



STRATHMORE INSTITUTE OF MATHEMATICAL SCIENCES
BBS ACTUARIAL SCIENCE; FINANCIAL ECONOMICS; FINANCIAL ENGINEERING
SPECIAL EXAMINATION
BSF 4230 ADVANCED PORTFOLIO MANAGEMENT

DATE: 1st April 2025

Time: 2 Hours

Instructions

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

QUESTION ONE [30 marks]

- a) Discuss the capital markets effects of late expansion phase of business cycle (10 marks)
- b) Your preliminary analysis has established the historical risk premiums associated with three risk factors that could potentially be included in your calculations: excess return on a proxy for the market portfolio (MKT) and two variables capturing general macroeconomic exposures (MACRO1) and (MACRO2). These values are $\lambda_{MKT} = 7.5\%$, $\lambda_{MACRO1} = -0.3\%$, and $\lambda_{MACRO2} = 0.6\%$.

You have also estimated the following factor betas (loadings) for all the three stocks with respect to each of these potential risk factors”

Stock	FACTOR LOADING		
	MKT	MACRO1	MACRO2
X	1.24	-0.42	0.00
Y	0.91	0.54	0.23
Z	1.03	-0.09	0.000

Required

- a) Calculate the expected returns for the three stocks using just the MKT risk factor. Assume a risk-free rate of 4.5% (6 marks)
- b) Calculate the expected returns for the three stocks using the three risk factors and the same 4.5% risk free rate. (9 marks)
- c) Discuss the difference between the expected return estimates from the single factor model and those from the multifactor model. Which estimates are most likely to be more useful in practice? (5 marks)

QUESTION TWO [20 marks]

An investment fund allocated assets in two countries across different sectors with the outcomes shown below.

	Portfolio Weight	Benchmark Weight	Portfolio Return	Benchmark Return
Kenya				
Agriculture	10%	25%	5.00%	4.00%
Banking	30%	20%	3.00%	-1.00%
Uganda				
Energy	20%	30%	6.00%	8.00%
Mining	40%	25%	4.00%	3.00%

Required

- Performance attribution at the country level using Brinson–Fachler model (Calculation and explanations required). (6 marks)
- Performance attribution at the sector level using Brinson–Fachler model (Calculation and explanations required). (10 marks)
- What is the interesting observation between your findings in (a) and (b) above. (4 marks)

QUESTION THREE [20 marks]

A pension fund has a single liability of Sh. 1 million due in 4 years. The investment manager has constructed the following portfolio to immunize the liability.

Bond	X	Y
Tenor – Years	3	5
Coupon rate	6%	9%
YTM	5%	10%
Par Value Invested (Sh.)	120,000	600,000

Required

- The Macaulay duration of the portfolio. Does the portfolio immunise the liability as stated by the manager? (14 marks)
- Demonstrate (calculations required) the effectiveness of the hedge if the yield curve shifted upwards by 2% immediately after constructing the portfolio. (6 marks)

QUESTION FOUR [20 marks]

An investor is in the process of projecting stock market returns in Kenya based on the following assumptions:

- Stock volatility – 35%
- Stock correlation with global market – 0.6
- Segmented market Sharpe ratio – 0.25
- Global market Sharpe ratio – 0.20
- Risk free rate – 10%
- Degree of market integration – 0.55

Required

- (i) Estimate the expected return for the stock using Singer and Terhaar Model (15 marks)
- (ii) How can the investor use shrinkage estimation to validate the expected returns? (5 marks)

QUESTION FIVE [20 marks]

- a) Discuss any two approaches to immunizing a portfolio of multiple liabilities (8 marks)
- b) Discuss any three passive investment strategies for equities citing relevant examples (12 marks)