have just analyzed but no debt. Will these two firms have the same growth rates in earnings per share if they have the same dividend payout ratio?

- Will they have the same equity value?
We begin by estimating the reinvestment rate and return on capital for Disney in 2008 using the numbers from the latest financial statements.

\[
\text{Reinvestment Rate}_{2008} = \frac{(2,752 - 1,839 + 241)}{7,030 (1-.38)} = 26.48\%
\]

We include $516 million in acquisitions made during 2008 in capital expenditures, but this is a volatile item. Disney does not make large acquisitions every year, but it does so infrequently - $7.5 billion to buy Pixar in 2006 and $11.5 billion to buy Capital Cities in 1996. Averaging out acquisitions from 1994-2008, we estimate an average annual value of $1,761 million for acquisitions over this period:

\[
\text{Reinvestment Rate}_{\text{Normalized}} = \frac{(3,939 - 1,839 + 241)}{7,030 (1-.38)} = 53.72\%
\]
Estimating Growth in Disney ROC and Expected Growth

- We compute the return on capital, using operating income in 2008 and capital invested at the start of 2008 (end of 2007):
  
  \[
  \text{Return on Capital}_{2008} = \frac{\text{EBIT} (1 - t)}{(\text{BV of Equity} + \text{BV of Debt} - \text{Cash})} = \frac{7,030 (1 - .38)}{(30,753 + 16,892 - 3,670)} = 9.91\%
  \]

- If Disney maintains its 2008 normalized reinvestment rate of 53.72% and return on capital of 9.91% for the next few years, its growth rate will be 5.32 percent.
  
  \[
  \text{Expected Growth Rate} = 53.72\% \times 9.91\% = 5.32\%
  \]
IV. Getting Closure in Valuation

- 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:

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

- When a firm’s cash flows grow at a “constant” rate forever, the present value of those cash flows can be written as:

\[
Value = \frac{Expected\ Cash\ Flow\ Next\ Period}{(r - g)}
\]

where,

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

- This “constant” growth rate is called a stable growth rate and cannot be higher than the growth rate of the economy in which the firm operates.

Aswath Damodaran
A key assumption in all discounted cash flow models is the period of high growth, and the pattern of growth during that period. In general, we can make one of three assumptions:

- there is no high growth, in which case the firm is already in stable growth
- there will be high growth for a period, at the end of which the growth rate will drop to the stable growth rate (2-stage)
- there will be high growth for a period, at the end of which the growth rate will decline gradually to a stable growth rate (3-stage)

The assumption of how long high growth will continue will depend upon several factors including:

- the size of the firm (larger firm -> shorter high growth periods)
- current growth rate (if high -> longer high growth period)
- barriers to entry and differential advantages (if high -> longer growth period)
## Choosing a Growth Period: Examples

<table>
<thead>
<tr>
<th></th>
<th>Disney</th>
<th>Aracruz</th>
<th>Tata Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Firm size/market size</strong></td>
<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>Firm has a small market share of the paper/pulp business, but the business is mature.</td>
<td>Firm has a large market share of Indian (domestic) market, but is small by global standards. Domestic market is also growing.</td>
</tr>
<tr>
<td><strong>Current excess returns</strong></td>
<td>Firm is earning more than its cost of capital, after a long period of negative excess returns.</td>
<td>Returns on capital are largely a function of paper/pulp prices, but on average have been less than the cost of capital.</td>
<td>Firm has a return on capital that is roughly equal to its cost of capital.</td>
</tr>
<tr>
<td><strong>Competitive advantages</strong></td>
<td>Has some of the most recognized brand names in the world. Knows more about operating theme parks than any other firm in the world. Has skilled animation studio staff.</td>
<td>Cost advantages because of access to Brazilian rain forests. Has invested in newer, updated plants and has skilled workforce.</td>
<td>Has cost advantages, because of lower labor and production costs in India.</td>
</tr>
<tr>
<td><strong>Length of high-growth period</strong></td>
<td>Ten years, entirely because of its strong competitive advantages (which have been wasted over the past few years), but the excess returns are likely to be small.</td>
<td>Five years, largely due to access to cheap raw material.</td>
<td>Five years, primarily because of high real growth in India.</td>
</tr>
</tbody>
</table>
Estimating Stable Period Inputs: Disney

- **Respect the cap**: The growth rate forever is assumed to be 3%. This is set lower than the riskfree rate (3.5%).

- **Think about stable period excess returns**: The return on capital for Disney will drop from its high growth period level of 9.91% to a stable growth return of 9%. This is still higher than the cost of capital of 7.95% but the competitive advantages that Disney has are unlikely to dissipate completely by the end of the 10th year.

