

# KASNEB

## CIFA PART III SECTION 6

### ADVANCED PORTFOLIO MANAGEMENT

THURSDAY: 25 May 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) In relation to options trading, describe the following risk management strategies:

- (i) Bull spread. (1 mark)
- (ii) Bear spread. (1 mark)
- (iii) Butterfly spread. (1 mark)

(b) Kefa Omanga is a portfolio manager for Hisa domestic equity portfolio. Kefa intends to compare the return performance of the following portfolio rebalancing strategies:

1. A constant-mix strategy allocated 90% to domestic equities and 10% to risk-free securities.
2. A constant-proportion portfolio insurance (CPPI) strategy with a floor value of 10% of the current market value of the domestic equity portfolio.

Hisa's forecast for the domestic equity market is for flat returns in the long term with periods of significant market volatility.

**Required:**

Compare the expected performance of the constant-mix and CPPI strategies assuming Hisa's forecast proves correct. (4 marks)

(c) Cecilia Ogalo and Alberto Magala are discussing how to evaluate a hedge fund manager. Cecilia Ogalo suggests that the hedge fund performance should be evaluated by comparing the manager's performance with the median of a universe of hedge funds with similar mandates.

**Required:**

Citing three reasons, explain why Cecilia Ogalo's suggestion for evaluating hedge fund manager performance is inappropriate. (3 marks)

(d) Jackson Omondi, an investment analyst, is currently managing a portfolio with a 65 percent allocation in stocks and 35 percent in bonds. The market value of the portfolio is Sh.200 million.

**Additional information:**

1. The stock has a beta of 1.15.
2. The modified duration of the bond is 6.75.
3. Jackson Omondi intends to increase the stock allocation to 85 percent and decrease the bond allocation to 15 percent for a period of six months.
4. Jackson Omondi also contemplates to increase the beta on the stock position from 1.15 to 1.20 and increase the modified duration of the bonds to 8.25.
5. A stock index futures contract that expires in six months is priced at Sh.157,500 and has a beta of 0.95.
6. A bond futures contract that is expected to expire in six months is priced at Sh.109,000 and has an implied modified duration of 5.25.
7. The stock futures contract has a multiplier of one.

**Required:**

(i) The number of stock futures contracts and the number of bond futures contracts that Jackson Omondi should trade in order to synthetically take the desired position in stock and bonds today. (9 marks)

(ii) Determine whether Jackson Omondi should go short or long based on your answer in (d) (i) above. (1 mark)

(Total: 20 marks)

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## QUESTION TWO

(a) Explain the following implicit costs in relation to securities trading:

- (i) Slippage costs. (2 marks)
- (ii) Market impact costs. (2 marks)
- (iii) Missed trade opportunity costs. (2 marks)

(b) Simon Murumba, a portfolio manager responsible for a global government bond has been disappointed with the low returns on the current bond portfolio consisting of government bonds relative to the benchmark, which is a diversified global bond index. He is therefore exploring general strategies to generate excess returns on the portfolio. He has already researched on two strategies (duration management strategy and investing in market outside the benchmark index).

### Required:

Explain three other strategies, excluding the two mentioned above, that Simon Murumba could use to generate excess returns on the current bond portfolio. (6 marks)

(c) Anthony Munyao is evaluating the performance of several asset management firms. A global firm states that its objective is to be a regional specialist in security selection and market allocation. The firm indicates that it seeks to outperform the MSCI Far East Index (MSCI - FEI), an index that captures large and mid-cap representation across three developed markets by:

1. Identifying substantial investment opportunities in under-valued and under-researched securities within the index's country components.
2. Overweighting/underweighting country versus the MSCI - FEI.
3. The global firm further states that it does not practice active currency management as part of its investment strategy.

The recent performance of the firm's growth equity composite is summarised below:

### Global firm growth equity composite

Country component	Country weights (%)	Rate of return in base currency (%)	Rate of return in local currency (%)	Currency contribution (%)	MSCI-FEI rate of return in local currency (%)
A	30	-4.70	-8.70	4.00	-8.00
B	45	10.40	2.40	8.00	4.00
C	25	15.60	15.60	0.00	7.50
Composite	100	7.17	2.37	4.80	1.28

### MSCI Far East Index (MSCI - FEI)

Country component	Country weights (%)	Rate of return in base currency (%)	Rate of return in local currency (%)	Currency contribution (%)
A	30	-4.00	-8.00	4.00
B	55	12.00	4.00	8.00
C	15	7.50	7.50	0.00
Composite	100	6.53	0.93	5.60

Note: The country components of the composite have average risk relative to their respective country indexes.

