

## Session 22: Post Class tests

1. An analyst valuing a social media company argues that a conventional DCF valuation will understate the value of the company because it does not consider the fact that the online advertising market is very large and that there is an option embedded in these companies which will make their values greater than the DCF value. Do you agree?
  - a. Yes.
  - b. No
  - c. Maybe, if \_\_\_\_\_.  
Explain.
2. You are a US consumer product company that is interested in investing in Brazil. Based on your assessment of the Brazilian market, you believe that the present value of the cash flows from investing in the market today is \$100 million and that the cost of entry is \$150 million. However, the market is a very large one and you believe that if the initial investment does better than expected, your expansion potential is large. Which of the following would you do?
  - a. Don't invest. The NPV is negative.
  - b. Invest, because there is expansion potential.
  - c. Invest, but only if the expansion potential has a positive NPV > \$50 million today.
  - d. Invest, but only if the expansion potential comes with exclusivity.
  - e. Invest, but only if the expansion potential comes with exclusivity and you believe that the option to expand has a value greater than \$50 million
  - f. Invest, but only if the expansion potential comes with exclusivity and you believe that the option to expand has a value greater than \$150 million
  - g. None of the above
3. You have just valued Liszt Software, a small technology company, with a proprietary patent for the next 15 years. You have computed a DCF value of \$100 million for the company, but believe that the patent could give you an entrée into a larger market. Based upon what you know today, you believe that the cost of expansion into the larger market is \$500 million but that the present value of the cash flows from expansion is \$300 million. A simulation of this present value yields a standard deviation of 25% and the risk free rate is 3%. What are the inputs that will you use to value the option to expand?
  - a.  $S =$
  - b.  $K =$
  - c.  $r =$
  - d.  $t =$
  - e.  $\sigma =$
  - f.  $y$  (Cost of delay) =

*Bonus: Value the option*

4. The option to abandon refers to the choice that a company has to abandon or scale down an investment, if the cash flows do not measure up to expectations. In which of the following cases will the option to abandon be most valuable?
- a. A short term, small, risky investment to a large company
  - b. A long term, large, risky investment to a large company
  - c. A long term, large, safe investment to a large company
  - d. A short term, small, risky investment to a small company
  - e. A long term, large, risky investment to a small company
  - f. A long term, large, safe investment to a small company

## Session 22: Post class test solutions

1. **c. Maybe**, if the social media company can use its user base to enter new markets that are unknown at the moment. The key, though, is that having the user base gives you partial exclusivity that cannot be matched easily by others.
2. **d. Invest, but only if the expansion potential comes with exclusivity and you believe that the option to expand has a value greater than \$50 million.** The initial investment has a net present value of -\$50 million. For the expansion potential to tip the scales, its value has to be greater than \$50 million and that can happen only if there is exclusivity.
3. **Inputs to the option pricing model**
  - a.  $S = 300$  = PV of cash flows, if you expand today
  - b.  $K = 500$  = Cost of expansion today
  - c.  $r = 3\%$
  - d.  $t = 15$  (Years of patent life left)
  - e.  $\sigma = 25\%$  (from simulation)
  - f.  $\gamma$  (Cost of delay) =  $1/15$  (You will lose one year of patent life by waiting)Bonus: The value that I get for  $d_1$ ,  $d_2$  and the option are below:  
 $d_1 = -0.6115$ ,  $N(d_1) = 0.2704$   
 $d_2 = -1.5798$ ,  $N(d_2) = 0.0571$   
Value of the option to expand = \$11.65 million. You would add this to your DCF value.
4. **e. A long term, large, risky investment to a small company.** The option to abandon will have more value in a risky project than a safe one, a longer term project than a shorter term one and on a large project (relative to the size of the company taking it) than a small one.