

Assignment



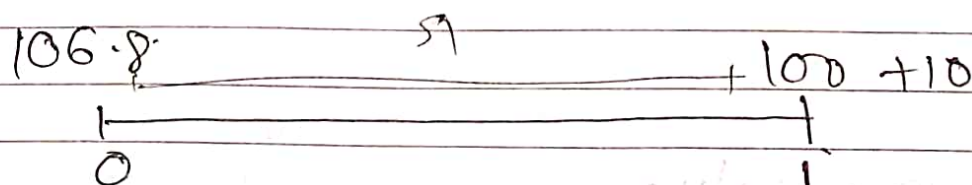
Fixed income

1) 8% $\rightarrow$ Semiannual Coupon rate

So,

annual coupon rate will be $8\% \times 2 = 16\%$

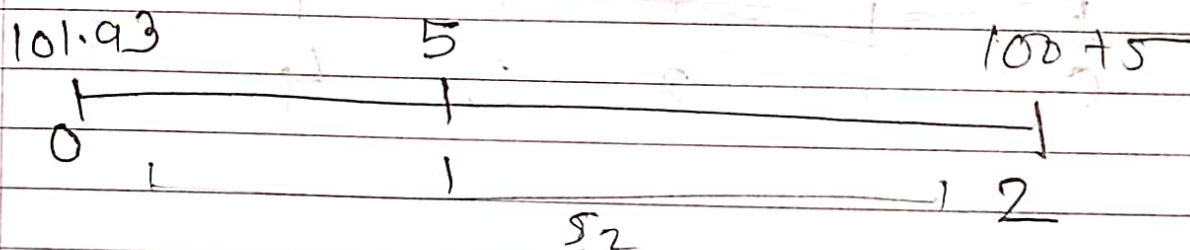
2) a) For Bond A.



