VALUATION: CASH FLOWS & DISCOUNT RATES

Cash is king.
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

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

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

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

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

Closing Thoughts
36. Closing Thoughts
I. Estimating Cash Flows

Cash Flow used

Cash flow to equity

Dividends

Augmented Dividends
Dividends + Stock Buybacks

Free Cash flow to Firm
EBIT (1 - tax rate)
- (Cap Ex - Depreciation)
- Change in Working Capital

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. In my 2008 valuation I am assuming the dividends are not only reasonable but sustainable.

- In November 2013, Deutsche Bank’s dividend policy was in flux. Not only did it report losses but it was on a pathway to increase its regulatory capital ratio. Rather than focus on the dividends (which were small), we estimated the potential dividends (by estimating the free cash flows to equity after investments in regulatory capital)

<table>
<thead>
<tr>
<th></th>
<th>Current</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Steady state</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Base</td>
<td>439,851 €</td>
<td>453,047 €</td>
<td>466,638 €</td>
<td>480,637 €</td>
<td>495,056 €</td>
<td>509,908 €</td>
<td>517,556 €</td>
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<tr>
<td>Capital ratio</td>
<td>15.13%</td>
<td>15.71%</td>
<td>16.28%</td>
<td>16.85%</td>
<td>17.43%</td>
<td>18.00%</td>
<td>18.00%</td>
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<tr>
<td>Tier 1 Capital</td>
<td>66,561 €</td>
<td>71,156 €</td>
<td>75,967 €</td>
<td>81,002 €</td>
<td>86,271 €</td>
<td>91,783 €</td>
<td>93,160 €</td>
</tr>
<tr>
<td>Change in regulatory capital</td>
<td>4,595 €</td>
<td>4,811 €</td>
<td>5,035 €</td>
<td>5,269 €</td>
<td>5,512 €</td>
<td>1,377 €</td>
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</tr>
<tr>
<td>Book Equity</td>
<td>76,829 €</td>
<td>81,424 €</td>
<td>86,235 €</td>
<td>91,270 €</td>
<td>96,539 €</td>
<td>102,051 €</td>
<td>103,605 €</td>
</tr>
<tr>
<td>ROE</td>
<td>-1.08%</td>
<td>0.74%</td>
<td>2.55%</td>
<td>4.37%</td>
<td>6.18%</td>
<td>8.00%</td>
<td>8.00%</td>
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<tr>
<td>Net Income</td>
<td>-716 €</td>
<td>602 €</td>
<td>2,203 €</td>
<td>3,988 €</td>
<td>5,971 €</td>
<td>8,164 €</td>
<td>8,287 €</td>
</tr>
<tr>
<td>- Investment in Regulatory Capital</td>
<td>4,595 €</td>
<td>4,811 €</td>
<td>5,035 €</td>
<td>5,269 €</td>
<td>5,512 €</td>
<td>1,554 €</td>
<td></td>
</tr>
<tr>
<td>FCFE</td>
<td>-3,993 €</td>
<td>-2,608 €</td>
<td>-1,047 €</td>
<td>702 €</td>
<td>2,652 €</td>
<td>6,733 €</td>
<td></td>
</tr>
</tbody>
</table>
## Estimating FCFE (past) : Tata Motors

<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>2008-09</td>
<td>-25,053₹</td>
<td>99,708₹</td>
<td>25,072₹</td>
<td>13,441₹</td>
<td>25,789₹</td>
<td>62,288₹</td>
<td>-248.63%</td>
</tr>
<tr>
<td>2009-10</td>
<td>29,151₹</td>
<td>84,754₹</td>
<td>39,602₹</td>
<td>-26,009₹</td>
<td>5,605₹</td>
<td>13,538₹</td>
<td>46.44%</td>
</tr>
<tr>
<td>2010-11</td>
<td>92,736₹</td>
<td>81,240₹</td>
<td>46,510₹</td>
<td>50,484₹</td>
<td>24,951₹</td>
<td>60,263₹</td>
<td>64.98%</td>
</tr>
<tr>
<td>2011-12</td>
<td>135,165₹</td>
<td>138,756₹</td>
<td>56,209₹</td>
<td>22,801₹</td>
<td>30,846₹</td>
<td>74,502₹</td>
<td>55.12%</td>
</tr>
<tr>
<td>2012-13</td>
<td>98,926₹</td>
<td>187,570₹</td>
<td>75,648₹</td>
<td>680₹</td>
<td>32,970₹</td>
<td>79,632₹</td>
<td>80.50%</td>
</tr>
<tr>
<td>Aggregate</td>
<td>330,925₹</td>
<td>592,028₹</td>
<td>243,041₹</td>
<td>61,397₹</td>
<td>120,160₹</td>
<td>290,224₹</td>
<td>87.70%</td>
</tr>
</tbody>
</table>
Estimating FCFF: Disney

