



STRATHMORE BUSINESS SCHOOL
BACHELOR OF FINANCIAL SERVICES
END OF SEMESTER EXAMINATION
AMS 4102: ADVANCED SECURITY ANALYSIS AND INVESTMENT

DATE: Mon, 22nd July 2024

TIME: 15:30 – 17:30

Instructions

1. This examination consists of **FIVE** questions.
2. Answer **Question ONE (COMPULSORY)** and any other **TWO** questions.

QUESTION ONE

(20 MARKS)

A public pension fund has employed three investment managers, each of whom is responsible for investing in one-third of all asset classes so that the pension fund has a well-diversified portfolio. Information about the managers is given below.

Manager	Average Return	$\hat{\sigma}$	$\hat{\beta}$
X	10%	20%	1.1
Y	11	10	0.7
Z	12	25	0.6
Market (M)	9	19	
Risk-free rate (R_f)	3		

- a) Calculate based on using the average market return and the CAPM calculate for each manager.
 - i) the expected return. **(3 marks)**
 - ii) Sharpe ratio. **(3 marks)**
 - iii) Treynor's ratio. **(3 marks)**
 - iv) M² alpha. **(3 marks)**
 - v) Jensen's alpha. **(3 marks)**
- b) Analyze and critically discuss your results and plot the returns and betas of these portfolios. **(5 marks)**

QUESTION TWO**(20 MARKS)**

Saylor Co. has a retirement benefit plan for its employees. The management is contemplating whether to offer employees over the age of 50 years a one-time lump-sum early retirement option that will be payable next year. Ten percent of Saylor's employees accept this option. Currently, the pension scheme has the following features:

1. The average age of the workforce is 35 years, and
2. There are no current pension recipients.

a) Discuss how the acceptance of the early retirement option changed each of the following:

- i) Liquidity requirement
- ii) Duration of Plan liabilities. **(6 marks)**

b) Discuss **Three** investment strategies/approaches to equity investment portfolio management. **(6 marks)**

c) An investor wants to create a new portfolio C by combining the following existing to portfolio X and Y.

It is proposed 80% to be invested in Portfolio X and 20% in Portfolio Y.

	Portfolio X	Portfolio Y
Expected return (%)	9.93	18.20
Risk, standard deviation (%)	16.21	33.11

If return correlation between the existing portfolio is +0.5, what will be the new Portfolio C's.

- i) Expected return. **(3 marks)**
- ii) Risk. **(5 marks)**

QUESTION THREE**(20 MARKS)**

a) On 1 January 2023, the Walbright Fund had a market value of Kes 100 million.

During the period 1 January 2023 to 30 April 2023, the stocks in the fund showed a capital gain of Kes 10 million.

On 1 May 2023, the stocks in the fund paid a total dividend of Kes 2 million. All dividends were reinvested in additional shares.

Because the fund's performance had been exceptional, institutions invested an additional Kes 20 million in Walbright on 1 May 2023.

On 31 December 2023, Walbright received total dividends of Kes 2.64 million. The fund's market value on 31 December 2023, not including the Kes 2.64 million in dividends, was Kes 140 million.

The fund made no other interim cash payments during 2014. Based on the information given, address the following.

- i) Compute the Walbright Fund's time-weighted rate of return, annualized. **(6 marks)**
- ii) Compute the Walbright Fund's money-weighted rate of return (*hint r is between 5% and 10%*), annualized. **(7 marks)**
- iii) Interpret the differences between the time-weighted and money-weighted rates of return. **(4 marks)**

b) Clearly explain the Markowitz Efficient frontier. **(3 marks)**

QUESTION FOUR

KCB Bank is a US-based commercial bank that began operations in 1896. In order to attract skilled labor, KCB Bank offers employees attractive benefits which include a defined benefit pension plan and annual wage increases above the rate of inflation. An asset only (AO) approach to strategic asset allocation is currently used for the investment management of the pension plan. Omondi is a consultant to the board of trustees of KCB Bank's pension plan. The board asks Omondi to recommend a strategic asset allocation for the pension plan given the following investment policy objectives:

Return requirement: Earn an average annual return of 8.7 percent plus management and administration fees of 0.7 percent.

Risk objective: A maximum standard deviation of portfolio returns of 10.0 percent.

For the strategic asset allocation analysis, Omondi has generated the corner portfolios shown in Exhibit 1. The KCB Bank pension plan investment policy statement (IPS) prohibits short positions and the use of leverage. The IPS allows investment in any single portfolio or combination of portfolios described in Exhibit 1.

Exhibit 1
Corner Portfolios
(Risk-free Rate = 4.5%)

Corner Portfolio Number	Expected Return (%)	Expected Standard Deviation (%)	Sharpe Ratio	Asset Classes (Portfolio Weights, %)				
				U.S. Equities	Non-U.S. Equities	Intermediate-term U.S. Bonds	Non-U.S. Bonds	U.S. Real Estate
1	10.8	16.1	0.39	100.0	0.0	0.0	0.0	0.0
2	10.4	14.2	0.42	82.4	0.0	0.0	0.0	17.6
3	10.3	12.7	0.46	74.1	4.0	0.0	0.0	21.9
4	9.1	9.1	0.51	33.7	12.0	36.7	0.0	17.6
5	8.0	7.4	0.47	25.0	11.8	45.3	3.4	14.5
6	6.9	5.2	0.46	0.0	13.7	53.0	27.1	6.2
7	6.6	4.8	0.44	0.0	11.2	53.0	31.5	4.3

- a) Using traditional mean-variance analysis:
- i) **Select** the *most* appropriate portfolio or combination of portfolios for the strategic asset allocation of the KCB Bank pension plan. **Justify** your response with **two** reasons other than meeting KCB Bank's return requirement. **(5 marks)**
 - ii) **Determine** the weight of total equities (U.S. and non-U.S. combined) in the *most* appropriate strategic asset allocation. **(7 marks)**
- b) Omondi proposes that the IPS be changed to allow borrowing or lending at the risk-free rate, currently 4.5 percent. He suggests that this change would enable KCB Bank's pension plan to minimize its expected standard deviation of return while achieving the plan's required return. Determine the most appropriate strategic asset allocation for the KCB Bank pension plan based on Omondi's proposal and the optimal asset allocation for the overall portfolio. **(8 marks)**

QUESTION FIVE

- a) An investment adviser is counseling Aimée Goddard, a client who recently inherited Shs1,200,000 and who has above-average risk tolerance ($\lambda = 2$). Because Goddard is young and one of her goals is to fund a comfortable retirement, she wants to earn returns that will outpace inflation in the long term. Goddard expects to liquidate Shs60,000 of the inherited portfolio in 12 months to fund the down payment on a house. She states that it is important for her to be able to take out the Shs60,000 without invading the initial capital of Shs1,200,000. The exhibit below shows three alternative strategic asset allocations.

Investor's Forecasts

Asset Allocation	Expected Return	Standard Deviation of Return
A	10%	20%
B	7%	10%
C	5.25%	5%

Required:

- i) Based only on Goddard's risk-adjusted expected returns for the asset allocations, which asset allocation would she prefer? (You need to determine the utility received from each asset allocation). **(8 marks)**
- ii) Recommend and justify a strategic asset allocation for Goddard. **(6 marks)**
- b) Discuss the **Two** objectives and any other **Three** key components of an Investment Policy Statement (IPS). **(10 marks)**
- c) Differentiate between:
- i) Capital allocation line (CAL)
 - ii) Capital Market Line (CML)
 - iii) Security Market line (SML). **(6 marks)**