Valuation - And Funding - Real Options
Scenarios and Strategies

:: Businesses and ideas are not (just) a sequence of (risky) cash flows

:: Businesses are a series of strategic decisions
   :: (that generate cash flows)

:: Example:
   :: What is the difference between research and development?

   :: Why did Uber not simultaneously launch in every US city?

   :: Amazon happened to get very good at selling books, ... then what
Definition of “Strategy”

:: Businesses and ideas are not (just) a sequence of (risky) cash flows

:: Businesses are a series of strategic decisions

:: Strategy
  = Mapping from future information to action

\[ \text{Action}_{t+1} = \text{function\ of\ information\ at\ } t+1 \]
Recall Valuation: Scenario-Based Valuation

:: Expected cash flows are hard to model directly
  :: $E[\tilde{c}_t]$ 

:: Expected cash flows CONDITIONAL on a scenario are easier to model
  :: $E[\tilde{c}_t|x]$ 

:: Expected cash flows and value is done in two steps
  :: $E[\tilde{c}_t] = \sum_x \text{prob}(x) E[\tilde{c}_t|x]$
Recall Valuation: Scenario-Based Valuation

Where is [the biggest amount of] the uncertainty?

\[ V(x) \]

will be learned here
Recall Valuation: Scenario-Based Valuation

:: Why model scenarios....
   :: “Easy” to aggregate into an overall NPV
      :: Probability weighted sum
   :: Makes the modeling more comprehensible
   :: Highlights why and how the project is risky
      :: What are you betting on?
   :: How can you manage the risk?
   :: Highlights what you want to incentivize

:: Identifies key future decisions (strategies)
At a start up - Strategic Flexibility

:: The Key – How and when does uncertainty resolve?

<table>
<thead>
<tr>
<th>0</th>
<th>3 to 7 years</th>
<th>T</th>
<th>3 to 10 years</th>
<th>S</th>
<th>In perpetuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Period</td>
<td>Rapid-Growth Period</td>
<td>Stable-Growth Period</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WHEN
WITH
IT = YOU
LEARN

7
At a start up - Strategic Flexibility - Four Examples
At a start up - Strategic Flexibility - Info resolution

Discount rate: 0% (easy) \( V_T \) are scenario values as of year 2

:: Choose:

:: NO staging – Invest 9.5 today
:: Staging – invest 4.75 today; invest 4.75 in one year

\[
\begin{align*}
\text{Case 1} & \\
V_T & \\
\text{E}[V_{T+j}] & \\
+32 & \cdot 0.25 = 10 \\
-32 & \cdot 0.25 = 9.5 \\
8 & \cdot 0.25 = 2 \\
-8 & \cdot 0.25 = -2
\end{align*}
\]
STAGED INVESTMENT

INVEST?

$V = 0.5(32) + 0.5(0)$

$K = 4.75$

$NPV = 11.25$

$32$

$0$

$11.25$

$0$

$0$

$K = 4.75$

$NPV = -0.75$

$0.5(11.25) + 0.5(0) = 5.625$

$K = 4.75$

$NPV = 0.875$

NO!
At a start up - Strategic Flexibility - Info resolution

Discount rate: 0% (easy). $V_T$ are scenario values as of year 2

:: Choose:

:: NO staging – Invest 9.5 today
:: Staging – invest 4.75 today; invest 4.75 in one year

<table>
<thead>
<tr>
<th>Case 2</th>
<th>$V_T$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+50</td>
</tr>
<tr>
<td></td>
<td>+30</td>
</tr>
<tr>
<td></td>
<td>-30</td>
</tr>
<tr>
<td></td>
<td>-50</td>
</tr>
</tbody>
</table>
At a start up - Strategic Flexibility - Info resolution

Discount rate: 0% (easy). $V_T$ are scenario values as of year 2

Choose:

- NO staging – Invest 9.5 today
- Staging – invest 4.75 today; invest 4.75 in one year

Case 3

$V_T$

\[ \begin{align*}
\bar{V} &= 10 \\
\text{cost} &= 4.75 \\
\bar{V} &= 9.25
\end{align*} \]
At a start up - Strategic Flexibility - Info resolution

Discount rate: 0% (easy). $V_T$ are scenario values as of year 2

Choose:

- NO staging – Invest 9.5 today
- Staging – invest 4.75 today; invest 4.75 in one year

Case 4

| $V_T$ |   
|-------|---
|       | +22
|       | -22
|       | +18
|       | -18
At a start up - Strategic Flexibility - Info resolution

Discount rate: 0% (easy). $V_T$ are scenario values as of year 2

:: Choose:

:: NO staging – Invest 9.5 today
:: Staging – invest 4.75 today; invest 4.75 in one year

<table>
<thead>
<tr>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_T$</td>
<td>$V_T$</td>
<td>$V_T$</td>
<td>$V_T$</td>
</tr>
<tr>
<td>+32</td>
<td>+50</td>
<td>+20</td>
<td>+22</td>
</tr>
<tr>
<td>-32</td>
<td>+30</td>
<td>-20</td>
<td>-22</td>
</tr>
<tr>
<td>8</td>
<td>-30</td>
<td>+20</td>
<td>+18</td>
</tr>
<tr>
<td>-8</td>
<td>-50</td>
<td>-20</td>
<td>-18</td>
</tr>
</tbody>
</table>
At a start up - Strategic Flexibility - and funding

:: Why do VC’s stage the funding?

:: What is the advantage of staging the funding?

:: What is the cost of staging the funding?
In general - Strategic Flexibility

:: Examples of Strategic Flexibility ("real options")

:: Postpone (timing)

:: Increase / decrease project scale

:: Cross-selling

:: Flexible inputs

:: Flexible outputs
In general - Strategic Flexibility

:: In general
  :: Flexibility and options increase value

:: Cautions
  :: Is your strategy feasible?
  :: Organizations are less flexible than you might think
  :: Competition
In “high risk” setting the strategic flexibility (being able to shut down) is important.

Flexibility is only helpful at points where large amounts of uncertainty resolve.

VC funding is often staged to “impose” the optimal strategy.