Lecture 12

Special cases in valuation: valuing high growth, distressed, private companies, companies in emerging markets, and banks
Takeaways from the visiting lecture
Special cases of valuation

- Valuing stable, money making companies with consistent and clear accounting statements, a long and stable history and lots of comparable firms is relatively easy (albeit tedious)
- The acid test of your valuation skills is when you have to value “difficult” companies:
  - Young companies early in the life cycle (such as gaming companies)
  - Companies in distress
  - Private companies with limited data and peers
  - Emerging market companies
  - Banks
Today we will cover the following cases of valuation

1. Young, high growth companies
2. Companies in distress
3. Private companies
4. Emerging market companies
5. Banks (scratching the surface)
### Problem with young, high growth companies

- High growth likely at the beginning, but will eventually slow down
- No historical accounting data for reliable revenue forecasts and forecast ratios
- New or niche business with no hard quantitative data on value drivers

### Solution in valuation

- Use growth stages in valuation
- Create future scenarios yourself rather than making linear growth forecasts
- Use multiples based on real data which are linked to future profitability (e.g., # of registered customers, clicks)
- Talk to experts to get a feel for growth expectations
Growth staging important especially in case of young, high-growth companies

<table>
<thead>
<tr>
<th>Firm type</th>
<th>Firm characteristics</th>
<th>Recommended growth model</th>
</tr>
</thead>
</table>
| Large and established            | • Growing at or lower than GDP growth rate  
                                        • Constrained by regulation and customer demand | • Stable growth                        |
| Large and growing moderately     | • Established, but growing beyond GDP growth rate  
                                        • Barriers of entry, not constrained by regulation or customer demand yet | • 2-stage growth                      |
| Small and growing very fast      | • Large barriers of entry (patent, commercialized innovation, customers on established platform)  
                                        • Redefines a customer need, product, or service | • 3 (or more) -stage growth            |
| Small and not growing            | • Innovation, but with little commercial value                                         | • None, most startups will never grow  |
Future scenarios – pharmaceuticals example

Steps in valuation

<table>
<thead>
<tr>
<th>Question to answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>How large is the total market for target groups?</td>
</tr>
<tr>
<td>How much can the product capture of the total market?</td>
</tr>
<tr>
<td>How long will the product be in the market generating licensing revenues?</td>
</tr>
<tr>
<td>How much spend is required to capture market share in each market and product?</td>
</tr>
<tr>
<td>Given all these assumptions, what is the range for company valuation?</td>
</tr>
</tbody>
</table>
No magic in valuation – two or more stage growth models use the same formulas

Firm value = \[ \sum_{t=1}^{n} \frac{FCFF_t}{(1 + WACC)^t} + \frac{FCFF_{n+1}}{(WACC - g)} \frac{1}{(1 + WACC)^n} \]

Equity value = \[ \sum_{t = 1}^{n} \frac{FCFE_t}{(1 + r)^t} + \frac{FCFE_{n+1}}{(r - g)} \frac{1}{(1 + r)^n} \]

Growth stages will impact your:
- Cash flows
- Discount rate (mature companies have betas closer to 1)
Simple example: two-stage model assumptions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current sales per share</td>
<td>€10</td>
</tr>
<tr>
<td>Sales growth for first three years</td>
<td>20%</td>
</tr>
<tr>
<td>Sales growth for year 4 and thereafter</td>
<td>5%</td>
</tr>
<tr>
<td>Net income margin</td>
<td>10%</td>
</tr>
<tr>
<td>Change in capex/sales growth</td>
<td>40%</td>
</tr>
<tr>
<td>Change in NWC/sales growth</td>
<td>25%</td>
</tr>
<tr>
<td>Debt / (debt + equity) ratio</td>
<td>30%</td>
</tr>
<tr>
<td>Required return on equity</td>
<td>12%</td>
</tr>
<tr>
<td>Terminal growth</td>
<td>2%</td>
</tr>
</tbody>
</table>
Example: two-stage model FCFE in year 1

