Kenmerk   :   Vellekoop/InvTh/AntwTentamen0506
Datum   :   15 oktober 2008

Course   : **Answers to Final Examination Introduction to Investment Theory**
Code   :   151560
Date   :   Nov 9, 2005

All answers must be motivated.
You may use an electronic calculator.
Lots of success !

1. a. $1 = 1.75\psi_1$, $1 = 4.10\psi_2$, $1 = 3.50\psi_3$ so $\psi = (0.5714, 0.2439, 0.2857)$ and $\psi_1 + \psi_2 + \psi_3 = \frac{1}{1+r_f}$ so $r_f = -9.2\%$.

    b. That is due to the profit for the bookmaker.

    c. $q_i = \frac{\psi_i}{\psi_1+\psi_2+\psi_3}$ gives $q = (0.5190, 0.2215, 0.2595)$ so answer is approximately 52%.

    d. Price p must satisfy $p = 5\psi_1 + p\psi_3$ so $p = 4$.

    e. If you bet x the expected utility is $0.7\ln(100 - x + 1.75x) + 0.3\ln(100 - x)$ which is maximal for $x = 30$.

2. a. Pricing the two given products gives

    $$d_{0,1} = 1 + \frac{0.02200}{2} \tag{1}$$

    $$\frac{0.031920}{2} = \frac{1 - d_{0,2}}{d_{0,1} + d_{0,2}} \tag{2}$$

    which gives $d_{0,1} = 0.98912$ and $d_{0,2} = 0.96875$.

    b. Since $d_{0,1} = (1 + \frac{f}{2})d_{0,2}$ we find $f = 4.205\%$.

    c. $P = 100000(0.025d_{0,1} + 1.025d_{0,2}) = 101770$ and

    $$QMD = \frac{0.025 \cdot \frac{1}{2} \cdot (1 + \frac{1}{2}s_1)^{-2} + 1.025 \cdot 1 \cdot (1 + \frac{1}{2}s_2)^{-3}}{P} \tag{3}$$

    $$= \frac{0.025 \cdot \frac{1}{2} \cdot d_{0,1}^2 + 1.025 \cdot 1 \cdot d_{0,2}^{3/2}}{P} \tag{4}$$

    $$= 0.9724 \tag{5}$$

    d. Approximately $101770(1 + 0.0080 * 0.97) = 102560$.

3. a. Invest half of your wealth in both assets i.e. $w_X = w_Y = \frac{1}{2}$.

    b. Variance is $(w_X^2 + 2\rho w_X w_Y + w_Y^2)\sigma^2 = \frac{1}{2}(1+\rho)\sigma^2$. If $\rho = -1$ we have perfectly offsetting risks so variance must become zero.

4. Many answers are possible here...