Quiz A: 4/25/12

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

Astro Mining Inc. has an opportunity to invest $500,000 in a new factory that will generate cash flows over the next four years that have a present value of $115,000 and will generate cash flows over its 15-year life that have an expected present value equal to $475,000. If the project's cash flows fall short of expectations, the factory can be sold for $450,000 any time over the next four years. The standard deviation of returns on the factory is expected to equal 35% over its 15-year life. However, the standard deviation will be much higher at 53% over the first four years of its life. This compares to a standard deviation of returns on the firm as a whole of 29%. 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

\[
NPV = -500,000 + \frac{475,000}{1.03^4} + \frac{3}{0.173} + \frac{0.404}{0.278} + \frac{0.631}{0.404} + \frac{0.852}{0.631} + \frac{1.976}{0.852} + \frac{2.484}{1.976}
\]

\[
\alpha_1 = \frac{-0.173}{0.173} + \frac{0.278}{0.173}
\]

\[
\alpha_2 = 0.278 - 0.173
\]

\[
\alpha_3 = 0.404 - 0.278
\]

\[
\alpha_4 = 0.631 - 0.404
\]

\[
\alpha_5 = 0.852 - 0.631
\]

\[
\alpha_6 = 1.976 - 0.852
\]

\[
\alpha_7 = 2.484 - 1.976
\]

\[
Pvck = \frac{450,000}{(1.031)^{13}}
\]

\[
\sigma = 0.53 + 0.6
\]

\[
T = 4.4
\]