<table>
<thead>
<tr>
<th>FCFE&lt;sub&gt;1&lt;/sub&gt;</th>
<th>(Sales x Net income margin) – Change in capex – change in NWC + debt issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCFE&lt;sub&gt;1&lt;/sub&gt;</td>
<td>€12 x 10% - (€2x40%) – (€2x25%) + (€2 x 65% x 30%)</td>
</tr>
<tr>
<td>FCFE&lt;sub&gt;1&lt;/sub&gt;</td>
<td>€1.2 - €0.8 - €0.5 + €0.39</td>
</tr>
<tr>
<td>FCFE&lt;sub&gt;1&lt;/sub&gt;</td>
<td>€0.29</td>
</tr>
</tbody>
</table>
Example: two-stage model predictions

<table>
<thead>
<tr>
<th></th>
<th>Year</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Sales growth in %</td>
<td>20%</td>
<td>20%</td>
<td>20%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Sales per share</td>
<td>€12.00</td>
<td>€14.40</td>
<td>€17.28</td>
<td>€18.14</td>
<td>€19.05</td>
</tr>
<tr>
<td>EPS</td>
<td>€1.20</td>
<td>€1.44</td>
<td>€1.73</td>
<td>€1.81</td>
<td>€1.91</td>
</tr>
<tr>
<td>Change in capex per share</td>
<td>€0.80</td>
<td>€0.96</td>
<td>€1.15</td>
<td>€0.35</td>
<td>€0.36</td>
</tr>
<tr>
<td>Change in NWC per share</td>
<td>€0.50</td>
<td>€0.60</td>
<td>€0.72</td>
<td>€0.22</td>
<td>€0.23</td>
</tr>
<tr>
<td>Debt issued per share</td>
<td>€0.39</td>
<td>€0.49</td>
<td>€0.56</td>
<td>€0.17</td>
<td>€0.18</td>
</tr>
<tr>
<td>FCFE per share</td>
<td>€0.29</td>
<td>€0.35</td>
<td>€0.42</td>
<td>€1.42</td>
<td>€1.49</td>
</tr>
</tbody>
</table>
Example: two-stage model value

Equity value = \sum \frac{FCFE_t}{(1+r)^t} + \frac{FCFE_{n1}}{(r-g)} \frac{1}{(1+r)^t}

\[
\text{Equity value} = \frac{€0.29}{1.12^1} + \frac{€0.35}{1.12^2} + \frac{€0.42}{1.12^3} + \frac{€1.42}{1.12^4} + \frac{€1.49}{1.12^5} + \frac{€1.49 \times 1.02}{(0.12-0.02)(1+0.12)^5} \\
\text{Stage 1} \quad \text{Stage 2} \quad \text{Stable growth}
\]

Equity value = €11.21
Distress haunts every firm

Potential distress
- All firms are subject to potential distress
- Firms in declining industries, bad management decisions or simply bad luck will eventually end up in distress

Realized distress
- Firms already in distress may be worth less than their outstanding debt
- Their equity still retains value: perhaps the firm will be bought out, it will be turned around, or there will be an equity bail-out
Dealing with potential distress: scenario approach

- Discounted cash flow analysis, no matter of the cash flows discounted, assumes that the firm will operate as **going concern**
- Estimate the cumulative **probability of distress**, say 10 years:
  - Bond ratings
  - Altman’s z-score
  - Bond spread over risk-free rate
- **Compute liquidation value (LV) of the firm**: 
  - Cash and marketable securities at 100%
  - Receivables at 75-80% (Ben Graham)
  - Inventory at 50%, 0% or even negative if perishable like food
  - Operating assets: even above book value for real estate, 20-50% for other assets depending on resale value (remember Storage Wars, anyone?)
- Compute value of equity as: 
  \[
  P(\text{distress}) \times \text{MAX}(0, \text{LV} - \text{Debt}) + (1 - P(\text{Distress})) \times \text{Value of firm without distress}
  \]
  Distress scenario  No distress scenario
Distress example: Las Vegas Sands

