First Principles

- Value is a function of cash, time and risk
- Both cash and risk may be managed
  - Selection of opportunity & strategy
  - Management and their incentives
  - Contractual terms
- Challenge of valuation: incomplete information
  - Costly and difficult to acquire
  - Players have different information
Techniques

- Discounted cash flow
- Scenario analysis (multi DCF)
- Multistage analysis (decision tree or real options analysis)
- “Venture Capital” method
Venture Capital Method

Steps:

1. Forecast future results ("success")
2. Determine likely value at that point (e.g. P/E ratio for comparable)
3. Determine likely dilution from: (a) capital and (b) employee stock
4. Determine share of value "pie" demanded given required rates of return
5. Convert future values to present to derive share prices, ownership percentages
Step 1: Forecast Results

- What’s a reasonable forecast?
- Upside case--what can go right?
- Over what period of time?
Step 2: Future Value

- What’s comparable?
  - Markets
  - Growth rates
  - Business model
  - Asset intensity
  - Cash flow characteristic

- Metrics
  - P/E ratio
  - Price-per-subscriber
  - Price-to-sales
  - Price-to-cash-flow
  - Cap rate
Step 3: Dilution

- How much capital? When?
- New shares for employees? When?
- Other potential issuances of stock (e.g. acquisition)
Step 4: Value “Pie”

- Required rate of return for investors, dependent on:
  - Risk free rate
  - Premium for market risk
  - Premium for illiquidity
  - Premium for value-added (compensation)

- Estimate using past experience (apply “fudge factor”)
VC Discount Rates

- Seed stage: 80% +
- Startup: 50-70%
- First-Stage: 40-60%
- Second-Stage: 30-50%
- Bridge/Mezzanine: 20-35%
- Public Expectations: 15-25%
Venture Capital Method

Steps:

1. Forecast future results ("success")
2. Determine likely value at that point (e.g. P/E ratio for comparable)
3. Determine likely dilution from: (a) capital and (b) employee stock
4. Determine share of value “pie” demanded given required rates of return
5. Convert future values to present to derive share prices, ownership percentages
Step 6: THINK!

- Consider other factors affecting price
- Competitive pressure in deal
- Buyer: possible synergies
- Seller: forgoing control

- Is this (generally) realistic?
- Use estimates to make plan
- Signal capabilities to investors, customers, etc.

- Does it make sense ???

- Do it make sense ???
Common Patterns

- Achieve plan, but two years later
- Achieve plan, but requires twice as much money
- More shares required for management
- Lower margins due to competition
- Exit windows
Typical VC Questions

- What if we use a different discount rate?
- What if terminal value is different?
- What if performance varies from plan? (timing? magnitude and financial need?)
- What if more shares are issued for management or other reasons?
- What if we’re confronted with a different asking valuation or share price?
Different Questions

- What are the logical implications of a given value level
  - What level of net income is required in year 5 for investor to receive target return?
  - What level of sales is required?
- Questions re:
  - industry structure
  - sustainability
  - exit multiples and options
When to Use What?

- How good are forecasts?
- How good are comparables?
- Highly risky investments/no substantive operating results for significant periods of time: VC METHOD
- Less explosive growth/predictable flows: DCF
• Part ART
• Part SCIENCE!
Also Remember...

- Venture capitalists don’t get rich by cutting tough deals
- Entrepreneurs don’t get rich by taking highest offers
- Don’t miss the forest for the trees! (sensitivity analysis)
Equity Concepts
Capitalization ("Cap Tables")

- Common shares
- Employee stock options (option pool)
- Preferred shares (various series)
- Warrants (on common or preferred)
## Cap Table Example

### Capitalization Structure

<table>
<thead>
<tr>
<th></th>
<th>Founding</th>
<th>Series A</th>
<th>Series B</th>
<th>Series C</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premoney Valuation</td>
<td>$6.5</td>
<td>$35.0</td>
<td>$100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invested Capital</td>
<td>$6.5</td>
<td>$8.5</td>
<td>$9.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postmoney Valuation</td>
<td>$13.0</td>
<td>$43.5</td>
<td>$109.0</td>
<td>$450.0</td>
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</tbody>
</table>

### Post Financing Ownership Levels

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Founding</th>
<th>Series A</th>
<th>Series B</th>
<th>Series C</th>
<th>Exit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Founders</td>
<td>100.0%</td>
<td>35.0%</td>
<td>27.0%</td>
<td>24.3%</td>
<td>19.5%</td>
</tr>
<tr>
<td>Employees</td>
<td>15.0%</td>
<td>15.0%</td>
<td>15.0%</td>
<td></td>
<td>12.0%</td>
</tr>
<tr>
<td>Series A Preferred</td>
<td>50.0%</td>
<td>38.5%</td>
<td>34.8%</td>
<td>27.8%</td>
<td></td>
</tr>
<tr>
<td>Series B Preferred</td>
<td>19.5%</td>
<td>17.6%</td>
<td></td>
<td>14.1%</td>
<td></td>
</tr>
<tr>
<td>Series C Preferred</td>
<td></td>
<td></td>
<td></td>
<td>8.3%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Public Market</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20.0%</td>
</tr>
<tr>
<td>Total Ownership</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

### Projected Investor Return

<table>
<thead>
<tr>
<th></th>
<th>Series A</th>
<th>Series B</th>
<th>Series C</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years until Exit</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Invested Capital</td>
<td>$6.5</td>
<td>$8.5</td>
<td>$9.0</td>
<td>$24.0</td>
</tr>
<tr>
<td>Invested Capital Value upon Exit</td>
<td>$125.2</td>
<td>$63.5</td>
<td>$29.7</td>
<td>$218.4</td>
</tr>
<tr>
<td>IRR</td>
<td>80.7%</td>
<td>65.3%</td>
<td>48.9%</td>
<td>72.1%</td>
</tr>
</tbody>
</table>


Important Concepts

- What constitutes company ownership?
- How does ownership change over time?
- Roles of Company Board
- Authorized vs issued / granted vs vested
- Authorizing new series of preferred
- “Printing stock” (new stock) for employees

- “Fully diluted” ownership
- “Treasury method” for share accounting
- Stock option expensing debate
- Vested vs unvested stock (restricted stock)
Equity Compensation
Employee Stock Pools

- Stock options (ISOs & NSOs) vs common stock
- “4 yr vesting with 1 yr cliff”
- What’s enough?
- Stock grants per year (public co)
- Stock grants per year (startups)
# Ranges of Grants

<table>
<thead>
<tr>
<th>Position</th>
<th>Pre-Rev</th>
<th>Post-Rev</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>5-10%</td>
<td>3-8%</td>
</tr>
<tr>
<td>VP Engineering</td>
<td>3-5%</td>
<td>1-3%</td>
</tr>
<tr>
<td>VP Marketing</td>
<td>3-5%</td>
<td>1-3%</td>
</tr>
<tr>
<td>VP Sales</td>
<td>1-2%</td>
<td>1%</td>
</tr>
<tr>
<td>CFO</td>
<td>2-3%</td>
<td>1-2%</td>
</tr>
<tr>
<td>Other VPs</td>
<td>1-2%</td>
<td>1%</td>
</tr>
<tr>
<td>Key Individuals</td>
<td>0.5-2%</td>
<td>0.3-1%</td>
</tr>
</tbody>
</table>
Stock Comp Philosophy

- Skew to key performers
- Egalitarian
- Replacement cost
- Vesting policies
- "Outsider" stock holdings
Team Formation
Team Assignments
Homework Review