SUSTAINABILITY OF EARNINGS

A Framework for Quantitative Modeling of Strategy, Risk, and Value

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Four questions

• Strategy: what’s it all about?
• What are key buckets of strategy risk to consider?
• How can one incorporate strategy risk into a company’s probabilistic risk model?
• How can one integrate strategy risk into
  — Computation of value and
  — Decisions about strategic maneuvers?
Strategy: what’s it all about?

- Strategy relates to **competitive forces**

- Schelling:
  - “Best course of action for each player depends on what the other players do”

- Buffet:
  - How wide is the “economic moat” that protects your business
Buckets of strategy risk

- Porter’s 5 forces:
  - Threat of new entrants
  - Jockeying for position among current competitors
  - Bargaining power of suppliers
  - Bargaining power of customers
  - Threat of substitute products
  - [Threat of government intervention]
Strategic forces affecting the company

- Bargaining power of suppliers
- Threat of government intervention
- Threat of substitute products
- Threat of new entrants
- Jockeying among current competitors
- Bargaining power of customers
Strategic forces affecting the company

- Suppliers
- Government
- Company
- Competitors
- Customers
Strategic forces affecting the insurance company

- Suppliers of capital and reinsurance
- Insurance company
- Distributors + policyholders
- State, federal regulators; rating agencies
- New startup competitors
Incorporating strategy risk into a company’s probabilistic risk model
Modeling

- We’d like to describe strategic forces via a mathematical model that is:
  - Probabilistic
  - Part of an enterprise-wide model of risk and economic capital
  - Interconnected with other types of risk
Proposal: model strategic forces as random variables
Example: significant new competitor = Bernoulli trial

<table>
<thead>
<tr>
<th>Probability</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>p</td>
<td>Success</td>
<td>Significant new competitor does not enter the business</td>
</tr>
<tr>
<td>1-p</td>
<td>Failure</td>
<td>Significant new competitor does enter the business</td>
</tr>
</tbody>
</table>
Probability models for other types of risk ought to be interconnected with modeling of strategic forces.

Example: if a significant new competitor enters the field, then

- Profit decreases
- Company takes on more insurance exposure to maintain revenues
- Mean and variability of the company’s loss distribution will shift
Modeling

![Graph showing Probability Density Function of Company Earnings for two scenarios: #1: No New Entrant and #2: Significant New Entrant.](Image)
Measuring how strategy risk affects value

Maximizing value via strategic maneuvers
• Panning’s rule: ERM must connect risk to value

• Panning’s model:

\[
Value = \frac{Earnings \times Probability \ of \ Sustainability \times Discount \ Factor}{1 - Growth \ Factor \times Probability \ of \ Sustainability \times Discount \ Factor}
\]

\[
Value = Earnings \times \frac{p \times DF}{1 - GF \times p \times DF}
\]
### Strategy risk affects value

- Estimated probability of strategic success (sustainability of earnings)
- Quantitative reflection of the differences in the companies’ “economic moats”

<table>
<thead>
<tr>
<th></th>
<th>Company A</th>
<th>Company B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E = expected earnings</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>r</td>
<td>10%</td>
</tr>
<tr>
<td>3</td>
<td>DF = 1/(1+r)</td>
<td>91%</td>
</tr>
<tr>
<td>4</td>
<td>g = growth rate</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>GF = 1+g</td>
<td>1.05</td>
</tr>
<tr>
<td>6</td>
<td>p</td>
<td>96%</td>
</tr>
<tr>
<td>7</td>
<td>1-p</td>
<td>4%</td>
</tr>
<tr>
<td>8</td>
<td>Value</td>
<td>1,043</td>
</tr>
<tr>
<td>9</td>
<td>P/E multiple</td>
<td>10.4</td>
</tr>
</tbody>
</table>

**Notes**

1. (8) = (1) * (6) * (3) / (1 - (5) * (6) * (3))
2. (9) = (8) / (1)
### Strategic maneuvers

**Company considers spending on a new strategic maneuver to improve competitive position**

**Estimated impact of strategic maneuver on the probability of sustainability**

**Calculations suggest that the new expenditure should increase the value of the company**

<table>
<thead>
<tr>
<th></th>
<th>Company A: Initial Position</th>
<th>Company A, after spending on Strategic Maneuver</th>
</tr>
</thead>
<tbody>
<tr>
<td>E = expected earnings</td>
<td>100</td>
<td>84</td>
</tr>
<tr>
<td>r</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>DF = 1/(1+r)</td>
<td>91%</td>
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<td>1.05</td>
<td>1.05</td>
</tr>
<tr>
<td>p</td>
<td>96.00%</td>
<td>98.46%</td>
</tr>
<tr>
<td>1-p</td>
<td>4.0%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Value</td>
<td>1,043</td>
<td>1,250</td>
</tr>
<tr>
<td>P/E multiple</td>
<td>10.4</td>
<td>14.9</td>
</tr>
</tbody>
</table>

**Notes**

\[(8) = (1) \times \{ (6) \times (3) \} / \{1 - (5) \times (6) \times (3) \} \]

\[(9) = (8) / (1) \]
Summary

- Strategy is about competitive forces
- Incorporate strategy risk as a random variable in the company’s economic capital model
- Strategy risk relates to the company’s sustainability of earnings
  - Quantify and incorporate into value to distinguish between businesses
  - Quantify and incorporate into value to decide among strategic choices
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