- In February 2009, LVS had B+ by S&P
  - Historically, 28.25% of B+ rated bonds default in 10 years
  - LVS has a 6.375% bond, maturing in February 2015 (7 years), trading at $529:
    \[
    529 = \sum_{t=1}^{10} \frac{63.75(1 - \Pi_{\text{Distress}})^t}{(1.03)^t} + \frac{1000(1 - \Pi_{\text{Distress}})^7}{(1.03)^7}
    \]
    - $\Pi_{\text{Distress}}$ = Annual probability of bond default = 13.54%
    - Cumulative probability of surviving 10 years = (1 - 0.1354)10 = 23.34%
    - Cumulative probability of distress over 10 years = 1 - 0.2334 = 76.67%

- If LVS is becomes distressed:
  - Expected distress sale proceeds < Face value of debt
  - Expected equity value/share = $0.00

- Expected value per share = $8.12(1 - 0.7667) + $0.00(0.7666) = $1.92

1 Assume this value per share comes from the DCF which assumes (optimistically) the firm to survive
Source: Aswath Damodaran
Equity is an option

• The equity in a firm is a residual claim: equity holders can walk into the boardroom, pay back all liabilities and its their firm

• If a firm is liquidated, the same principle applies. Equity holders cannot ever be forced to contribute additional capital

• This sounds like an American call option: it gives the owner right to purchase an asset (the firm) at strike price (total value of liabilities)

• Consider a firm worth €100 million, net debt face value €80 million. Suppose the enterprise (equity plus debt) value suddenly drops to €60 million due to worsening revenue and margin expectations. Is the firm equity worth now:
  a. Negative – net debt is more than firm value
  b. Zero
  c. Positive

• Please submit answers through presemo.aalto.fi/valuation12
Value of equity in distress: SAS

- Value of interest-bearing liabilities at the end of 2012: 3.1 bn SEK
- FCFF value of SAS on January 2014: 2.2 bn SEK (instructor’s analysis)
- It does not look as if SAS would be generating a lot of FCFE in near future
- How is it possible for equity to have a positive value?
Valuing equity as a (out of the money) call option

- To get equity value as call option, use Black and Scholes with following parameters:
  - $S =$ current value of the firm (equity + debt)
  - $X =$ value of interest-bearing liabilities (debt)
  - $\sigma =$ volatility of firm value (equity plus debt)
  - $r =$ risk-free rate
  - $t =$ weighted average duration of interest-bearing debt
Going to private company valuation is like becoming a mime after being an actor

**Actor**
- Everything is set up
- Market value for show is available from ticket sales

**Mime**
- Need to improvise
- No or only noisy market value available for show

- Nothing fundamentally different: discount cash flows to firm or equity
- Two problems:
  - Bad data
  - No observable market value
Since valuation is more art than science, let’s work through a hypothetical example

- Your friend owns a taxi operator with four drivers in Helsinki. He has been approached by an outside investor willing to purchase the entire company.
- The company has been doing rather well because of municipality-paid business and regular customers.
- The company makes 600,000 EUR in revenues (net VAT) per year with 200,000 EUR operating profit.
- The company has no debt, but it leases five cars with 10-year commitment of 60,000 per annum.

<table>
<thead>
<tr>
<th>EUR</th>
<th>Last year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>600,000</td>
<td></td>
</tr>
<tr>
<td>- Operating lease expense</td>
<td>60,000</td>
<td>10 year lease</td>
</tr>
<tr>
<td>- Wages</td>
<td>150,000</td>
<td>Wages and employer expenses</td>
</tr>
<tr>
<td>- Material</td>
<td>100,000</td>
<td>Gasoline</td>
</tr>
<tr>
<td>- Other operating expenses</td>
<td>90,000</td>
<td>Car wash, parking facilities, services</td>
</tr>
<tr>
<td>Operating income</td>
<td>200,000</td>
<td></td>
</tr>
<tr>
<td>- Taxes</td>
<td>40,000</td>
<td>(20% tax rate)</td>
</tr>
<tr>
<td>Net Income</td>
<td>160,000</td>
<td></td>
</tr>
</tbody>
</table>
Problem 1: getting beta

