FINAL MAYO 12-5-2014 (CURSO 2013-2014)

1.

a) $C\left(1+TAE\right)^{10} = 2C \Longrightarrow \sqrt[10]{2} - 1 = TAE$

Por otro lado: $\left(1+\frac{R}{2}\right)^4 = 1 + TAE$

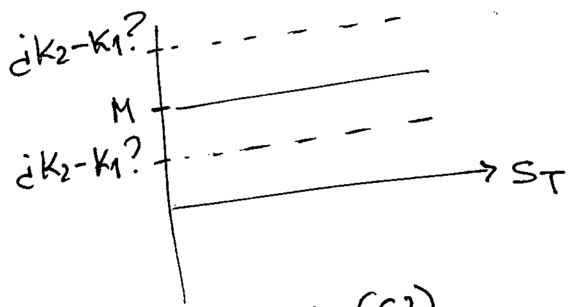
$\Longrightarrow \sqrt[10]{2} - 1 = \left(1+\frac{R}{2}\right)^4 - 1 \Longrightarrow \sqrt[40]{2} - 1 = \frac{R}{2}$

$\Longrightarrow R = 2\left[\sqrt[40]{2} - 1\right] = \boxed{3'496\ \%}$

b) C1 $\begin{cases} \text{forward compr. str. } K_1 \\ \text{forward vend. str. } K_2 \end{cases}$ $\downarrow$ flujo en T

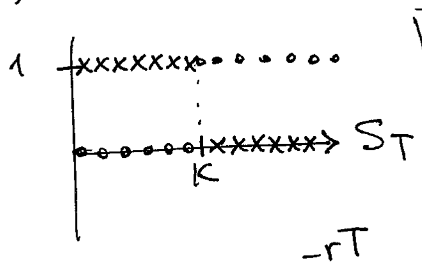
C2 $\{$ bono nom. M $\downarrow$ flujo en T: M

$$\begin{array}{rl} & S_T - K_1 \\ + & K_2 - S_T \\ \hline & K_2 - K_1 \end{array}$$



$\Longrightarrow \begin{cases} \text{si } K_2 - K_1 > M \Longrightarrow \text{precio}(C1) > \text{precio}(C2) \\ \text{si } K_2 - K_1 = M \Longrightarrow \text{precio}(C1) = \text{precio}(C2) \\ \text{si } K_2 - K_1 < M \Longrightarrow \text{precio}(C1) < \text{precio}(C2) \end{cases}$

c) Conocemos los flujos de cartera $\begin{cases} 1 \text{ call digital comprada} \\ 1 \text{ put digital comprada} \end{cases}$ $\downarrow$ flujo en T $= 1$ (constante)



$\Longrightarrow p + c = 1 . P(0,T) = e^{-rT}$

$\Longrightarrow p = e^{-rT} - c = e^{-rT} - e^{-rT}\,\Phi(d_-) = e^{-rT}\left(1 - \Phi(d_-)\right)$

$\Longrightarrow \boxed{p = e^{-rT}\,\Phi(-d_-)}$

d) Teoría. (Santorum pág 83)

2.

cartera
$$\begin{cases} 2 \text{ calls compr. str. } K = \dfrac{500}{6} = \dfrac{250}{3} \xrightarrow{\text{flujo en } T} 2\left(S_T - \dfrac{250}{3}\right)^+ \\ 2 \text{ puts compr. str. } K = \dfrac{500}{6} = \dfrac{250}{3} \xrightarrow{\text{flujo en } T} \cdot\, 2\left(\dfrac{250}{3} - S_T\right)^+ \end{cases}$$

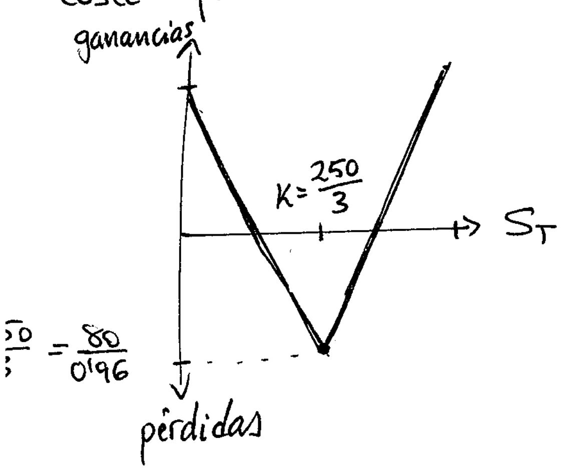
precio call : $c = 30$ €

precio put : $c - p = S_0 - KP(0,T) \Longrightarrow p = c - S_0 - KP(0,T) \Longrightarrow$

$$\Longrightarrow p = 30 - 100 - \frac{250}{3} \cdot 0'96 = 10$$

coste formar cartera (hoy) : $2c + 2p = 2 \cdot 30 + 2 \cdot 10 = 80$ €

$\Longrightarrow$ en tiempo $T=1$: $\dfrac{80}{P(0,1)} = \dfrac{80}{0'96} =$



3.

