HURDLE RATES X: FINANCING WEIGHTS & COST OF CAPITAL

The minimum acceptable hurdle rate, at last..
The Investment Decision
Invest in assets that earn a return greater than the minimum acceptable hurdle rate

Hurdle Rate
4. Define & Measure Risk
5. The Risk free Rate
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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

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

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

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

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

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24. Trends & Measures
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30. Cash flows
31. Growth
32. Terminal Value
33. To value per share
34. The value of control
35. Relative Valuation

36. Closing Thoughts
The weights used in the cost of capital computation should be market values.

There are three specious arguments used against market value.

- Book value is more reliable than market value because it is not as volatile: While it is true that book value does not change as much as market value, this is more a reflection of weakness than strength.

- Using book value rather than market value is a more conservative approach to estimating debt ratios: For most companies, using book values will yield a lower cost of capital than using market value weights.

- Since accounting returns are computed based upon book value, consistency requires the use of book value in computing cost of capital: While it may seem consistent to use book values for both accounting return and cost of capital calculations, it does not make economic sense.

In practical terms, estimating the market value of equity should be easy for a publicly traded firm, but some or all of the debt at most companies is not traded. As a consequence, most practitioners use the book value of debt as a proxy for the market value of debt.
Disney: From book value to market value for interest bearing debt...

- In Disney’s 2013 financial statements, the debt due over time was footnoted.

<table>
<thead>
<tr>
<th>Time due</th>
<th>Amount due</th>
<th>Weight</th>
<th>Weight * Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>$1,452</td>
<td>11.96%</td>
<td>0.06</td>
</tr>
<tr>
<td>2</td>
<td>$1,300</td>
<td>10.71%</td>
<td>0.21</td>
</tr>
<tr>
<td>3</td>
<td>$1,500</td>
<td>12.36%</td>
<td>0.37</td>
</tr>
<tr>
<td>4</td>
<td>$2,650</td>
<td>21.83%</td>
<td>0.87</td>
</tr>
<tr>
<td>6</td>
<td>$500</td>
<td>4.12%</td>
<td>0.25</td>
</tr>
<tr>
<td>8</td>
<td>$1,362</td>
<td>11.22%</td>
<td>0.9</td>
</tr>
<tr>
<td>9</td>
<td>$1,400</td>
<td>11.53%</td>
<td>1.04</td>
</tr>
<tr>
<td>19</td>
<td>$500</td>
<td>4.12%</td>
<td>0.78</td>
</tr>
<tr>
<td>26</td>
<td>$25</td>
<td>0.21%</td>
<td>0.05</td>
</tr>
<tr>
<td>28</td>
<td>$950</td>
<td>7.83%</td>
<td>2.19</td>
</tr>
<tr>
<td>29</td>
<td>$500</td>
<td>4.12%</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td>$12,139</td>
<td></td>
<td>7.92</td>
</tr>
</tbody>
</table>

- Disney’s total debt due, in book value terms, on the balance sheet is $14,288 million and the total interest expense for the year was $349 million. Using 3.75% as the pre-tax cost of debt:

- Estimated MV of Disney Debt = 

\[
349 \left( \frac{1}{(1.0375)^{7.92}} \right) + \frac{14,288}{(1.0375)^{7.92}} = $13,028 million
\]
Operating Leases at Disney

- The “debt value” of operating leases is the present value of the lease payments, at a rate that reflects their risk, usually the pre-tax cost of debt.
- The pre-tax cost of debt at Disney is 3.75%.

<table>
<thead>
<tr>
<th>Year</th>
<th>Commitment</th>
<th>Present Value @3.75%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$507.00</td>
<td>$488.67</td>
</tr>
<tr>
<td>2</td>
<td>$422.00</td>
<td>$392.05</td>
</tr>
<tr>
<td>3</td>
<td>$342.00</td>
<td>$306.24</td>
</tr>
<tr>
<td>4</td>
<td>$272.00</td>
<td>$234.76</td>
</tr>
<tr>
<td>5</td>
<td>$217.00</td>
<td>$180.52</td>
</tr>
<tr>
<td>6-10</td>
<td>$356.80</td>
<td>$1,330.69</td>
</tr>
</tbody>
</table>

Debt value of leases = $2,932.93 + $2,933 = $15,961 million

Disney reported $1,784 million in commitments after year 5. Given that their average commitment over the first 5 years, we assume they are all $356.8 million each.
Application Test: Estimating Market Value

- Estimate the
  - Market value of equity at your firm and Book Value of equity
  - Market value of debt and book value of debt (If you cannot find the average maturity of your debt, use 3 years): Remember to capitalize the value of operating leases and add them on to both the book value and the market value of debt.