Anthony Munyao has evaluated the contribution of market allocation to the total return of the global firm growth equity composite. He wants to further evaluate the performance of the composite, especially with respect to the global firm's statements about security selection and active currency management.

**Required:**

- (i) Determine the performance of the global firm's growth equity composite relative to the MSCI-FEI in terms of base currency and local currency. (2 marks)
  - (ii) Evaluate whether the contribution of security selection to the total return of the global firm's growth equity composite is consistent with the global firm's stated objective regarding security selection. (3 marks)
  - (iii) Determine whether the contribution of currency movements to the total return of the global firm's growth equity composite is consistent with the global firm's statement about active currency management. (3 marks)
- (Total: 20 marks)**

**QUESTION THREE**

- (a) In the context of portfolio management, distinguish between "performance measurement" and "performance evaluation". (2 marks)
- (b) Describe the following portfolio performance measures:
  - (i) Total rate of return. (1 mark)
  - (ii) Time-weighted rate of return. (1 mark)
  - (iii) Money-weighted rate of return. (1 mark)
  - (iv) Linked internal rate of return (LIRR). (1 mark)
- (c) Joseph Mvurya is a portfolio manager for a global hedge fund which focuses on precious metals, fixed income securities and derivatives. He has a strategy of rolling forward a long position in short dated platinum futures traded on New York Merchantile Exchange (NYMEX). Joseph's expectations are as follows:
  - 1. Electricity supply disruptions in South Africa, the world's dominant platinum producer will cause platinum supply to fall and spot prices to rise.
  - 2. Interest rates will rise.
  - 3. The convenience yield on platinum will increase.

Joseph Mvurya observes that his expectations are not yet reflected in the platinum futures prices.

**Required:**

Assuming that Joseph Mvurya's market expectations are correct, explain the expected change on the following return components:

- (i) Spot return (price return). (2 marks)
  - (ii) Collateral return (collateral yield). (2 marks)
  - (iii) Roll return (roll yield). (2 marks)
- (d) Wananchi Bank has been tasked to finance the construction of a local hospital expansion. The cash flow requirements for the hospital expansion are Sh.20 million in 6 months and an additional Sh.40 million in one year. Wananchi Bank is offering to lend at a floating rate of 90-day Treasury bill plus 50 basis points reset after every six months with a maximum allowable increase of 300 basis points over the initial lending rate for the life of the loan. The entire principal of the Sh.60 million loan is to be repaid at the end of 5 years from today.

Wananchi Bank reviews its interest rate forecasts and decides to fund the hospital loan by issuing a 5-year fixed rate certificate of deposit (CD) when the cash flows will be required. The CD cannot be withdrawn prior to maturity. After six months, Wananchi Bank issues a 5-year fixed rate CD for Sh.20 million to fund the first drawdown. Later, after another six months, Wananchi Bank issues a 5-year fixed rate CD for Sh.40 million to fund the second drawdown. After the second issue, the market value of the assets related to the hospital transactions is Sh.60 million. There is an economic surplus of Sh.4 million related to the hospital transactions.

Immediately after the second drawdown, the assets and liabilities of Wananchi Bank related to the hospital transactions have the following characteristics:

	Assets (loans)	Liabilities (CD)
Modified duration	0.50	4.00
Weighted average maturity (years)	4.00	4.83

**Required:**

- (i) The present value of the liabilities funding the hospital loan immediately after the second drawdown. (3 marks)
- (ii) The change in economic surplus assuming that interest rates increase by 50 basis points for both assets and liabilities. (5 marks)
- (Total: 20 marks)**

**QUESTION FOUR**

- (a) A portfolio manager responsible for monitoring a client's portfolio has been tasked to monitor the market and economic changes.

**Required:**

Discuss three areas of market and economic changes that the portfolio manager should monitor in his assignment. (3 marks)

- (b) Silvia Chessetto, an investment analyst, is advising an endowment fund on adding non-domestic assets to its portfolio. The asset allocation of the fund is 60% domestic equities and 40% domestic fixed income. The current portfolio has an expected return of 6.25% with a standard deviation of 9.5%. Silvia is evaluating two new asset classes that might provide a mean-variance improvement for the endowment fund. Silvia provides the endowment trustees with the data shown below:

Asset class	Asset class expectations		
	Expected return (%)	Standard deviation (%)	Correlation with the current portfolio
Non-domestic developed market equity	8.0	14.0	0.70
Emerging market equity	9.0	18.0	0.50

The risk-free rate is 2.0%.

The correlations provided above reflect normal market conditions.

Silvia believes that the use of conditional return correlations is valuable in stress testing.

