

CIFA PART II SECTION 4
PORTFOLIO MANAGEMENT

FRIDAY: 1 December 2017.

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) You have recently been appointed as the Chief Investment Officer (CIO) of a major investment advisory firm in your country. Martin Kibet, a high net worth client has approached your firm seeking to invest Sh.100 million.

Required:

Evaluate the four steps in the portfolio management process that you are expected to follow while investing the client's money. (4 marks)

- (b) The investment policy statement (IPS) serves as a governing document for most investment decisions. It should identify the objectives and operational constraints on the investment portfolio.

In light of the above statement, discuss five categories of portfolio constraints. (5 marks)

- (c) Amos Mambo has invested 30% of his funds in risk-free assets and the remaining 70% in an index fund that represents the market. The risk-free rate is 8%. The index fund is expected to generate a return of 21% with a standard deviation of 9.8%. Amos Mambo is considering the following three options:

Option 1 – Maintain the portfolio as it is.

Option 2 – Withdraw his investment from the risk-free security and invest the same in the index fund.

Option 3 – Apart from investing his entire funds in the index fund, Amos Mambo intends to borrow a sum equal to 20% of his available funds at risk-free rate and invest the same in the index fund.

Required:

(i) The expected portfolio return under each of the three options. (3 marks)

(ii) The portfolio risk under each of the three options. (3 marks)

(iii) Comment on your answer in (c) (i) and (c) (ii) above based on the borrowing option. (1 mark)

- (d) The table below shows the portfolio return and the benchmark return for a bond portfolio over a six-year period.

| Period | Portfolio return (%) | Benchmark return (%) |
|--------|----------------------|----------------------|
| 2011 | 14.10 | 13.70 |
| 2012 | 8.20 | 8.00 |
| 2013 | 7.80 | 8.00 |
| 2014 | 3.20 | 3.50 |
| 2015 | 2.60 | 2.40 |
| 2016 | 3.30 | 3.00 |

Required:

Portfolio tracking risk.

(4 marks)

(Total: 20 marks)

QUESTION TWO

(a) Explain five steps of the risk management process. (5 marks)

(b) The estimated rate of return of six securities and their respective Beta coefficients are as shown below:

| Security | Estimated rate of return (%) | Beta Coefficients |
|----------|------------------------------|-------------------|
| A | 15 | 1.15 |
| B | 17 | 1.19 |
| C | 23 | 1.22 |
| D | 30 | 1.75 |
| E | 20 | 1.14 |
| F | 18 | 1.13 |
| G | 25 | 1.21 |

Additional information:

- The risk-free rate of return is 9%.
- The expected market rate of return is 21%.

Required:

(i) Using capital asset pricing model (CAPM), identify the securities that are correctly valued, overvalued or undervalued. (8 marks)

(ii) Illustrate, using a well labelled diagram, the results obtained in (b) (i) above. (2 marks)

(c) Modern portfolio theory (MPT) might not be directly applicable to “real world” portfolios since some of the underlying assumptions of MPT do not hold.

Required:

Discuss the impact of the following on the capital market line (CML):

(i) Taxes. (2 marks)

(ii) Different borrowing and lending rates. (3 marks)

(Total: 20 marks)

QUESTION THREE

(a) In relation to behavioural finance, explain five emotional biases that could affect financial decisions. (5 marks)

(b) Evaluate two factors that could affect portfolio diversification. (4 marks)

(c) The rates of return on company X's security and the market portfolios for 10 periods are given below:

| Period | Return on company X's security (%) | Return on market portfolio (%) |
|--------|------------------------------------|--------------------------------|
| 1 | 20 | 22 |
| 2 | 22 | 20 |
| 3 | 25 | 18 |
| 4 | 21 | 16 |
| 5 | 18 | 20 |
| 6 | -5 | 8 |
| 7 | 17 | -6 |
| 8 | 19 | 5 |
| 9 | -7 | 6 |
| 10 | 20 | 11 |

Required:

The security characteristic line (SCL) for company X's security. (8 marks)

(d) Melissa Onyango, a financial advisor interviewed a client so as to prepare a written investment policy statement (IPS). After the interview, Onyango established the following:

- The client's earnings have exceeded pre-tax income of Sh.12 million each year for the past five years.
- The client has no dependants.
- The client's subsistence needs are approximately Sh.4.5 million per year.
- The client feels uncomfortable with the lack of security markets knowledge.

