ESTIMATING HURDLE RATES I: DEFINING & MEASURING RISK

Risk = Danger + Opportunity
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 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 Dividend Decision**
  - If you cannot find investments that make your minimum acceptable rate, return the cash to owners of your business
  - 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 on whether they prefer dividends or buybacks

The return should reflect the magnitude and the timing of the cashflows, as well as all side effects.
The notion of a benchmark

- Since financial resources are finite, there is a hurdle that projects have to cross before being deemed acceptable.
- This hurdle will be higher for riskier projects than for safer projects.
- A simple representation of the hurdle rate is as follows:
  \[
  \text{Hurdle rate} = \text{Riskless Rate} + \text{Risk Premium}
  \]
- The two basic questions that every risk and return model in finance tries to answer are:
  - How do you measure risk?
  - How do you translate this risk measure into a risk premium?
What is Risk?

- Risk, in traditional terms, is viewed as a ‘negative’. Webster’s dictionary, for instance, defines risk as “exposing to danger or hazard”. The Chinese symbols for risk, reproduced below, give a much better description of risk:

危机

- The first symbol is the symbol for “danger”, while the second is the symbol for “opportunity”, making risk a mix of danger and opportunity. You cannot have one, without the other.

- Risk is therefore neither good nor bad. It is just a fact of life. The question that businesses have to address is therefore not whether to avoid risk but how best to incorporate it into their decision making.
Alternatives to the CAPM

Step 1: Defining Risk

The risk in an investment can be measured by the variance in actual returns around an expected return.

- Riskless Investment
- Low Risk Investment
- High Risk Investment

Step 2: Differentiating between Rewarded and Unrewarded Risk

- Risk that is specific to investment (Firm Specific)
  - Can be diversified away in a diversified portfolio
  - Each investment is a small proportion of portfolio
  - Risk averages out across investments in portfolio
  - The marginal investor is assumed to hold a “diversified” portfolio. Thus, only market risk will be rewarded and priced.

- Risk that affects all investments (Market Risk)
  - Cannot be diversified away since most assets are affected by it.

Step 3: Measuring Market Risk

- The CAPM
  - If there is no private information
  - No transactions cost
  - The optimal diversified portfolio includes every traded asset.
  - Everyone will hold this market portfolio.

  \[ \text{Market Risk} = \text{Risk added by any investment to the market portfolio} \]

- The APM
  - If there are no arbitrage opportunities
  - Then the market risk of any asset must be captured by betas relative to factors that affect all investments.

  \[ \text{Market Risk} = \text{Risk exposures of any asset to market factors} \]

- Multi-Factor Models
  - Since market risk affects most or all investments, it must come from macroeconomic factors.
  - \[ \text{Market Risk} = \text{Risk exposures of any asset to macroeconomic factors} \]

- Proxy Models
  - In an efficient market, differences in returns across long periods must be due to market risk differences.
  - Looking for variables correlated with returns should then give us proxies for this risk.

  \[ \text{Market Risk} = \text{Captured by the Proxy Variable(s)} \]

<table>
<thead>
<tr>
<th>The CAPM</th>
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<th>Multi-Factor Models</th>
<th>Proxy Models</th>
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Beta of asset relative to Market portfolio (from a regression) | Beta of asset relative to unspecified market factors (from a factor analysis) | Betas of assets relative to specified macroeconomic factors (from a regression) | Equation relating returns to proxy variables (from a regression) |
Limitations of the CAPM

1. The model makes unrealistic assumptions
2. The parameters of the model cannot be estimated precisely
   - Definition of a market index
   - Firm may have changed during the 'estimation' period'
3. The model does not work well
   - If the model is right, there should be a linear relationship between returns and betas
     the only variable that should explain returns is betas
   - The reality is that
     the relationship between betas and returns is weak
     Other variables (size, price/book value) seem to explain differences in returns better.
Why the CAPM persists...

- The CAPM, notwithstanding its many critics and limitations, has survived as the default model for risk in equity valuation and corporate finance. The alternative models that have been presented as better models (APM, Multifactor model..) have made inroads in performance evaluation but not in prospective analysis because:
  - The alternative models (which are richer) do a much better job than the CAPM in explaining past return, but their effectiveness drops off when it comes to estimating expected future returns (because the models tend to shift and change).
  - The alternative models are more complicated and require more information than the CAPM.
  - For most companies, the expected returns you get with the the alternative models is not different enough to be worth the extra trouble of estimating four additional betas.
Gauging the marginal investor: Disney in 2009
Extending the assessment of the investor base

- In all five of the publicly traded companies that we are looking at, institutions are big holders of the company’s stock.

<table>
<thead>
<tr>
<th></th>
<th>Disney</th>
<th>Deutsche Bank</th>
<th>Vale (preferred)</th>
<th>Tata Motors</th>
<th>Baidu (Class A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutions</td>
<td>70.2%</td>
<td>40.9%</td>
<td>71.2%</td>
<td>44%</td>
<td>70%</td>
</tr>
<tr>
<td>Individuals</td>
<td>21.3%</td>
<td>58.9%</td>
<td>27.8%</td>
<td>25%</td>
<td>20%</td>
</tr>
<tr>
<td>Insiders</td>
<td>7.5%</td>
<td>0.2%</td>
<td>1.0%</td>
<td>31%*</td>
<td>10%</td>
</tr>
</tbody>
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<tr>
<th>Company</th>
<th>Largest holder</th>
<th>Number of institutional investors in top ten holdings</th>
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<tr>
<td>Disney</td>
<td>Laurene Jobs (7.3%)</td>
<td>8</td>
</tr>
<tr>
<td>Deutsche Bank</td>
<td>Blackrock (4.69%)</td>
<td>10</td>
</tr>
<tr>
<td>Vale Preferred</td>
<td>Aberdeen (7.40%)</td>
<td>8</td>
</tr>
<tr>
<td>Tata Motors</td>
<td>Tata Sons (26.07%)</td>
<td>7</td>
</tr>
<tr>
<td>Baidu (Class A)</td>
<td>Capital Group (12.46%)</td>
<td>10</td>
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Application Test: Who is the marginal investor in your firm?

- Looking at the breakdown of stockholders in your firm, consider whether the marginal investor is
  - An institutional investor
  - An individual investor
  - An insider
Task
Who is the marginal investor in your firm?