- **Reinvest to grow**: The expected growth rate in stable growth will be 3%. In conjunction with the return on capital of 9%, this yields a stable period reinvestment rate of 33.33%:
  - Reinvestment Rate = Growth Rate / Return on Capital = 3% / 9% = 33.33%

- **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 = 3.5% + 6% = 9.5%
  - The debt ratio for Disney will stay at 26.73%. Since we assume that the cost of debt remains unchanged at 6%, this will result in a cost of capital of 7.95%
  - Cost of capital = 9.5% (.733) + 6% (1-.38) (.267) = 7.95%
V. From firm value to equity value per share

<table>
<thead>
<tr>
<th>Approach used</th>
<th>To get to equity value per share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount dividends per share at the cost of equity</td>
<td>Present value is value of equity per share</td>
</tr>
<tr>
<td>Discount aggregate FCFE at the cost of equity</td>
<td>Present value is value of aggregate equity. Subtract the value of equity options given to managers and divide by number of shares.</td>
</tr>
<tr>
<td>Discount aggregate FCFF at the cost of capital</td>
<td>PV = Value of operating assets + Cash &amp; Near Cash investments + Value of minority cross holdings -Debt outstanding = Value of equity -Value of equity options = Value of equity in common stock / Number of shares</td>
</tr>
</tbody>
</table>
Valuing Deutsche Bank in early 2008

- To value Deutsche Bank, we started with the normalized income over the previous five years (3,954 million Euros) and the dividends in 2008 (2,146 million Euros). We assumed that the payout ratio and ROE, based on these numbers will continue for the next 5 years:
  - Payout ratio = 2,146/3954 = 54.28%
  - Expected growth rate = (1 - 0.5428) * 0.1181 = 0.054 or 5.4%
  - Cost of equity = 9.23%

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Income</th>
<th>Payout Ratio</th>
<th>Dividends</th>
<th>PV @ 9.23%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>4,167 €</td>
<td>54.28%</td>
<td>2,262 €</td>
<td>2,071 €</td>
</tr>
<tr>
<td>2009</td>
<td>4,392 €</td>
<td>54.28%</td>
<td>2,384 €</td>
<td>1,998 €</td>
</tr>
<tr>
<td>2010</td>
<td>4,629 €</td>
<td>54.28%</td>
<td>2,513 €</td>
<td>1,928 €</td>
</tr>
<tr>
<td>2011</td>
<td>4,879 €</td>
<td>54.28%</td>
<td>2,648 €</td>
<td>1,861 €</td>
</tr>
<tr>
<td>2012</td>
<td>5,143 €</td>
<td>54.28%</td>
<td>2,791 €</td>
<td>1,795 €</td>
</tr>
</tbody>
</table>

Aswath Damodaran
Deutsche Bank in stable growth

At the end of year 5, the firm is in stable growth. We assume that the cost of equity drops to 8.5% (as the beta moves to 1) and that the return on equity also drops to 8.5 (to equal the cost of equity).

Stable Period Payout Ratio = \(1 - \frac{g}{\text{ROE}} = 1 - \frac{0.03}{0.085} = 0.6471\) or 64.71%

Expected Dividends in Year 6 = Expected Net Income\(_5\) \(\times (1+g_{\text{Stable}})\) * Stable Payout Ratio
\[= €5,143 \times (1.03) \times 0.6471 = €3,427\] million

Terminal Value = \(\frac{\text{Expected Dividends}_6}{(\text{Cost of Equity}-g)} = \frac{3,247}{(0.085-0.03)} = 62,318\) million Euros

PV of Terminal Value = \(\frac{\text{Terminal Value}_n}{(1+\text{Cost of Equity}_{\text{High growth}})^n} = \frac{62,318}{(1.0923)^5} = 40,079\) mil Euros

Value of equity = €9,653 + €40,079 = €49,732 million Euros

Value of equity per share = \(\frac{\text{Value of Equity}}{\# \text{Shares}} = \frac{49,732}{474.2} = 104.88\) Euros/share

Stock was trading at 89 Euros per share at the time of the analysis.
What does the valuation tell us? One of three possibilities...

- **Stock is under valued**: This valuation would suggest that Deutsche Bank is significantly overvalued, given our estimates of expected growth and risk.

- **Dividends may not reflect the cash flows generated by Deutsche Bank**: The FCFE could have been significantly lower than the dividends paid.