- Obviously there is no publicly available beta
- Use the bottom-up beta (aka Hamada correction, lecture 7):
  - Take beta for a relevant set of publicly traded peer companies
  - Unlever the beta for peer companies:
    \[ \beta_u = \frac{E}{D+E} \beta_E \]
  - Take mean/median of peer companies unlevered beta
  - Relever the beta for target company using peer group unlevered beta:
    \[ \beta_E = \frac{D+E}{E} \beta_u \]
- For the taxi company, assume we got beta of 1.5 using cruise line operators, airlines, and retailers as benchmark and finally using leverage ratio of the target company
- We assume for now that the **buyer is diversified**, so no need to add premium for the lack of diversification yet
Problem 2: Cost of debt

Coverage Ratio = Operating Income/ Interest (Lease) Expense = 200,000/ 60,000 = 3.33

Rating based on coverage ratio = BB+

Default spread = 3.25%

After-tax cost of debt = (Risk-free rate + Default spread) (1 – tax rate) = (1.5% + 3.25%) (1 - .20) = 3.80%

To compute the cost of capital, use industry average debt ratio 0.125 and equity risk premium of 4%:

Cost of capital = (1.5% + 1.5 x 4%) x 0.875 + 3.80% x 0.125 = 7.04%
Problem 3: human capital and operating lease

- Your friend no longer wants to drive the taxi, but his personal regular customers bring in 30,000 EUR of income each year
- We adjust financials accordingly and also capitalize the lease

<table>
<thead>
<tr>
<th>EUR</th>
<th>Last year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues</td>
<td>570,000</td>
<td>30,000 regular customer income removed</td>
</tr>
<tr>
<td>- Operating lease depreciation</td>
<td>46,898</td>
<td>10% * PV of lease</td>
</tr>
<tr>
<td>- Wages</td>
<td>150,000</td>
<td>Wages and employer expenses</td>
</tr>
<tr>
<td>- Material</td>
<td>95,000</td>
<td>Gasoline consumption related to regular customer income taken out</td>
</tr>
<tr>
<td>- Other operating expenses</td>
<td>90,000</td>
<td>Car wash, parking facilities, services</td>
</tr>
<tr>
<td>Operating income</td>
<td>188,102</td>
<td></td>
</tr>
<tr>
<td>- Interest payment (lease)</td>
<td>22,277</td>
<td>4.75% (pretax cost of debt) x PV of lease</td>
</tr>
<tr>
<td>- Taxes</td>
<td>33,165</td>
<td>20 %</td>
</tr>
<tr>
<td>Net Income</td>
<td>132,660</td>
<td></td>
</tr>
<tr>
<td>PV of 10 year lease @ 4.75%</td>
<td>468981</td>
<td></td>
</tr>
</tbody>
</table>
Completing the valuation

• **Inputs:**
  – Adjusted operating income (OI) 188,102
  – Tax rate = 20%
  – Cost of capital = 7.04%
  – Expected growth rate = 2%
  – Reinvestment rate = 10% (buy some computers, chairs etc.)

• **Valuation**
  
  Value of the taxi operator = Expected FCFF next year / (Cost of capital –g)
  
  = Expected OI next year (1- tax rate) (1- reinvestment rate) / (WACC – g)
  
  = 188,102 (1.02) (1-0.2) (1-.10)/ (.00704 - .02)
  
  = €1.93 million

  Value of equity = €1.93 million - €0.47 million (PV of leases) = €1.46 million

• Your friend says he received an offer of 500,000 EUR from the investor. Should he sell?
  – Lack of diversification discount?
  – Illiquidity discount?
Completing the valuation – to sell or not