**Required:**

- (i) Determine if adding non-domestic developed market equity would provide a mean-variance improvement for the current portfolio. (2 marks)
- (ii) Citing two reasons, justify Silvia's belief that the use of conditional return correlations is valuable in stress testing. (2 marks)
- (c) Patrick Mezo is reviewing the performance of the global equity managers of a local university endowment fund. AIK Capital is currently the endowment fund's large capitalisation global equity manager. Performance data for AIK Capital is shown below:

**AIK Capital performance data (2005–2016)**

Average annual rate of return	22.1%
Standard deviation of annual rate of return	16.8%
Beta	1.2

Patrick Mezo also presents the endowment investment committee with performance information for Exodus Asset Management which is another large capitalisation firm. Performance data for Exodus Asset Management is shown below:

**Exodus Asset Management performance data (2005-2016)**

Average annual rate of return	24.2%
Standard deviation of annual rate of return	20.2%
Beta	0.8

Performance data for the relevant risk free asset and market index are shown below:

**Relevant risk-free asset and market index performance data (2005-2016)**

Risk free asset: Average annual rate of return	5.0%
Market index: Average annual rate of return	18.9%
Standard deviation of annual rate of return	13.8%

**Required:**

Calculate the Sharpe ratio and Treynor's performance measure for both AIK Capital and Exodus Asset Management.

(4 marks)

(d) Using the information in (c) above, calculate the following components of investment performance for Exodus Asset Management:

(i) Overall performance. (1 mark)

(ii) Risk. (1 mark)

(iii) Selectivity. (1 mark)

(iv) Diversification. (1 mark)

(v) Net selectivity. (1 mark)

(e) Using the information in (c) above, explain why different rankings of AIK Capital and Exodus Asset Management could result from using:

(i) The Sharpe ratio versus the Treynor's measure. (2 marks)

(ii) Overall performance versus net selectivity. (2 marks)

**(Total: 20 marks)**

**QUESTION FIVE**

(a) Explain four reasons why a fixed income dealer might prefer to trade his bond portfolio in a secondary market.

(4 marks)

(b) A portfolio manager decided to purchase corporate bonds with a market value of Sh.5 million. To finance 60 percent of the purchase, the portfolio manager entered into a 30-day repurchase agreement (repo) with a bond dealer. The 30-day term repo rate was 4.6 percent per annum. At the end of 30 days, the bonds purchased by the portfolio manager had increased in value by 0.5 percent and the portfolio manager decided to sell the bonds. No coupons were received during the 30-day period.

**Required:**

(i) Compute the 30-day rate of return on the equity and borrowed components of the portfolio. (3 marks)

(ii) Calculate the 30-day portfolio rate of return. (2 marks)

(iii) Compute the 30-day portfolio rate of return, if the increase in value of the bonds was 0.3 percent instead of 0.5 percent. (2 marks)

(c) Mark Mutiso works for a global investment firm. His client wishes to capture excess equity returns from small capitalisation United States (US) stocks while simultaneously establishing exposure to the large capitalisation US equity market. Mark has determined that the Russell 2000 index and the standard and poor (S & P 500) index are the appropriate small capitalisation and large capitalisation benchmarks respectively. Mark proposes the following two strategies:

**Strategy one:**

- Hire an equity manager who has consistently outperformed the Russell 2000 index.
- Buy the same dollar amount of Russell 2000 futures exposure.
- Sell short the same dollar amount of S & P 500 index futures exposure.

**Strategy two:**

- Hire a market neutral (long/short) small capitalisation manager.
- Buy the same dollar amount of S & P 500 index futures exposure.

**Required:**

Explain whether each of the above strategies would achieve the client's objectives.

(4 marks)

- (d) Clement Kivuti is a portfolio manager at PM Hedge Fund (PMHF). PMHF holds a four-year Sh.120 million, 6% fixed rate bond that pays interest semi-annually. Clement expects four-year interest rates to rise. He intends to reduce the duration of the bond position. An analyst at PMHF suggests that Clement can reduce the modified duration of this position which is currently 3, to a more acceptable duration of 0.3 by using an interest rate swap. Clement estimates the notional principal on the swap to be as close as possible to the Sh.120 million principal of the original bond.

The analyst provides Clement with the following four possible swaps:

**Available swap position**

Swap	Type of swap	Term of the swap	Frequency of payment
1	Pay fixed, receive floating	2 years	Semi-annually
2	Pay floating, receive fixed	4 years	Quarterly
3	Pay fixed, receive floating	4 years	Quarterly
4	Pay floating, receive fixed	2 years	Semi-annually

Assume that the modified duration of the fixed-rate component of a swap is 75% of its maturity.

**Required:**

Advise Clement Kivuti on the swap that meets the stated goals.

(5 marks)

(Total: 20 marks)

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