- **Estimates of growth and risk are wrong**: It is also possible that we have over estimated growth or under estimated risk in the model, thus reducing our estimate of value.
Valuing Tata Chemicals in early 2009: The high growth period

- We used the normalized return on equity of 17.34% (see earlier table) and the current book value of equity (Rs 35,717 million) to estimate net income:
  
  Normalized Net Income = 35,717 * .1734 = Rs, 6,193 million

  (We removed interest income from cash to arrive at the normalized return on equity)

- We use the average equity reinvestment rate of 63.62 percent and the normalized return on equity of 17.34% to estimate growth:
  
  Expected Growth in Net Income = 63.62% * 17.34% = 11.03%

- We assume that the current cost of equity (see earlier page) of 13.93% will hold for the next 5 years.

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Income</td>
<td>Rs 6,876</td>
<td>Rs 7,634</td>
<td>Rs 8,476</td>
<td>Rs 9,411</td>
<td>Rs 10,449</td>
<td></td>
</tr>
<tr>
<td>Equity Reinvestment Rate</td>
<td>63.62%</td>
<td>63.62%</td>
<td>63.62%</td>
<td>63.62%</td>
<td>63.62%</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>Rs 2,501</td>
<td>Rs 2,777</td>
<td>Rs 3,084</td>
<td>Rs 3,423</td>
<td>Rs 3,801</td>
<td></td>
</tr>
<tr>
<td>Cost of Equity</td>
<td>13.93%</td>
<td>13.93%</td>
<td>13.93%</td>
<td>13.93%</td>
<td>13.93%</td>
<td></td>
</tr>
<tr>
<td>Present Value</td>
<td>Rs 2,195</td>
<td>Rs 2,160</td>
<td>Rs 2,085</td>
<td>Rs 2,032</td>
<td>Rs 1,980</td>
<td>Rs 10,433</td>
</tr>
</tbody>
</table>

Aswath Damodaran
Stable growth and value....

- After year five, we will assume that the beta will increase to 1 and that the equity risk premium will decline to 7.5 percent (we assumed India country risk would drop). The resulting cost of equity is 11.5 percent.
  
  Cost of Equity in Stable Growth = 4% + 1(7.5%) = 11.5%

- We will assume that the growth in net income will drop to 4% and that the return on equity will rise to 11.5% (which is also the cost of equity).

  Equity Reinvestment Rate _Stable Growth_ = 4%/11.5% = 34.78%

  FCFE in Year 6 = 10,449(1.04)(1 – 0.3478) = Rs 7,087 million

  Terminal Value of Equity = 7,087/(0.115 – 0.04) = Rs 94,497 million

- To value equity in the firm today

  Value of equity = PV of FCFE during high growth + PV of terminal value + Cash

  = 10,433 + 94,497/1.13935 +1,759 = Rs 61,423 million

  Dividing by 235.17 million shares yields a value of equity per share of Rs 261, about 20% higher than the stock price of Rs 222 per share.
# Disney: Inputs to Valuation

<table>
<thead>
<tr>
<th></th>
<th>High Growth Phase</th>
<th>Transition Phase</th>
<th>Stable Growth Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of Period</td>
<td>5 years</td>
<td>5 years</td>
<td>Forever after 10 years</td>
</tr>
<tr>
<td>Tax Rate</td>
<td>38%</td>
<td>38%</td>
<td>38%</td>
</tr>
<tr>
<td>Return on Capital</td>
<td>9.91%</td>
<td>Declines linearly to 9%</td>
<td>Stable ROC of 9%</td>
</tr>
<tr>
<td>Reinvestment Rate</td>
<td>53.72% (based on normalized acquisition costs)</td>
<td>Declines to 33.33% as ROC and growth rates drop: Reinvestment Rate = g/ROC</td>
<td>33.33% of after-tax operating income, estimated from stable growth rate of 3% and return on capital of 9%. Reinvestment rate = 3/9 = 33.33%</td>
</tr>
<tr>
<td>Expected Growth Rate in EBIT</td>
<td>ROC * Reinvestment Rate = 9.91%*53.72% = 5.32%</td>
<td>Linear decline to Stable Growth Rate of 3%</td>
<td>3%</td>
</tr>
<tr>
<td>Debt/Capital Ratio</td>
<td>26.7%</td>
<td>Stays unchanged</td>
<td>Stays unchanged</td>
</tr>
<tr>
<td>Risk Parameters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>0.9033, k_s = 8.91%</td>
<td>Beta changes linearly to 1.00; Cost of debt stays at 6%</td>
<td>Beta = 1.00; k_s = 9.5%</td>
</tr>
<tr>
<td>Pre-tax Cost of Debt</td>
<td>6%</td>
<td></td>
<td>Cost of debt stays at 6%</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>7.52%</td>
<td></td>
<td>Cost of capital goes to 7.95%</td>
</tr>
</tbody>
</table>

