Session 10: Post Class tests

1. Cyrus Inc. is a company that operates in the entertainment software business and you are trying to estimate a beta for being just in the entertainment software business. The average regression beta across 49 entertainment software companies is 1.38, the average debt to equity ratio for these firms is 25% and cash as a percent of firm value is 20% for the firms. What is the unlevered beta of being in the entertainment software business? (You can assume a 40% marginal tax rate for all firms.)
   a. 1.20
   b. 1.50
   c. 1.44
   d. 1.00
   e. None of the above

2. Gecko Enterprises operates in two businesses: it gets $100 million in revenues from food processing and $50 million in revenues from chemicals. You have the following information on the two businesses:

<table>
<thead>
<tr>
<th></th>
<th>Unlevered Beta</th>
<th>EV/Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>0.80</td>
<td>1.25</td>
</tr>
<tr>
<td>Chemicals</td>
<td>1.20</td>
<td>1.5</td>
</tr>
</tbody>
</table>

If Gecko Enterprises has a debt to equity ratio of 66.67%, estimate the levered beta for Gecko. (Marginal tax rate is 40%)
   a. 1.40
   b. 1.31
   c. 1.33
   d. 1.20
   e. None of the above

3. Nova Inc. is an entertainment company that derives two thirds of its value from the movie business and one third from operating movie theaters. The company has no debt, no cash and a beta of 0.90. It is considering divesting itself of the movie theater business and returning the cash to stockholders. If the beta of the movie theater business is 1.00, estimate the beta for Nova after the divestiture.
   a. 0.75
   b. 0.80
   c. 0.85
   d. 0.90
   e. 1.00

4. Lavazza Coffee is a publicly traded company that sells coffee beans. It has 10 million shares outstanding, trading at $5/share, no debt or cash and has a beta of 0.75. It is considering borrowing $25 million and investing in coffee shops. If the beta of coffee shops/restaurants is 1.20, estimate the beta for Lavazza's equity after the expansion. (The marginal tax rate is 40%).
   a. 1.08
   b. 0.90
c. 1.21  
d. 1.56  
e. None of the above

5. LoMax Systems produces car alarms and has a market capitalization of $100 million, debt of $50 million and a cash balance of $25 million. It currently has a beta of 1.17. It is considering using the cash to buy back stock. Estimate the beta after the transaction.
   a. 1.080  
   b. 1.404  
   c. 1.242  
   d. 1.512  
   e. None of the above
Session 10: Post class test solutions

1. **b. 1.50:** First, unlever the average beta in the sector, using the average debt to equity ratio. Second, correct for the cash holdings of firms in the sector.
   - Unlevered beta = 1.38/(1 + (1-.4)(.25)) = 1.20
   - Unlevered beta of business = 1.20/(1-.2) = 1.50

2. **c. 1.33.** First, estimate the values of the two businesses, using the revenues from each business and the EV/Sales averages for the sectors. Then, use these values to get weights for the businesses and an unlevered beta for the company.

<table>
<thead>
<tr>
<th>Unlevered Beta</th>
<th>EV/Sales</th>
<th>Revenues</th>
<th>Estimated value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td>0.8</td>
<td>1.25</td>
<td>100</td>
</tr>
<tr>
<td>Chemicals</td>
<td>1.2</td>
<td>1.5</td>
<td>50</td>
</tr>
<tr>
<td>Company</td>
<td>0.95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   Levered beta = 0.95 (1+(1-.4) (.6667)) = 1.33

3. **c. 0.85.** The current beta (which is also the unlevered beta, because the firm has no debt) is a weighted average of the betas of the two businesses the firm is in:
   - Beta of movies (2/3) + 1.00 (1/3) = 0.90
   - Beta of movies = (0.90- (1/3))/(2/3) = 0.85

4. **e. None of the above.** The unlevered beta for the company after the expansion will be a weighted average of two businesses, its current business with a value of $50 million and an unlevered beta of 0.75 and its new business with a value of $25 million and an unlevered beta of 1.20:
   - Unlevered beta = 0.75 (50.75) + 1.20 (25/75) = 0.90
   - The debt to equity ratio after the transaction will be 33.33% ($25 million in new debt on top of $50 million in existing equity).
   - Levered beta = 0.90 (1+(1-.4) (25/50)) = 1.17

5. **d. 1.512.** The first step is to estimate the unlevered beta of the business that the company currently is in. To do this, you first unlever the beta:
   - Unlevered beta of company = 1.17/(1+ (1-.40) (50/100)) = 0.90
   - Then, you take out the effect of cash ($25 million out of firm value of $150 million).
   - Unlevered beta of business = 0.90 / (1- 25/150) = 1.08
   - After the cash is used to buy back stock, the value of equity will go down to $75 and the debt to equity ratio will rise to 66.67% (50/75):
   - Levered beta = 1.08 (1+ (1-.4) (50/75)) = 1.512