Quiz B: 4/25/12

Name & Time ____________________________  Key

Quiz: Set up the calculations needed to determine whether Astro Mining should build the factory.

Astro Mining Inc. has an opportunity to invest $300,000 in a factory that will generate cash flows over the next five years equal to $105,000 and will generate cash flows over its 15-year life equal to $290,000. If the factory's sales exceed expectations, the factory can be expanded any time over the next five years at an expected cost of $200,000. The expansion will generate cash flows with an expected present value at the time of the expansion equal to $205,000 and with an expected present value today of $140,000. The standard deviation of returns on the factory over the next five years is expected to equal 41% and over its 15-year life is expected to equal 38%. This is less than the standard deviation of returns on the expansion which is expected to equal 51% over the next five years and 43% once it is built (if it is). The return on Treasuries varies with maturity as follows: 1-year = 0.173%; 2-year = 0.278%; 3-year = 0.404%; 4-year = 0.631%; 5-year = 0.852%; 10-year = 1.976%; 15-year = 2.484%.

Note: Bonus WSJ Questions on back of page

\[ NPV = -300,000 + 290,000 + C \]

\[ C = 5 \times N(d_1) - PV(\bar{k}) \times N(d_2) \]

\[ d_1 = \frac{\ln(\frac{\bar{C}}{\bar{k}})}{\sigma \sqrt{T}} + \frac{\bar{k} \sqrt{T}}{2} \]

\[ d_2 = d_1 - \sigma \sqrt{T} \]

\[ N(d_2) \Rightarrow \text{look up on tables or in Excel (normsdist)} \]

\[ \bar{k} = 14.0\text{,}000 \]

\[ PV(\bar{k}) = \frac{200,000}{(1.00052)^{15}} \]

\[ f_6 = 0.51 \]

\[ f_{14} = 0.5 \]