Aswath Damodaran
## Current Cashflow to Firm

EBIT\( (1-t) = 7030(1-0.38) = 4359 \)

- Nt CpX = 2,101
- Chg WC = 241
- FCFF = 2,017

Reinvestment Rate = \( \frac{2342}{4359} = 53.72\% \)

Return on capital = 9.91%

## Expected Growth in EBIT \((1-t)\)

\[ 0.5372 \times 0.0991 = 0.0532 = 5.32\% \]

## Stable Growth

- \( g = 3\% \)
- Beta = 1.00
- Cost of capital = 7.95%
- ROC = 9%
- Reinvestment Rate = 31%

## Terminal Value \(10\)

\[ \frac{4704}{0.0795 - 0.03} = 94,928 \]

## Cost of Capital (WACC)

\[ \text{Cost of Equity} = 8.91\% \]

\[ \text{Cost of Debt} = (3.5\% + 2.5\%)(1-0.38) = 3.72\% \]

\[ \text{Based on actual A rating} \]

\[ \text{Unlevered Beta for Sectors: } 0.7333 \]

\[ D/E = 36.91\% \]

Aswath Damodaran
Investment decision affects risk of assets being financed and financing decision affects return.

The Investment Decision
Invest in projects that earn a return greater than a minimum acceptable hurdle rate.

Existing Investments
ROC = 9.91%

New Investments
Return on Capital = 9.91%

Reinvestment Rate = 53.72%

Cost of capital = 8.91% (.73) + 3.72% (.27) = 7.52%

Current EBIT (1-t) $4,359

Expected Growth Rate = 9.91% * 53.72% = 5.32%

Financing Mix
D = 27%; E = 73%

Financing Choices
Fixed rate US $ debt with duration of years

Table: Expected growth, EBIT (1-t), Reinvestment, Reinvestment, FCFF, Terminal Value, Cost of capital, PV

Value of operating assets = $65,284
+ Cash $3,795.00
+ Cross holdings $1,763.00
- Debt $16,682.15
- Minority interests $1,344.00
- Equity Options $527.90
Value of equity in stock = $52,288.17
Value per share = $28.16

Disney: Corporate Financing Decisions and Firm Value
Ways of changing value...

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

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

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

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

Are you investing optimally for future growth?

Are you managing your existing investments/assets well?

Are you building on your competitive advantages?

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

Is there scope for more efficient utilization of existing assets?

Stable growth firm, with no or very limited excess returns
**Current Cashflow to Firm**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT(1-t)</td>
<td>7030(1-.38) = 4,359</td>
</tr>
<tr>
<td>Nt CpX</td>
<td>2,101</td>
</tr>
<tr>
<td>Chg WC</td>
<td>241</td>
</tr>
<tr>
<td>FCFF</td>
<td>2,017</td>
</tr>
<tr>
<td>Reinvestment Rate</td>
<td>53.72%</td>
</tr>
<tr>
<td>Return on capital</td>
<td>9.91%</td>
</tr>
</tbody>
</table>

**Expected Growth in EBIT (1-t)**

<table>
<thead>
<tr>
<th>Year</th>
<th>EBIT (1-t)</th>
<th>Growth decreases gradually to 3%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$4,640</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$4,939</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>$5,257</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>$5,596</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>$5,957</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>$6,300</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>$6,619</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>$6,909</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>$7,164</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$7,379</td>
<td></td>
</tr>
</tbody>
</table>

**Terminal Value**

\[ \text{Terminal Value}_{10} = \frac{5067}{(0.0719 - 0.03)} = 120,982 \]

**Cost of Capital (WACC)**

\[ \text{Cost of Capital (WACC)} = 0.74\% (0.60) + 3.72\% (0.40) = 7.33\% \]

**Cost of Equity**

9.74%

**Riskfree Rate**

Riskfree rate = 3.5%

**Beta**

1.04

**Risk Premium**

6%

**Unlevered Beta for Sectors:** 0.7333

D/E = 66.67%

**On June 1, 2009, Disney was trading at $24.34/share**
First Principles

Corporate Finance: The Big Picture

- **The hurdle rate** should reflect the riskiness of the investment and the mix of debt and equity used to fund it.
- **The return** should reflect the magnitude and the timing of the cashflows as well as all side effects.
- **The optimal mix of debt and equity** maximizes firm value.
- **The right kind of debt** matches the tenor of your assets.
- **How much cash you can return** depends upon current & potential investment opportunities.
- **How you choose to return cash to the owners will depend** whether they prefer dividends or buybacks.

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.

Maximize the value of the business (firm)