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CIFA PART III SECTION 5

FIXED INCOME INVESTMENTS ANALYSIS

THURSDAY: 26 November 2020.

Time Allowed: 3 hours.

Answer ALL questions. Marks allocated to each question are shown at the end of the question. Show ALL your workings.

QUESTION ONE

(a) In relation to bond indenture:

- (i) Distinguish between “affirmative covenant” and “negative covenant”. (4 marks)
- (ii) Highlight three types of information contained in a bond indenture. (3 marks)

(b) Explain four methods that could be used by the Central Bank of your country to issue sovereign debt. (4 marks)

(c) The following information relates to XYZ Pension Fund:

1. Annual pension obligations is Sh.2 million paid in perpetuity.
2. The duration of 5-year maturity bonds with annual coupon rates of 12% is 4 years.
3. The duration of 20-year maturity bonds with annual coupon rates of 6% is 11 years.
4. The yield to maturity on all bonds is 16%.

Required:

- (i) The amount to be held in each bond to fully fund and immunise the pension obligation. (3 marks)
- (ii) The par value of the holdings in the 20-year coupon bond. (2 marks)

(d) Mildred Naliaka would like to invest in a 6%, 25 year bond selling to yield 9%. The modified duration for the bond is 10.62 and the convexity is 182.92.

Required:

The percentage change in price of the bond assuming that the required yield increases by 200 basis points from 9% to 11%. (4 marks)

(Total: 20 marks)

QUESTION TWO

(a) Examine four relationships between yield change and bond price behaviour. (4 marks)

(b) A financial analyst has gathered the following information about the yield structure of an AAA rated corporate bond:

Period	Yield (%)
3 months	8.50
6 months	9.25
1 year	10.50
2 years	11.25
3 years and above	12.00

Required:

The implicit one-year forward rate:

- (i) In year 2. (2 marks)
- (ii) In year 3. (2 marks)

- (c) Juhudi Ltd. has a Sh.60 million bond issue outstanding that has a 12% annual coupon interest rate and 20 years remaining to maturity. The bond was sold five years ago. The floatation cost was Sh.3 million which the company has been amortising on a straight-line basis over the 25 year original life of the bond. The bond has a call provision that makes it possible for the company to retire the issue at this time by calling the bonds at a 10% call premium.

Investment bankers have assured the company that it could sell an additional Sh.60 million worth of 20 year bonds at an interest rate of 9%.

To ensure that the funds required to payoff the old debt will be available, the new bonds will be sold one month before the old bond is called, so for one month, interest will have to be paid on the two bond issues.

Current short-term interest rates are 6%. Predictions are that long term interest rates are unlikely to fall below 9%. Floatation costs on a new refunding issue will amount to Sh.2,650,000.

Juhudi Ltd.'s corporate tax rate is 30% and after tax cost of debt is approximately 6.3%.

Required:

Using relevant computations, advise Juhudi Ltd. on whether to refund the 12%, Sh.60 million bond. (12 marks)

(Total: 20 marks)

QUESTION THREE

- (a) Explain the following terms used in fixed income investments analysis:

- (i) Term to maturity of a bond. (2 marks)
- (ii) Principal value of a bond. (2 marks)
- (iii) Coupon rate. (2 marks)
- (iv) Reinvestment income. (2 marks)
- (v) Embedded options. (2 marks)

- (b) The following information relates to a bond transition matrix developed by a rating agency for a one-year period:

Rating at start of year	Rating at end of year								Total
	AAA	AA	A	BBB	BB	B	CCC	D	
AAA	93.20	6.00	0.60	0.12	0.08	0.00	0.00	0.00	100
AA	1.60	92.25	5.07	0.36	0.11	0.07	0.03	0.01	100
A	0.18	2.65	91.91	4.80	0.37	0.02	0.02	0.05	100
BBB	0.04	0.30	5.20	87.70	5.70	0.70	0.16	0.20	100
BB	0.03	0.11	0.61	6.80	81.65	7.10	2.60	1.10	100
B	0.01	0.09	0.55	0.88	7.90	75.67	8.70	6.20	100
CCC	0.00	0.01	0.31	0.84	2.30	8.10	62.54	25.90	100

Note: The first four ratings, are investment grades.

Required:

- (i) The probability that a Bond rated BBB will be downgraded. (1 mark)
- (ii) The probability that a Bond rated BBB will go into default. (1 mark)
- (iii) The probability that a Bond rated BBB will be upgraded. (1 mark)
- (iv) The probability that a Bond rated B will be upgraded to investment grade. (1 mark)
- (v) The probability that a Bond rated A will be downgraded to non-investment grades. (1 mark)
- (vi) The probability that a Bond rated AAA will not be downgraded at the end of one year. (1 mark)

- (c) The yield of a Sh.1000, 3.5% coupon 5-year annual pay bond in Nairobi Securities Exchange is 2.8%. The same bond sells for an equivalent Sh.1,019.80 in Uganda Securities Exchange.