$$106.8 = (110 \times (1 + S_1)^{-1})$$

$$S_1 = \frac{110 - 106.8}{110} = 2.996\%$$

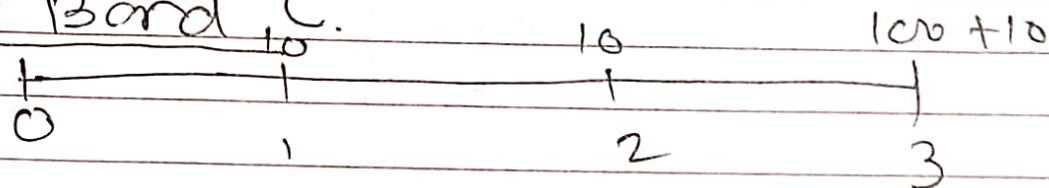
For Bond B



$$101.93 = 105 (1 + S_2)^{-2}$$

$$S_2 = 1.4947\%$$

For Bond C

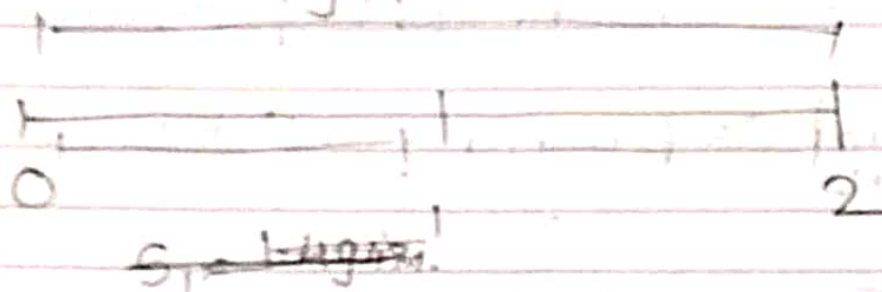


$$111.31 = 110 \times (1 + S_3)^{-3}$$

$$S_3 = 3.508\%$$

b) Computing Forward rate for Bond B

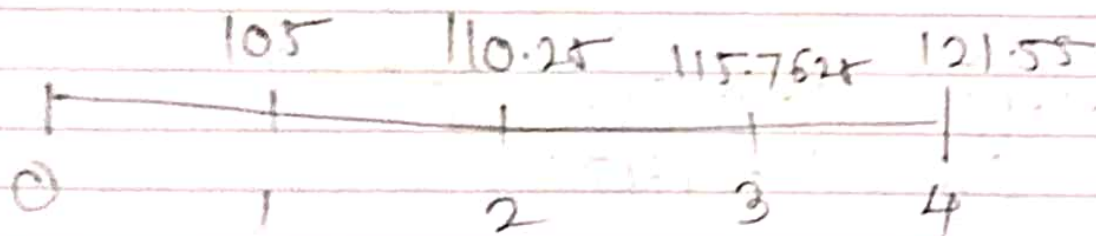
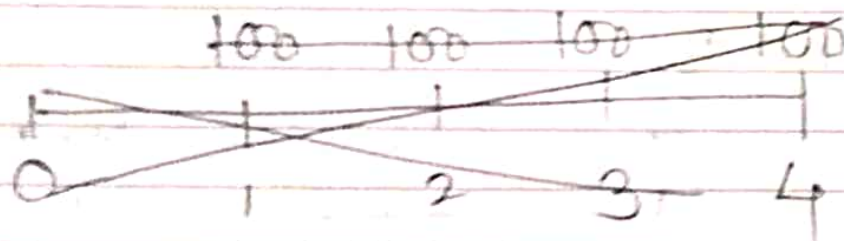
1.4947-1.



3) • No par value.

4.7m = 5-1.

Coupon Coupon = 100 grows at 5-1.



a] price of 5cam

$$\begin{aligned} &= 105(1+i)^{-1} + 110.25(1+i)^{-2} + 115.76(1+i)^{-3} \\ &\quad + 121.55(1+i)^{-4} \\ &= 399.45 \end{aligned}$$

b] AS there is NO price Risk associated in this Bond.

Investor only have to face Reinvestment Risk.

4] Pairing Statements :-

- | | | |
|---|---|---|
| 1 | → | a |
| 2 | → | b |
| 3 | → | d |
| 4 | → | c |

Reason:-

1] option a has price Risk if interest rates goes up and also it don't have any coupon Reinvestment to offset this Risk.

2] Treasury strips similar to zero coupon Bond. So it has price Risk, assuming maturity of treasury bill is high after December 2016, so, treasury strips

will get least affected than treasury bills.

3] For option - d.

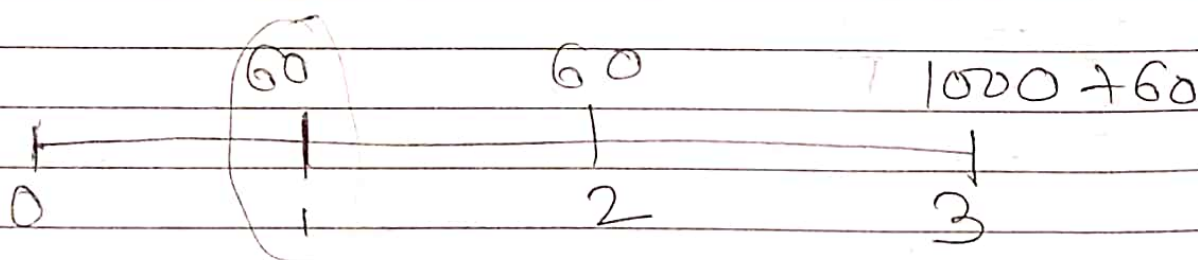
as maturity of treasury Bond is higher than maturity of treasury Notes. So it will be highly sensitive.

4] For option C :-

Treasury Notes will have price Risk & Reinvestment Risk, but Both will offset each other at duration.

also maturity is ^{less} ~~lower~~ than treasury bond. So it will get least affected by changes in interest rates.

5] $T = 3$, $\text{par} = 1000$, $C = 6\%$.
 $YTM = 6.5\%$.



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

$$= 986.7876$$

price of Bond at time 1

$$= 60(1.06)^{-1} + 1060(1.06)^{-2}$$

$$= 990.8969$$

So, Rate of Return for holding Bond for - 1-year

$$986.75(1+i)^1 = 990.8969$$

$$i = 0.00419$$

$$i = 0.41955\%$$

b) price of Bond at time 1 will get discounted by 6%.

$$= 60(1.06)^{-1} + 1060(1.06)^{-2}$$

$$= 1000.$$

~~So, Rate of Return~~ So, as YTM goes down, we will sell the Bond at par value.