- Estimate the
  - Weights for equity and debt based upon market value
  - Weights for equity and debt based upon book value
Current Cost of Capital: Disney

- **Equity**
  - Cost of Equity = Riskfree rate + Beta * Risk Premium
    = 2.75% + 1.0013 (5.76%) = 8.52%
  - Market Value of Equity = $121,878 million
  - Equity/(Debt+Equity) = 88.42%

- **Debt**
  - After-tax Cost of debt = (Riskfree rate + Default Spread) (1-t)
    = (2.75%+1%) (1-.361) = 2.40%
  - Market Value of Debt = $13,028+ $2933 = $ 15,961 million
  - Debt/(Debt +Equity) = 11.58%

- **Cost of Capital = 8.52%(.8842)+ 2.40%(.1158) = 7.81%

\[
\frac{121,878}{121,878+15,961}
\]
# Divisional Costs of Capital: Disney and Vale

## Disney

<table>
<thead>
<tr>
<th>Business</th>
<th>Cost of equity</th>
<th>Cost of debt</th>
<th>Marginal tax rate</th>
<th>After-tax cost of debt</th>
<th>Debt ratio</th>
<th>Cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media Networks</td>
<td>9.07%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>9.12%</td>
<td>8.46%</td>
</tr>
<tr>
<td>Parks &amp; Resorts</td>
<td>7.09%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>10.24%</td>
<td>6.61%</td>
</tr>
<tr>
<td>Studio Entertainment</td>
<td>9.92%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>17.16%</td>
<td>8.63%</td>
</tr>
<tr>
<td>Consumer Products</td>
<td>9.55%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>53.94%</td>
<td>5.69%</td>
</tr>
<tr>
<td>Interactive</td>
<td>11.65%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>29.11%</td>
<td>8.96%</td>
</tr>
<tr>
<td>Disney Operations</td>
<td>8.52%</td>
<td>3.75%</td>
<td>36.10%</td>
<td>2.40%</td>
<td>11.58%</td>
<td>7.81%</td>
</tr>
</tbody>
</table>

## Vale

<table>
<thead>
<tr>
<th>Business</th>
<th>Cost of equity</th>
<th>After-tax cost of debt</th>
<th>Debt ratio</th>
<th>Cost of capital (in US$)</th>
<th>Cost of capital (in $R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metals &amp; Mining</td>
<td>11.35%</td>
<td>2.67%</td>
<td>35.48%</td>
<td>8.27%</td>
<td>15.70%</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>11.13%</td>
<td>2.67%</td>
<td>35.48%</td>
<td>8.13%</td>
<td>15.55%</td>
</tr>
<tr>
<td>Fertilizers</td>
<td>12.70%</td>
<td>2.67%</td>
<td>35.48%</td>
<td>9.14%</td>
<td>16.63%</td>
</tr>
<tr>
<td>Logistics</td>
<td>10.29%</td>
<td>2.67%</td>
<td>35.48%</td>
<td>7.59%</td>
<td>14.97%</td>
</tr>
<tr>
<td>Vale Operations</td>
<td>11.23%</td>
<td>2.67%</td>
<td>35.48%</td>
<td>8.20%</td>
<td>15.62%</td>
</tr>
</tbody>
</table>
Costs of Capital: Tata Motors, Baidu and Bookscape

- To estimate the costs of capital for Tata Motors in Indian rupees:
  
  \[
  \text{Cost of capital} = 14.49\% \times (1-0.2928) + 6.50\% \times 0.2928 = 12.15\%
  \]

- For Baidu, we follow the same path to estimate a cost of equity in Chinese RMB:
  
  \[
  \text{Cost of capital} = 12.91\% \times (1-0.0523) + 3.45\% \times 0.0523 = 12.42\%
  \]

- For Bookscape, the cost of capital is different depending on whether you look at market or total beta:

<table>
<thead>
<tr>
<th></th>
<th>Cost of equity</th>
<th>Pre-tax Cost of debt</th>
<th>After-tax cost of debt</th>
<th>D/(D+E)</th>
<th>Cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Beta</td>
<td>7.46%</td>
<td>4.05%</td>
<td>2.43%</td>
<td>17.63%</td>
<td>6.57%</td>
</tr>
<tr>
<td>Total Beta</td>
<td>11.98%</td>
<td>4.05%</td>
<td>2.43%</td>
<td>17.63%</td>
<td>10.30%</td>
</tr>
</tbody>
</table>
Application Test: Estimating Cost of Capital

- Using the bottom-up unlevered beta that you computed for your firm, and the values of debt and equity you have estimated for your firm, estimate a bottom-up levered beta and cost of equity for your firm.

- Based upon the costs of equity and debt that you have estimated, and the weights for each, estimate the cost of capital for your firm.

- How different would your cost of capital have been, if you used book value weights?
Choosing a Hurdle Rate

- Either the cost of equity or the cost of capital can be used as a hurdle rate, depending upon whether the returns measured are to equity investors or to all claimholders on the firm (capital).
- If returns are measured to equity investors, the appropriate hurdle rate is the cost of equity.
- If returns are measured to capital (or the firm), the appropriate hurdle rate is the cost of capital.
Back to First Principles

Maximize the value of the business (firm)

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

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

- **The optimal mix** of debt and equity maximizes firm value.
- **The right kind of debt** matches the tenor of your assets.

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

- **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.
Task
Estimate a cost of capital for your company (and its businesses)