FIP Assignment

Q.1 $C = 8\%$

$$(1+i) = \left(1 + \frac{i^{(p)}}{p}\right)^2$$

$$1 + i = \left(1 + \frac{0.08}{2}\right)^2$$

$$i = 8.16\% \text{ p.a}$$

Q.2

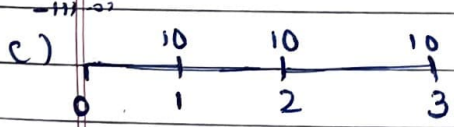
b) $(1+S_2)^2 = (1+S_1)(1+1Y1Y)$

$$(1.03982)^2 = (1.0299)(1+1Y1Y)$$

$$1Y1Y = \frac{(1.03982)^2}{1.0299} - 1$$

$$1Y1Y = 4.9795\%$$

c)



$$-111.31 + 10\left[\frac{1-(1+x)^{-3}}{x}\right] + \frac{100}{(1+x)^3} = 0$$

$$x = 5.7856\%$$

$$S_3 = 5.7856$$

Q.3 yr. 1 = $100(1+0.05)$

yr. 2 = $100(1+0.05)^2$

yr. 3 = $100(1+0.05)^3$

yr. 4 = $100(1+0.05)^4$

YTM = 5%.

a) $PV = \frac{100}{(1.05)} + \frac{100}{(1.05)^2} + \frac{100(1.05)^3}{(1.05)^3} + \frac{100(1.05)^4}{(1.05)^4}$

$PV = 400$

∴ Price is $400

b) $\frac{\Sigma(PV \times t)}{\Sigma PV}$

$= \frac{100\times1 + 100\times2 + 100\times3 + 100\times4}{400}$

∴ MCD = 2.5 years

$MD = \frac{-MCD}{1+YTM}$

$= \frac{-2.5}{1+0.05}$

$= 2.380952$ years

Q.4 The investments are ranked from most attracted to least

(B) Zero coupon Treasury Strips

(C) 5.5% Treasury coupons

(D) 9.25% Treasury bond

(A) Short treasury bills

The bond is affected in a higher way by yield curves if the coupons are lower. Also it doesn't have a major affect on short term securities.

Q.5 $T = 1$

$C = 6\%$.

$FV = \$1000$

$y = 6.5\%$.

(a) Rate of Return $= 6.5\%$. ($\because$ YTM hasn't changed)

Verifying above

$$PV @ t=1 = 1060(1.065)^{-2} + \frac{60}{1.065} + 60$$

$$= 1050.896$$

$$\text{Horizon yield} = \frac{1050.896}{\text{Ap}5670} - 1$$

$$= 7.499\% \approx 7.5\%.$$

(b) Purchase Price @ $T = 0$

$$= 60\left(\frac{1-(1.065)^{-3}}{0.065}\right) + 1000(1.065)^{-3}$$

$$= 986.76$$

Selling price @ $T = 1 = 1000$

($\because$ $c = r$)

Total inflows @ $T = 1$: $1000 + 60$

$$= 1060$$

Rate of Return = $\left(\frac{1060}{986.76}\right) - 1$

ROR = 7.42227 %.

Q.6 * It is assumed that the full risk of being unable to resell the bonds at the stipulated offerty price by the underwriter,

* the risk of interest rate movement b/w the time of purchase & time of resell is beared by the underwriter.

* Bonds with longer maturity usually have higher duration & they are exposed to more interest rate risk.

* That's why the fees of underwriting for longer maturity bonds are higher as the risk is higher.

Q-7 I Disagree

Q.8 C = 6 %.

i = 6 %.

T = 10

PV = 100

(a) i = 18 %.

$PV = 6\left(\frac{1-(1.18)^{-10}}{0.18}\right) + 100\,(1.18)^{-10}$

PV = 54.03

(b) i = 16 %.

$PV = 6\left(\frac{1-(1.16)^{-10}}{0.16}\right) + 100\,(1.16)^{-10}$

PV = 61.66

classmate
Date
Page

% Change = $1 - \frac{51.66}{54.13}$

% chg = 8.7674 %.

c) i = 5 %.

$PV = 6\left(\frac{1-(1.05)^{-10}}{0.05}\right) + 100(1.05)^{-10}$

$= 107.7217$

d) i = 6 %.

PV = 100 ∵ i = C

% change $= 1 - \frac{100}{107.7217}$

% chge = 7.1682 %.

e) Due to the convex nature of price yield curve the price volatility is higher at lower interest rates.

Q-9 PV = 100

FV = 100.5

$\frac{9(1.094)^{3}-1}{0.094}\Big) + 9(1.112)^{-1} + 109(1.112)^{-2}$

$= 130.5357$

∴ Total Return

$100(1+c)^3 = 130.5357$

i = 8.324527 %.

Q.10 Answer → (c)

Q.11 Since ZCBs also have an convex price yield curve, I disagree with the statement.

Q.12 Modified Duration = $\frac{\text{Macauley Duration}}{(1 + YTM)}$

By the eqn we can derive that as YTM goes towards 0, the MD will move towards macauley duration.
∴ I agree with statement.

Q.13 A Portfolio may have the same duration, their convexities might be different which will lead to unequal changes with changes in interest rates.
∴ I disagree.

Q.14

Bond	Market Value	Duration
W	13	2
X	60	6
Y	27	7
Z	40	14

$\Sigma MV = 140$

a) Duration = $\Sigma w \times$ duration

$= \frac{13}{140} \times 2 + \frac{60}{140} \times 4 + \frac{27}{140} \times 7 + \frac{40}{140} \times 14$

$= \frac{70}{70} + \frac{280}{70} + \frac{189}{140} + \frac{560}{140}$

$= 4 + 1.35 + 4$

$= 8.9642\%$

b) $8.964 \times (0.0005)$
$= 4.48214\%$

c) $4 - 2 \times \frac{13}{140} = 0.1857$

$x - 7 \times \frac{27}{140} = 1.35$

$4 - 8 \times \frac{60}{140} = 3.428$

$2 - 14 \times \frac{10}{140} = 0.44$

Q.15 Yield curve:

a) It is the graphical depiction of the relation b/w bonds of the same credit quality but diff. maturities.

b) Treasury securities are most watched as they are free from default risk, it is the most active bond offerly with no zero liquidity issues.