Q.8. $\text{par} = 100$, $C = 6\%$, $T = 10$.

a) $YTM = 15\%$.

$$PV = 6 \left[\frac{1 - (1.15)^{-10}}{0.15} \right] + 100 (1.15)^{-10}$$
$$= 54.83108$$

b) $15 \rightarrow 16\%$.

$$PV = 51.6677$$

price change by 5.7%.

c) $YTM = 5\%$.

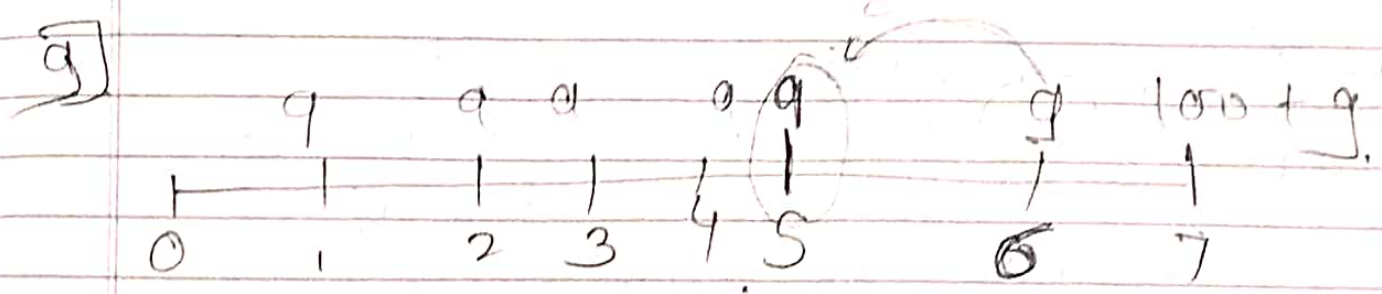
$$PV = 107.721$$

d) $YTM = 6\%$.

$$PV = 100$$

price change by 7.1%.

e) volatility in price is higher when interest rates are low.



$$PV = g \times \left[\frac{1 - (1 + 0.074)^{-7}}{0.074} \right] + 100(1.074)^{-7}$$

~~PV~~, $PV = 98.0135$

So, at time 5
price of Bond.

$$= g \times \left[\frac{(1.074)^5 - 1}{0.074} \right] + g(1.112)^{-2} + 100(1.112)^{-2}$$

$$= 142.3386.$$

Total Return for this Bond.

$$98.0135 (1+i)^5 = 142.3386$$

$i = 7.742\%$

0,000,000 1m
 30,000,000 3m
 13m

DATE / /
 PAGE NO.

Q.13] two portfolio can have same duration
 1] their convexities can differ.

So change in parallel shift in the yield curve, % change in price may differ.

2] For Non-parallel shift in the yield curve, portfolio of differing convexities may perform differently.

Q.14] total market value (million)
 $= 13 + 27 + 60 + 40$
 $= 140,00,000.0$

total portfolio duration $\Rightarrow$ weighted average of duration of all individual bond.

Portfolio duration =

$$2 \times \frac{130,00,000}{1,40,00,000} + 7 \times \frac{270,00,000}{14,00,00,000}$$

$$+ 8 \times \frac{60,00,00,000}{14,00,00,000} + 14 \times \frac{40,00,00,000}{14,00,00,000}$$

$$= 2 \times \frac{1.3}{14} + 7 \times \frac{2.7}{14} + 8 \times \frac{6}{14} + 14 \times \frac{4}{14}$$

$$= 8.9642$$

(Q.15) yield Curve is a line that plot yields of bonds having equal credit quality, but differing maturity dates.

- Treasury yield Curve nothing But government Bond yield Curve.
- market participants view this yield curve to identify the future state of the economy, which would help them to make relevant decision.
- It is use to derive yield to maturity.
- It play important role in Bond valuation.

DATE		
V.P.O.E. 60		

Scanned with CamScanner