5. All of the client's current savings are invested in money market securities guaranteed by an agency of her national government.
6. The client's response to a standard risk assessment questionnaire suggests that she has low risk tolerance.

Required:

Assess the client's ability to bear risk and willingness to take risk.

(3 marks)

(Total: 20 marks)

QUESTION FOUR

- (a) A medical foundation (MF) based in a developed country was established to provide grants in perpetuity. The foundation is expecting to receive Sh.450 million cash gift three months from now. The gift will greatly increase the size of the foundation's endowment from its current Sh.100 million. The foundation's grant making policy has been to pay out virtually all of its annual net investment income. Since its investment approach has been conservative, the endowment portfolio now consists of entirely fixed income securities. The foundation's annual grants must be at least equal to 5% of its assets' market value to maintain MF's tax exempt status, a requirement that is expected to continue indefinitely. The foundation expects to have no additional gifts or fundraising activities in the foreseeable future.

Given the changes in circumstances that the cash gift will make, the finance committee wishes to develop new grant making and investment policies. Annual spending must at least meet the 5% of the market value requirements, but the committee is unsure of how much higher spending can or should be. The committee intends to pay out as much as possible, however, it understands that preserving the real value of the foundation's assets is equally important in order to preserve its future grant making capabilities.

You have been tasked to assist the committee in developing appropriate policies:

Required:

Formulate and justify an investment policy statement for the foundation.

(12 marks)

- (b) Johnson Mwau is an investment consultant. One of the portfolios he consults for is ABC portfolio which is managed for a pension fund with a high risk aversion of 0.15. The portfolio manager for the ABC fund anticipates that the portfolio will generate a quarterly residual return of 0.5% with a residual risk of 1%.

XYZ is also a fund for which Mwau consults for and which is an actively managed, large capitalised portfolio. Mwau decides to use a market timing strategy. The portfolio manager for XYZ makes weekly bets on the direction of the large capitalised market. The portfolio manager is right 53% of the time. During a recent meeting, the manager said that he could increase his coverage by including small capitalised stocks but he was expecting to be correct only 52% of the time for the small capitalised sector. He would make the same number of bets in the small capitalised sector as the large capitalised sector. The manager states that the information sources for the large capitalised bets and small capitalised bets are uncorrelated.

Required:

- (i) The annualised value added for portfolio ABC based on the portfolio manager's estimates of residual risk and residual return. (2 marks)
- (ii) The optimal level of annualised residual risk for portfolio ABC. (3 marks)
- (iii) The combined information ratio if the portfolio manager for XYZ includes small capitalised stocks along with large capitalised stocks in his strategy. (3 marks)

(Total: 20 marks)

QUESTION FIVE

- (a) Sospeter Muhongo is the Chief Finance Officer (CFO) of Next Tech Limited (NTL), a computer manufacturing company that develops computer software. NTL operates a defined benefit (DB) pension scheme that is open to new participants. The DB scheme is entirely funded by NTL staff retirement contributions.

The company's risk committee has requested Muhongo to assess how NTL's DB scheme compares to two competitor schemes; XYZ and ABC. He summarises selected financial data in Exhibit 1 and the scheme characteristics in Exhibit 2 for each of the three firms:

Exhibit 1
Selected financial data
For the year ended 31 December 2016

| | NTL | XYZ | ABC |
|---|------|------|------|
| Sales (Sh."million") | 500 | 300 | 800 |
| Net income (Sh."million") | 135 | 90 | 120 |
| Projected benefit obligation (Sh."million") | 520 | 409 | 201 |
| Debt-to-equity ratio | 1.30 | 1.10 | 1.40 |

