Session 10a: 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.

	Unlevered Beta	EV/Sales	Revenues	Estimated value	Weights
Food	0.8	1.25	100	125	0.625
Chemicals	1.2	1.5	50	75	0.375
Company	0.95			200	

   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