Required:

Determine whether there is an arbitrage opportunity and demonstrate how it could be exploited. (4 marks)
(Total: 20 marks)

QUESTION FOUR

- (a) Explain the difference between “liquidity preference theory” and “preferred habitat theory” in relation to term structure of interest rates. (4 marks)
- (b) Explain four risks that could be faced by investors who rely on ratings provided by credit rating agencies. (4 marks)
- (c) A financial analyst is assessing Crystal Ltd., a Multimedia Company, with the following selected financial information:

	2018 Sh. “million”	2019 Sh. “million”
Operating income	6,456	7,726
Revenue	38,063	40,893
Depreciation and amortisation	1,713	1,841
Capital expenditures	2,110	3,559
Cash flow from operations	6,578	6,994
Total debt	12,480	13,997
Total equity	37,519	39,385
Dividend paid	653	756
Interest expense	330	360

Note: Free cash flow (FCF) is after dividends for all calculations.

Required:

Calculate the following cash flows and ratios for each of the years ended 2018 and 2019:

- (i) Earnings before interest, tax, depreciation and amortisation (EBITDA). (2 marks)
- (ii) Free cash flow (FCF) after dividends. (2 marks)
- (iii) Operating margin. (2 marks)
- (iv) EBITDA/Interest. (2 marks)
- (v) FCF/Debt. (2 marks)
- (vi) Debt/Capital. (2 marks)
- (Total: 20 marks)**

QUESTION FIVE

- (a) Citing three reasons, explain why term to maturity of a bond is important to an investor. (3 marks)
- (b) A fixed income manager has constructed a sample portfolio of treasury bonds with different maturities as follows:

Security	Weight (%)	Current yield	Key rate duration
2 year	45	4.50	0.91
10 year	15	4.63	2.15
20 year	10	4.82	3.89
25 year	30	4.97	4.12

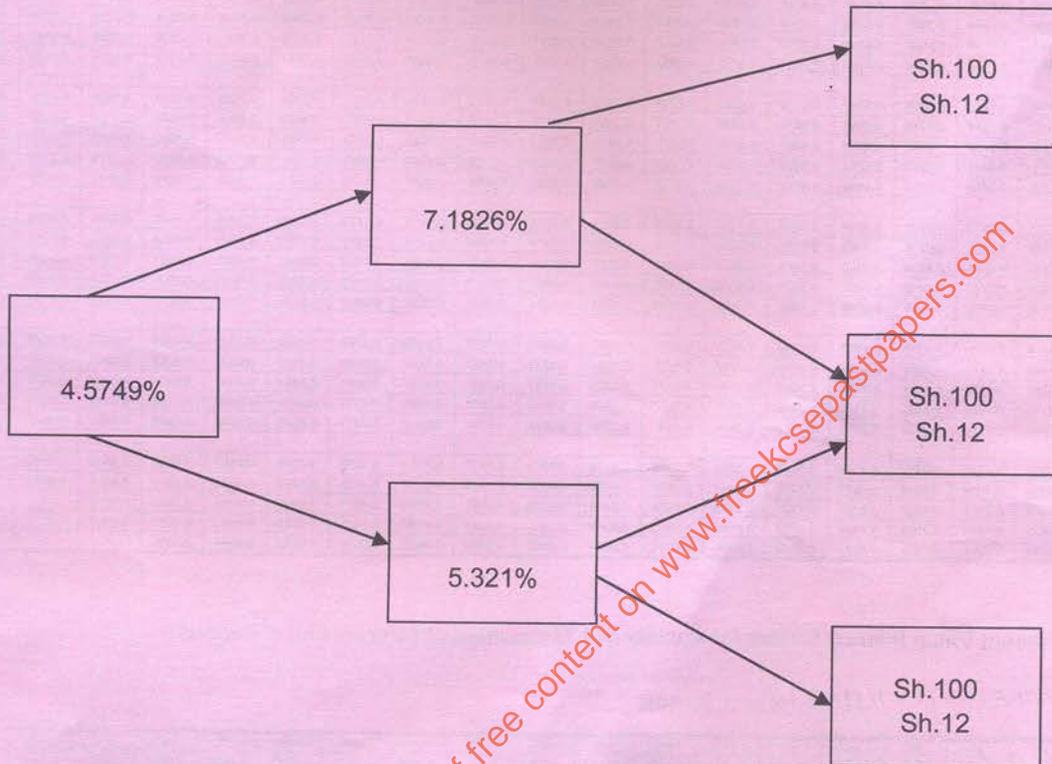
Required:

- (i) The effective duration for the portfolio for a parallel shift in the yield curve. (4 marks)
- (ii) Assume that the yield curve shifts in a non-parallel fashion and the anticipated change for the 2 year and 10 year rate is an increase of 50 basis point while the 20 year and 25 year rate are expected to increase by 100 basis point.

Determine the effect of this yield shift to the bond's value.

(3 marks)

- (c) An analyst uses the following binomial interest rate to value bonds with embedded options:



Required:

- (i) Calculate the value of an option free, 12% annual coupon bond with two years remaining to maturity. The bond has a face value of Sh.100. (4 marks)
- (ii) Calculate the value of embedded call option assuming the above bond is callable at Sh.105 at the end of year 1. (3 marks)
- (iii) Determine the value of embedded put option assuming the above bond is puttable at Sh.105 at the end of year 1. (3 marks)

(Total: 20 marks)

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