Exhibit 2
Defined Benefit (DB) plan characteristics

| | NTL | XYZ | ABC |
|---|------------|------------|------------|
| Provision allowing lump-sum distributions | Yes | No | No |
| Provision allowing early retirement | No | No | Yes |
| Proportion of active lives (%) | 62 | 57 | -69 |
| Plan funded status | Surplus | Deficit | Surplus |

Required:

Citing one reason, determine the company's pension scheme with the lowest risk tolerance under the following categories:

- (i) Sponsor financial status. (3 marks)
 - (ii) Workforce characteristics. (3 marks)
- (b) Doreen Nyamai, a financial analyst at Truepack Capital employs the Grinold - Kroner model in forecasting long-term developed market equity returns. Doreen makes the following forecasts:
1. A 3.5% dividend yield on Kenyan equities, based on Nairobi Securities Exchange composite index.
 2. A repurchase yield of 1.5% for Kenyan equities.
 3. A long-term inflation rate of 4% per annum.
 4. Long-term corporate real earnings growth at 6% per annum, based on a 1.5% premium for corporate growth over her expected Kenyan gross domestic product (GDP) growth rate of 3%.
 5. An expansion rate for price-to-earnings (P/E) multiple of 0.25% per year.

Required:

Determine the expected rate of return on Kenyan equities using Grinold-Kroner model. (3 marks)

- (c) Jonathan Rotich, a financial analyst has been presented with the following information relating to a portfolio of three companies' shares trading at the securities exchange.

| Company's share | Opening price | Closing price |
|------------------------|----------------------|----------------------|
| | Sh. | Sh. |
| A | 12 | 15 |
| B | 52 | 48 |
| C | 38 | 45 |

Required:

Based on holding period return (HPR), compute the following:

- (i) Arithmetic mean. (2 marks)
 - (ii) Geometric mean. (2 marks)
 - (iii) The value of the new index using the results obtained in (c) (i) and (c) (ii) above. Assume an initial index value of 131. (2 marks)
- (d) The Metro Fund is a portfolio consisting of 42% fixed-income investments and 58% equity investments. The manager of Metro Fund recently estimated that the annual value at risk (VaR) as 5% assuming a 250-day trading year. The portfolio is worth Sh.1,367,000 based on the portfolio's market value of Sh.12,428,000. The correlation between shares and bonds is zero.

Required:

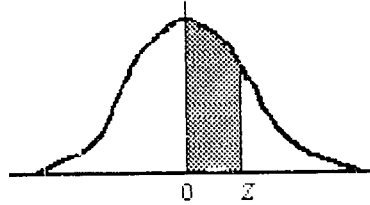
The daily expected loss in bond position that will be exceeded 5% of the time assuming the annual loss in the equity position is only expected to exceed Sh.1,153,000. (5 marks)

(Total: 20 marks)