Acción S

$$100 \begin{array}{l} \nearrow 110 \\ \searrow 80 \end{array}$$

Call

$$8 \begin{array}{l} \nearrow (S_T - K)^+ = 110 - 100 = 10 \\ \searrow (S_T - K)^+ = (80 - 100)^+ = 0 \end{array}$$

$$x \begin{array}{l} \nearrow 1 \\ \searrow 1 \end{array}$$

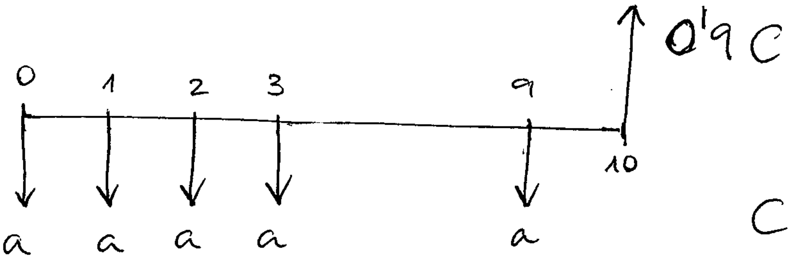
Numerario S :

$$1 \begin{array}{l} \nearrow 1 \\ \searrow 1 \end{array} \qquad \frac{8}{100} \begin{array}{l} \nearrow \frac{10}{110} \\ \searrow 0 \end{array}$$

$$\Longrightarrow \begin{cases} 1 = p + q \longrightarrow q = \dfrac{3}{25} \\ \dfrac{8}{100} = \dfrac{10}{110} p \Rightarrow p = \dfrac{22}{25} \end{cases}$$

$$\Longrightarrow \frac{x}{100} = \frac{22}{25} \cdot \frac{1}{110} + \frac{3}{25} \cdot \frac{1}{80} = 0'0095 \Longrightarrow \boxed{x = 0'95}$$

$\boxed{4.}$



$C :=$ capital acumulado

$$C = a(1+R)^{10} + \cdots + a(1+R) =$$
$$= a \sum_{j=1}^{10} (1+R) \underset{\substack{\uparrow \\ \text{tabla } x=5\%}}{=} 13'207\, a$$

Entonces, cálculo del TIR: $x := \text{TIR}$

$$\sum_{j=0}^{9} \frac{a}{(1+x)^j} = \frac{0'9 . 13'207 . a}{(1+x)^{10}} \Longrightarrow (1+x)^{10} \sum_{j=0}^{9} \frac{a}{(1+x)^j} = 11'8863\, a$$

$$\Longrightarrow \cancel{a} \sum_{j=1}^{10} (1+x)^j = 11'8863 \cancel{a} \Longrightarrow \boxed{x \approx 3'11\%}$$

tabla (aprox.)

$\boxed{5.}$ $t_0 = 0$, $t_1 = 1.\Delta t$, $t_2 = 2.\Delta t$, ... , $t_j = j.\Delta t \xrightarrow[j\to\infty]{} \infty$

$$K_{esp} = \frac{1}{\Delta T} \cdot \frac{P(0,t_0) - P(0,t_\infty)}{\sum_{j=1}^{\infty} P(0,t_j)} = \frac{1}{\Delta T} \cdot \frac{1-0}{\sum_{j=1}^{\infty} P(0,t_j)}$$

$$\sum_{j=1}^{\infty} P(0,t_j) = \sum_{j=1}^{\infty} \left(0'98^{\Delta T}\right)^j = \frac{1}{1-0'98^{\Delta T}}$$

$$\Longrightarrow \boxed{K_{esp} = \frac{1}{\Delta T} \cdot \frac{1}{1/_{1-0'98^{\Delta T}}} = \frac{1}{\Delta T} \cdot \left(1 - 0'98^{\Delta T}\right)}$$