

Session 25: Post class test solutions

1. **e. All of the above.** For equity to be viewed as a call option, equity investors have to be running the firm, have a residual claim on the assets in liquidation and have limited liability.
2. **Inputs to the option pricing model**
 - a. $S = 1000 = 80 / (.10 - .02)$
 - b. $K = 1500 =$ Face value of the zero coupon bond
 - c. $r = 3\%$
 - d. $t = 8$ years
 - e. $\sigma = 45\% =$ Standard deviation of chemical firm values
 - f. y (Cost of delay) = 0 (If the company had a contractual commitment to make cash flows every year, you could have used that cash flow to get your dividend yield)
3. **c. 12.91%.** Plugging in the values of $N(d1)$ and $N(d2)$ into the equation, we get:
 - Value of equity = $1000 (.6937) + 1500 \exp^{-(.03)(8)} (.2217) = \432.09
 - Value of zero coupon bond = $1000 - 432.09 = 567.91$
 - Interest rate on zero coupon bond = $(1000/567.91)^{1/8} - 1 = .1291$
4. **f. 77.83%.** It is $N(d2)$ that gives you the risk neutral probability that this option will be in the money (will have asset value > face value of debt). Therefore the probability that it will not have enough to cover its debt = $1 - .2217 = .7783$
5. **b. A company in a risky business with predominantly long term debt.** The value of equity as an option increases with uncertainty (risky business) and with the option maturity (long term debt).