Assignment

1. $d^{(4)} = 8\%$

i) $d = 1 - \left(1 - \frac{8\%}{4}\right)^4$

$= 7.763184\%$

ii) $d = \frac{i}{1+i}$

$7.763184\% = \frac{i}{1+i}$ $\quad 1+i = \frac{1}{1-d}$

$= \frac{1}{1-7.763184\%} - 1$

$= 8.416578\%$

iii) $\delta = \ln(1+i)$

$= 8.0810829\%$

iv) $i = 8.416578\%$

$d^{(12)} = 12\left[1 - (1-7.763184\%)^{1/12}\right]$

$= 8.053934\%$

2. $\delta(t) = 0.004t + 0.0002t^2$

i) $PV = 1000 \times \frac{1}{e^{\int_0^{10} 0.004t + 0.0002t^2}}$

$= 1000 \times \frac{1}{e^{\left[0.004\frac{t^2}{2} + 0.0002\frac{t^3}{3}\right]_0^{10}}}$

$= 1000 \times \frac{1}{e^{[0.2 + 0.0666667]}}$

$= 765.928339$

ii) $i = \frac{1000 - 765.928339}{765.928339} = 30.5605171\%$

ii $d^{(2)} = ?$

a $d = 2.25 \text{ p.q} = 9\% \text{ p.a}$

$d^{(2)} = 2\left[1-(1-9\%)^{1/2}\right]$

$= 9.2121578\%$

b $d^{(1/2)} = 5\%$

$d = 1-\left(1-\dfrac{5\%}{1/2}\right)^{1/2}$

$= 5.1316702\%$

$d^{(2)} = 2\left[1-(1-5.1316702\%)^{1/2}\right]$

$= 5.1992508\%$

iii $i = 5\%$

$1+i = \dfrac{1}{1-d}$

$\cancel{1.05 = \dfrac{1}{1-d}}$ $\quad \cancel{0.05 = \dfrac{1}{1-d}}$ $\quad 1.05 = \dfrac{1}{1-d}$

$1.05 - 1.05d = 1$

$0.05 = 1.05d$

$d = 4.7619047\%$

4 (i) $i = 8\%$

$1.08 = \dfrac{1}{1-d}$

$1.08 - 1.08d = 1$

$\dfrac{0.08}{1.08} = d$

$7.4074074\% = d$

i $d^{(12)} = 12\left[1-(1-7.4074074\%)^{1/12}\right]$

$= 7.6714776\%$

ii $i^{(365)} = 365\left[(1+8\%)^{1/365} - 1\right]$

$= 7.6969155\%$

iii $\delta = \ln(1+i)$

$= 7.6961041\%$

iv $i^{(0.5)} = 0.5\left[(1+8\%)^{1/0.5} - 1\right]$

$= 8.32\%$

5

i $d^{(4)} = 6\%$

a $d = 1 - \left(1 - \frac{6\%}{4}\right)^4$

$= 5.866345\%$

$1+i = \frac{1}{1-d} = \frac{1}{1-5.866345\%}$

$i = 6.2319316\%$

$i^{(2)} = 2\left[(1+6.2319316\%)^{1/2} - 1\right]$

$= 6.1377516\%$

b $d^{(12)} = 12\left[1 - (1-5.866345\%)^{1/12}\right]$

$= 6.0302532\%$

ii

a Original term of loan 365 days

No deferment - 17 July 2005

Outstanding term - 272 days

$\frac{272}{365} \times 200000 = 14904.1096$

$\therefore$ Sum paid $= 220000 - 14904.1096$

$= 205095.89$

$20000 = \left(1 + \frac{[illegible]}{[illegible]}\right)^{[illegible]} = 26000$

$1 + \frac{[illegible]}{[illegible]} = \left(\frac{26000}{20000}\right)^{[illegible]}$

$[illegible] = [illegible]$

$20000 = \left(1 + \frac{[illegible]}{2}\right)^{[illegible]} = 26000$

$[illegible] = 17.[illegible]$

$20000 = \left(1 + i \times \frac{[illegible]}{12}\right) = 26000$

$i = \frac{26000}{20000} \times \frac{12}{[illegible]} - [illegible]$

$= 21.[illegible]$

[illegible] rate of int. needs to be higher to achieve same final amt

$^{(2)} = 0.0775\% = 7.75\%$

$i = \left(\cancel{1+i}\ 1 + \frac{7.75}{2}\right)^2 - 1$

$= 7.9001562\%$

$\delta = \ln(1+i)$

$= 7.6036133\%$

$d = \frac{i}{1+i} = \frac{7.9001562\%}{1+7.9001562\%}$

$= 7.3217282\%$

$d^{(12)} = 12\left[1 - (1 - 7.3217282\%)^{1/12}\right]$

$= 7.5795756\%$

$^{(1/2)} = 1/2\left[(1+7.9001562\%)^2 - 1\right]$

$= 8.2122185\%$

b $\delta = 6\%$

$e^{\delta} = 1+i$

$i = 6.1836546\%$

$d = \frac{i}{1+i} = 5.8235466\%$

$d^{(12)} = 12\left[1-(1-5.8235466\%)^{1/12}\right]$

$= 5.9850252\%$

ii $d^{(4)} = 6\%$

$d = 1-\left(1-\frac{6\%}{4}\right)^4$

$= 5.866345\%$

$1+i = \frac{1}{1-d} = \frac{1}{1-5.866345\%}$

$i = 6.2319316\%$

$i^{(12)} = 12\left[(1+6.2319316\%)^{1/12}-1\right]$

$= 6.0607089\%$

c $d, \delta, i^{(4)}, i$

12 7049

0 $i^{(12)} = 6\%$ 2 $i^{(4)} = 1.5\%$ 4.5 $d^{(12)} = 6\%$ 6

i $i^{(12)} = 6\%$

$i = \frac{i^{(12)}}{12} = 0.5\%$

For $A = (1+0.5\%)^{24} = 1.1272$

$\therefore CA = 7945.63$

For next 2.5 yrs $= (1+10\times 1.5\%) = 1.15$

$\therefore CA = 9137.48$

$v = 1-d = \left(1-\frac{d^{(12)}}{12}\right)^{12} = 0.94162$

$i = v^{-1} - 1 = 6.2\%$

For next 1.5 yrs $= (1.6.2\%)^{1.5} = 1.0944$

ii $t = 9/12$

$A = 50000$

$r = 12$

$50000 = p + (p\times 12/100 \times 9/12)$

$= p + 0.09p$

$= 1.09p$

$p = 45871.56$