- In the fiscal year ended September 2013, Disney reported the following:
  - Operating income (adjusted for leases) = $10,032 million
  - Effective tax rate = 31.02%
  - Capital Expenditures (including acquisitions) = $5,239 million
  - Depreciation & Amortization = $2,192 million
  - Change in non-cash working capital = $103 million

- The free cash flow to the firm can be computed as follows:
  - After-tax Operating Income = 10,032 (1 - .3102) = $6,920
  - Net Cap Expenditures = $5,239 - $2,192 = $3,629
  - Change in Working Capital = $103
  - Free Cashflow to Firm (FCFF) = $3,188

- The reinvestment and reinvestment rate are as follows:
  - Reinvestment = $3,629 + $103 = $3,732 million
  - Reinvestment Rate = $3,732/ $6,920 = 53.93%
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 2013

- 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 an equity risk premium of 4.50%, yielded a cost of equity of 9.23%.

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

- In November 2013, the Euro risk-free rate had dropped to 1.75% and the Deutsche’s equity risk premium had risen to 6.12%:

\[
\text{Cost of equity}_{\text{Nov '13}} = \text{Riskfree Rate}_{\text{Nov '13}} + \beta \times \text{(ERP)} \\
= 1.75\% + 1.1516 \times 6.12\% = 8.80\%
\]
Cost of Equity: Tata Motors

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

- Earlier, we estimated a levered beta for equity of 1.1007 for Tata Motor’s operating assets. Since we will be discounting FCFE with the income from cash included in the cash, we recomputed a beta for Tata Motors as a company (with cash):
  \[ \text{Levered Beta}_{\text{Company}} = 1.1007 \times \left( \frac{1428}{1630} \right) + 0 \times \left( \frac{202}{1630} \right) = 0.964 \]

- With a nominal rupee risk-free rate of 6.57 percent and an equity risk premium of 7.19% for Tata Motors, we arrive at a cost of equity of 13.50%.
  \[ \text{Cost of Equity} = 6.57\% + 0.964 \times (7.19\%) = 13.50\% \]
The beta for Disney’s stock in November 2013 was 1.0013. The T. bond rate at that time was 2.75%. Using an estimated equity risk premium of 5.76%, we estimated the cost of equity for Disney to be 8.52%:

\[
\text{Cost of Equity} = 2.75\% + 1.0013(5.76\%) = 8.52\%
\]

Disney’s bond rating in May 2009 was A, and based on this rating, the estimated pretax cost of debt for Disney is 3.75%. Using a marginal tax rate of 36.1, the after-tax cost of debt for Disney is 2.40%.

\[
\text{After-Tax Cost of Debt} = 3.75\% (1 - 0.361) = 2.40\% 
\]

The cost of capital was calculated using these costs and the weights based on market values of equity (121,878) and debt (15,961):

\[
\text{Cost of capital} = 8.52\% \frac{121,878}{(15,961+121,878)} + 2.40\% \frac{15,961}{(15,961+121,878)} = 7.81\%
\]
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>After-tax Cost of Debt</th>
<th>Debt Ratio</th>
<th>Cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.0013</td>
<td>8.52%</td>
<td>2.40%</td>
<td>11.50%</td>
<td>7.81%</td>
</tr>
<tr>
<td>2</td>
<td>1.0013</td>
<td>8.52%</td>
<td>2.40%</td>
<td>11.50%</td>
<td>7.81%</td>
</tr>
<tr>
<td>3</td>
<td>1.0013</td>
<td>8.52%</td>
<td>2.40%</td>
<td>11.50%</td>
<td>7.81%</td>
</tr>
<tr>
<td>4</td>
<td>1.0013</td>
<td>8.52%</td>
<td>2.40%</td>
<td>11.50%</td>
<td>7.81%</td>
</tr>
<tr>
<td>5</td>
<td>1.0013</td>
<td>8.52%</td>
<td>2.40%</td>
<td>11.50%</td>
<td>7.81%</td>
</tr>
<tr>
<td>6</td>
<td>1.0010</td>
<td>8.52%</td>
<td>2.40%</td>
<td>13.20%</td>
<td>7.71%</td>
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<td>7</td>
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<td>2.40%</td>
<td>14.90%</td>
<td>7.60%</td>
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<td>1.0005</td>
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<td>16.60%</td>
<td>7.50%</td>
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<td>9</td>
<td>1.0003</td>
<td>8.51%</td>
<td>2.40%</td>
<td>18.30%</td>
<td>7.39%</td>
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<td>10</td>
<td>1.0000</td>
<td>8.51%</td>
<td>2.40%</td>
<td>20.00%</td>
<td>7.29%</td>
</tr>
</tbody>
</table>
Task
Estimate the base year’s cash flows & current discount rate for your firm.