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NORMAL CURVE

AREAS
under the
STANDARD
NORMAL CURVE
from 0 to z



| z | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0160 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .0675 | .0714 | .0754 |
| 0.2 | .0793 | .0832 | .0871 | .0910 | .0948 | .0987 | .1026 | .1064 | .1103 | .1141 |
| 0.3 | .1179 | .1217 | .1255 | .1293 | .1331 | .1368 | .1406 | .1443 | .1480 | .1517 |
| 0.4 | .1554 | .1591 | .1628 | .1664 | .1700 | .1736 | .1772 | .1808 | .1844 | .1879 |
| 0.5 | .1915 | .1950 | .1985 | .201 | .2051 | .2088 | .2123 | .2157 | .2190 | .2224 |
| 0.6 | .2258 | .2291 | .2324 | .2357 | .2389 | .2422 | .2454 | .2486 | .2518 | .2549 |
| 0.7 | .2580 | .2612 | .2642 | .2673 | .2704 | .2734 | .2764 | .2794 | .2823 | .2852 |
| 0.8 | .2881 | .2910 | .2939 | .2967 | .2996 | .3023 | .3051 | .3078 | .3106 | .3133 |
| 0.9 | .3159 | .3186 | .3212 | .3238 | .3264 | .3289 | .3315 | .3340 | .3365 | .3389 |
| 1.0 | .3413 | .3438 | .3461 | .3485 | .3508 | .3531 | .3554 | .3577 | .3599 | .3621 |
| 1.1 | .3643 | .3665 | .3686 | .3708 | .3729 | .3749 | .3770 | .3790 | .3810 | .3830 |
| 1.2 | .3849 | .3869 | .3888 | .3907 | .3925 | .3944 | .3962 | .3980 | .3997 | .4015 |
| 1.3 | .4032 | .4049 | .4066 | .4082 | .4099 | .4115 | .4131 | .4147 | .4162 | .4177 |
| 1.4 | .4192 | .4207 | .4222 | .4236 | .4251 | .4265 | .4279 | .4292 | .4306 | .4319 |
| 1.5 | .4332 | .4345 | .4357 | .4370 | .4382 | .4394 | .4406 | .4418 | .4429 | .4441 |
| 1.6 | .4452 | .4463 | .4474 | .4484 | .4495 | .4505 | .4515 | .4525 | .4535 | .4545 |
| 1.7 | .4554 | .4564 | .4573 | .4582 | .4591 | .4599 | .4608 | .4616 | .4625 | .4633 |
| 1.8 | .4641 | .4649 | .4656 | .4664 | .4671 | .4678 | .4686 | .4693 | .4699 | .4706 |
| 1.9 | .4713 | .4719 | .4726 | .4732 | .4738 | .4744 | .4750 | .4756 | .4761 | .4767 |
| 2.0 | .4772 | .4778 | .4783 | .4788 | .4793 | .4798 | .4803 | .4808 | .4812 | .4817 |
| 2.1 | .4821 | .4826 | .4830 | .4834 | .4838 | .4842 | .4846 | .4850 | .4854 | .4857 |
| 2.2 | .4861 | .4864 | .4868 | .4871 | .4875 | .4878 | .4881 | .4884 | .4887 | .4890 |
| 2.3 | .4893 | .4896 | .4898 | .4901 | .4904 | .4906 | .4909 | .4911 | .4913 | .4916 |
| 2.4 | .4918 | .4920 | .4922 | .4925 | .4927 | .4929 | .4931 | .4932 | .4934 | .4936 |
| 2.5 | .4938 | .4940 | .4941 | .4943 | .4945 | .4946 | .4948 | .4949 | .4951 | .4952 |
| 2.6 | .4953 | .4955 | .4956 | .4957 | .4959 | .4960 | .4961 | .4962 | .4963 | .4964 |
| 2.7 | .4965 | .4966 | .4967 | .4968 | .4969 | .4970 | .4971 | .4972 | .4973 | .4974 |
| 2.8 | .4974 | .4975 | .4976 | .4977 | .4977 | .4978 | .4979 | .4979 | .4980 | .4981 |
| 2.9 | .4981 | .4982 | .4982 | .4983 | .4984 | .4984 | .4985 | .4985 | .4986 | .4986 |
| 3.0 | .4987 | .4987 | .4987 | .4988 | .4988 | .4989 | .4989 | .4989 | .4990 | .4990 |
| 3.1 | .4990 | .4991 | .4991 | .4991 | .4992 | .4992 | .4992 | .4992 | .4993 | .4993 |
| 3.2 | .4993 | .4993 | .4994 | .4994 | .4994 | .4994 | .4994 | .4995 | .4995 | .4995 |
| 3.3 | .4995 | .4995 | .4995 | .4996 | .4996 | .4996 | .4996 | .4996 | .4996 | .4997 |
| 3.4 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4997 | .4998 |
| 3.5 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 | .4998 |
| 3.6 | .4998 | .4998 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 |
| 3.7 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 |
| 3.8 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 | .4999 |
| 3.9 | .5000 | .5000 | .5000 | .5000 | .5000 | .5000 | .5000 | .5000 | .5000 | .5000 |