Lecture 10: Supplementary Exercise

1) The Cost of Underpricing. If equity can be mispriced, then sometimes managers will optimally choose not to issue equity and fund a project because the equity is too mispriced. We examined one such example in Lecture 10. By changing the numbers (assets in place or the value of the NPV), you can develop some intuition for the types of firm for whom this problem will be most sever. Downloading the companion spreadsheet will help you with the answers.

A) Steps for calculating value of old equity holders wealth.

1) Calculate the fraction of the firm which must be sold to raise the required capital investment ($100). Assume that the firm issues equity and invests in the positive NPV project in both states. We will check this assumption below.
2) Calculate the wealth of old and new shareholders in the 2 states
3) By comparing the wealth of old shareholders if they issue equity and invest or if they do nothing, decide in which states the manager's of the firm should sell equity and invest in the project. Manager's should choose to issue equity when the NPV of the project on its own (i.e. assuming capital structure is irrelevant) plus the NPV of financing is positive.
4) Check whether our assumption in step 1) is correct. Does the manager choose to issue equity in both states. If not, the equity issue decision will reveal information to the market. Is this bad or good information? The market may be learning about the NPV of the project (this should be good news) or the market may be learning about the true value of the equity (this should be bad news).
5) Calculate the new percent of the firm which must be exchanged for $100 of cash. If the manager doesn't always issue equity and invest, then the percentage we calculated in 1) is not correct. Calculate the new percentage.
6) Calculate the expected value of old equity holders wealth. You now know what decision managers will make in each of the states and what the resulting wealth of the old equity holder will be. Take the average of this an you have the expected value of old equity holders wealth. Compare this to the expected value of old equity holders wealth in an M&M world (this is the expected value of the assets in place plus the expected value of the project). If the wealth is different between the two (MM world and the world where equity may be mispriced), the capital structure is relevant.

B) Example 2. Reverse the value of the assets in place. In class, the assets in place were worth 150 in state 1 and 50 in state 2. Now assume the assets in place are worth 150 in state 2 and 50 in state 1. Notice, the value of the assets in place and the project are now negatively correlated. Does the cost of under pricing arise in this example or is capital structure irrelevant?

C) Example 3. Shrink the variability of the value of the assets in place. Assume that in state 1 the assets in place are worth 110 and in state 2 they are worth 90. Does the cost of under pricing arise in this example or is capital structure irrelevant?