• presemo.aalto.fi/valuation12
Valuing emerging market companies

- Valuation can be done in **any currency**: valuing an emerging market firm in Indonesian Rupees, Russian Roubles or Euros is fine.
- A lot of the parameters will change, but **be consistent**:  
  - Emerging-market risk-free rates are higher, but so is typically inflation.
  - Do not use high nominal growth rates from an emerging market country and then a risk-free rate from a low-inflation country (course *International Financial Management* deals with this topic).
  - Most of emerging market (or even “developed market” government bonds are not risk-free), need to strip out the default and refinancing risk from the government bond yield.
- Country risk can be included as an additional risk factor, but know the firm before mindlessly adding additional risk factor.
Three ways to strip out default risk in Euro-area

1. Find EUR sovereign bond for German (or other country which you can argue to be risk-free) and the target country (e.g., Turkey). The difference is the default spread.

2. Obtain CDS spread for your target country.

3. Look at government bond rating. Check Moody’s or S&P average default spread from benchmark bonds of same ratings class if the government is not traded or illiquid.
EUR sovereign bond default spread example

Country risk premium is a bit ad hoc, but let’s cover it anyway

- In (simple) theory, separate country risk-premiums should not exist: country risk can be diversified away
- In practice, analysts often add markups for emerging market companies for increased political risk (more about that in *International Financial Management*), currency risk, higher equity volatility etc.

- **Simplest (and least sensible) way:** get a country risk-premium and apply it without too much thought based on country of incorporation (or headquarters)
- **Simple way:** get revenue split from segment reporting and use revenue-weighted country premium
- **Bit harder way:** get operating footprint and apply country risk premium by operating footprint exposure, weighted by e.g., production volume
- **Hardest (and least pragmatic) way:** model probability of catastrophe risk and loss given occurrence. Incorporate these into cash-flow forecasts, not discount rate
## Possibilities for estimating country risk

<table>
<thead>
<tr>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>- Take the government default spread. Assume that each firm has same exposure to country risk so just add the default spread on required rate of return</td>
</tr>
<tr>
<td>- Assume that higher beta companies have higher country risk so add default spread to equity risk premium (ERP) so it will scale up with beta</td>
</tr>
<tr>
<td>- Scale ERP with relative volatility in target country vs. reference country</td>
</tr>
<tr>
<td>- Scale default spread with relative volatility of target country equity or bond index</td>
</tr>
</tbody>
</table>

**These approaches are rather unscientific, but each can be logically defended**
Six points on valuing banks

- **Banks make money on leverage.** Regulation defines how much equity per assets a bank must have (capital ratio)
- When a bank grows, its shareholders must contribute additional regulatory equity capital. Think this as capital expenditure
- FCFE = Net income – investment in regulatory capital
- **Book value matters:** as assets should be marked to market, book values are relevant provided that they can be trusted
- Valuation of banks is all about asset **quality**
  - Revenue forecasts are driven by how much their existing (and future) loan base can generate interest income less loan losses
  - When asset quality declines, banks must do write-downs. For every euro written down for a bank operating at lower bound of regulatory capital, shareholders must contribute equal amount of equity – equity is quickly wiped out especially for banks sailing “too close to wind”
- Banks can be (very roughly) split to **stock business** (lending) driven by banks own assets, **transaction (flow) business** driven by client trading transactions, and pure advisory business (such as M&A) driven by client needs
Closing thought

“We are in danger of valuing most highly those things we can measure most accurately, which means that we are often precisely wrong rather than approximately right”

—Sir John Banham Director General of the Confederation of British Industry 1987-1992,
T.HANKS!

IDEA COURTESY BY IFM CLASS OF 2014
Acknowledgements

• Lectures 1, 2, 5, 6, 10, and 12 have been inspired by (in the order of importance):
  – Aswath Damodaran (NYU) "Valuation" lecture slides
  – McKinsey & Company
  – CFA Institute Equity Asset Valuation lecture kit
  – Chunlin Liu (U of Nevada) "Corporate Valuation" lecture slides
  – Valuation 2014 student minicases